

FINAL

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# 2023 Water Supply Facilities Work Plan Update

City of Cape Coral Utilities Department

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## Quality information

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# 1. Introduction

The purpose of the City of Cape Coral (City) Water Supply Facilities Work Plan (Work Plan) is to complete the following objectives:

- Evaluate projected City population and projected water demands for a planning period of at least ten years.
- Identify and plan for the water supply sources and facilities needed to serve existing and new development within the City's jurisdiction.

The South Florida Water Management District (SFWMD) approved the 2022 Lower West Coast (LWC) Water Supply Plan Update in December 2022. Chapter 163, Part II, Florida Statutes (F.S.), requires local governments to prepare and adopt Work Plans into their Comprehensive Plans within 18 months after the SFWMD approves the regional water supply plan or its update. Therefore, the deadline for local governments within the Lower West Coast Region to update their comprehensive plans with the Work Plan is June 2024.

## 1.1 Statutory History

The Florida Legislature enacted bills during the 2002, 2004, 2005, 2011, 2012, 2015, and 2016 sessions to address the state's water supply needs. These bills, particularly Senate Bills 360 and 444 enacted during the 2005 legislative session, strengthened the statutory links between the regional water supply plans (RWSPs) prepared by water management districts and the Comprehensive Plans prepared by local governments through changes to Chapters 163 and 373, F.S. These changes improved coordination between local land use planning and regional water supply planning.

## 1.2 Statutory Requirements

The City has considered the following statutory provisions when updating the City Work Plan, as summarized below:

1. Coordinate appropriate aspects of the Comprehensive Plan with the applicable RWSP [Section 163.3177(4)(a), F.S.].
2. Ensure the Future Land Use Plan is based on availability of adequate water supplies, public facilities, and services [Section 163.3177(6)(a), F.S.]. Data and analyses demonstrating that adequate water supplies and associated public facilities will be available to meet projected growth demands must accompany all proposed Future Land Use Plan and Plan amendments submitted for review.
3. In consultation with the water supplier, ensure adequate water supplies and potable water 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 [Section 163.3180(2), F.S.].
4. For local governments subject to an RWSP, revise the General Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Groundwater Aquifer Recharge element (the "Infrastructure element") through a Comprehensive Plan amendment to:

- a. Identify and incorporate the alternative water supply project(s) selected by the local government from projects identified in the applicable RWSP, or alternative project(s) proposed by the local government under Section 373.709(8)(b), F.S. [Section 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 applicable RWSP [Section 163.3177(6)(c)3., 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 [Sections 163.3177(6)(c)3. and (5), 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 5-year period [Section 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 applicable RWSP and water use permit(s) [Section 163.3177(6)(d), F.S.]. The comprehensive plan must address the water supply sources necessary to meet the existing and projected water use demand for the established planning period, considering the applicable RWSP [Section 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 consistency between the Comprehensive Plan and the applicable RWSP [Section 163.3177(6)(h)1., F.S.].
8. Local governments are required to comprehensively evaluate and update the Comprehensive Plan to reflect changes in local conditions every seven years. The evaluation could address the local government's 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 [Section 163.3191(3), F.S.].
9. Local governments may be exempt from updating their Work Plan if they meet certain criteria. A local government that does not own, operate, or maintain its own water supply facilities and is served by a public water supply entity with a permitted allocation of 300 million gallons per day (mgd) or greater is not required to amend its Comprehensive Plan when an RWSP is updated if the local government uses less than 1 percent of the public water supply entity's total permitted allocation. However, the local government must cooperate with the public water supply entity that provides service within its jurisdiction and must keep the Sanitary Sewer, Solid Waste, Drainage, Potable Water, and Natural Groundwater Aquifer Recharge element up to date, pursuant to Section 163.3191, F.S. A local government should contact the Florida Department of Economic Opportunity (DEO) to verify its qualifications for the exemption [Section 163.3177(6)(c)4., F.S.].
10. Local governments with a Sector Plan adopted in accordance with Section 163.3245, F.S., should incorporate information from the adopted Sector Plan, Master Plan, and Detailed Specific Area Plan into the Work Plan. The focus should be on water needs, water supply and resource development, conservation measures, and intergovernmental coordination activities with the SFWMD and water supply development projects needed to address projected development in the Sector Plan area [Section 163.3245, F.S.].

## 2. Background

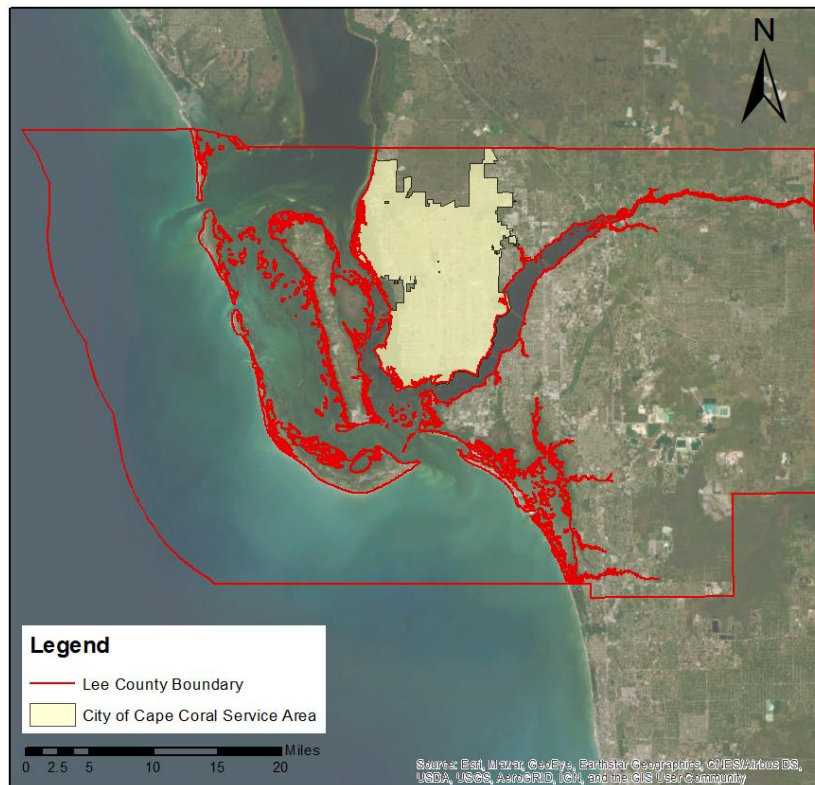
### 2.1 Local Government Overview

The City of Cape Coral is located on a peninsula in southwest Florida that borders the Caloosahatchee River Estuary to the south and east, and the Matlacha Pass to the west. The City was originally incorporated in 1970 and recently celebrated its 50<sup>th</sup> year anniversary of incorporation in 2020. The City’s boundaries are approximately 120 square miles in area and include a distinctive network of more than 400 miles of freshwater and saltwater canals, which attracts a prominent seasonal resident population. The City’s location within Lee County is provided in **Figure 2-1**.

City residents predominantly obtain their potable water from the City’s Utilities Department, which is responsible for ensuring sufficient capacity is available for existing and future customers. However, a portion of City residents still rely on self-supply wells for their potable water and irrigation quality (IQ) water needs, and another portion obtain their potable water from the Greater Pine Island Water Association (GPIWA). Since 2000, the City has been pursuing and executing a Utilities Extension Project (UEP) program to provide potable water and IQ water (as well as sanitary sewer) utility service to areas previously unserved by the City’s Utilities Department.

According to the United States Census Bureau, the City is estimated to have a year-round population of approximately 216,992 as of July 2022. This estimate accounts for data obtained through the recent 2020 Census. Under build-out (BO) conditions, the City population is estimated to reach 366,393. The City has accordingly reached approximately 59% of its BO capacity as of 2022. The UEP program provides a unique challenge to the City as the majority of the future population growth is anticipated to occur in the UEP expansion areas. City facilities will need to continue to accommodate sizable growth in population until BO conditions have been reached.

**Figure 2-1: City of Cape Coral Location within Lee County**



## 2.2 Relevant Regional Issues

The regional issues identified for 2045 in the 2022 LWC Water Supply Plan Update include the following:

1. Increased withdrawals from the surficial aquifer system (SAS) and the freshwater portions of the intermediate aquifer system (IAS) are generally limited due to potential impacts on wetlands and existing legal water uses, including domestic self-supply (DSS). Additional impacts include the potential for saltwater intrusion; and the possibility of reaching aquifer maximum developable limits (MDLs). New or increased allocations will be evaluated on an application-by-application basis to determine if a project meets water use permitting criteria.
  - a. In some areas, such as Cape Coral and Lehigh Acres, cumulative demands are negatively affecting aquifer water levels.
2. Increases in surface water allocations from Lake Okeechobee and hydraulically connected surface waters are limited by the Lake Okeechobee Service Area (LOSA) restricted allocation area (RAA) criteria. Water availability from Lake Okeechobee is discussed comprehensively in the Lower East Coast Water Supply Plan.
3. Peak freshwater discharges of surface water during the wet season are affecting the health of the Caloosahatchee River Estuary. Additional storage is required in the basin and in the regional system to attenuate damaging peak flow events.
4. During dry conditions, surface water availability and current storage capacity sometimes are insufficient to meet water demands and environmental needs for the C-43 Canal and Caloosahatchee River Estuary.
5. Withdrawals from the Floridan Aquifer System (FAS) are expected to increase to meet future demands. Monitoring water levels and water quality in the FAS will be needed to ensure long-term sustainability of the resource.
6. Climate change and sea level rise could impact the availability of freshwater resources in the LWC Planning Area.

With regard to the City of Cape Coral specifically, raw water for the City's reverse osmosis (RO) water treatment plants (WTPs) is sourced from the Upper Floridan Aquifer, which is not directly affected by most of the regional issues identified above. However, the City has still observed local issues pertaining to its water supply. Water Science Associates (WSA) noted the following in the City's recently completed Comprehensive Utilities Master Plan Update (November 2022):

- Increased salinity levels have been observed in some production wells located in the Lower Hawthorn Aquifer underlying the City. The preferential vertical movement of water from deeper aquifers is believed to be the reason for the increase in salinity levels. Most of the production wells have only experienced a slow decline in water quality, but there have also been instances where production wells have more quickly deteriorating water quality. Because some production wells are experiencing these issues while other wells located immediately adjacent are not, it is postulated that a localized enhanced vertical permeability located beneath the wellfield production zone is causing these issues. As more utilities and municipalities in the South Florida area utilize RO technology and brackish groundwater supplies, this limitation is becoming more common in the region.
- Water level decline was observed within the Mid-Hawthorn Aquifers underlying the City, due to utilization by domestic and irrigation supply users (and previous use by City Utilities). Aquifer use limitations were

consequently placed on the Mid-Hawthorn Aquifer by the SFWMD due to this overutilization and the resulting water level decline.

Through the City's UEP program, Mid-Hawthorn Aquifer water level conditions south of Pine Island Road have begun to recover and rebound. Areas north of Pine Island Road, where the UEP program has not yet been implemented, are still exhibiting low groundwater levels. An abundance of domestic self-supply wells combined with abnormally dry seasons continue to contribute to lower groundwater levels in the northern service area. Groundwater levels in these areas may also improve as the UEP program expands to the northern sections of the City's boundaries.

The City has reduced its water demand by implementing stringent restrictions on water use and has separated its potable water and IQ water systems. The City is implementing several near-term, mid-term and long-term projects to provide IQ water availability to its customers. The City has entered into individual interlocal agreements with the Florida Governmental Utility Authority (FGUA) and the City of Fort Myers (CFM) for the purchase of excess reclaimed water from the two public utilities to supplement the City's IQ water supply. The City previously completed improvements in 2019 to increase IQ water supplies received from the FGUA. A reclaimed water transmission main across the Caloosahatchee River was also constructed and began operation in the beginning of 2024 to obtain IQ water from the CFM.

Additionally, the City obtained a water use permit (WUP) from the Southwest Florida Water Management District (SFWMD) to utilize the Southwest Aggregates Mine Reservoir as a seasonal surface water source to further supplement the City's IQ water supplied by the freshwater canal system. In 2017, the City conducted a full scale pilot test to evaluate the feasibility of utilizing the inactive mining quarry, and has since utilized the surface water source during the dry seasons from 2020 through 2023. Design and construction of a permanent pump station and pipeline is underway to replace the temporary pump station and to replace conveyance of water from the mine using the US-41 drainage swales. Improvements are anticipated to be completed in 2025.

## 3. Data Analysis

### 3.1 Population Information

The City is comprised of an expansive land area of roughly 120 square miles, much of which remains undeveloped as natural land preservations. The City has approximately 150,000 pre-platted building sites that are predominantly divided into 5,000 square foot lots (10,000 square foot/double lot standard building sites) for residential development.

It is estimated, that as of 2022, approximately 76% of the City population is served with potable water and approximately 55% is served with IQ water. Percentages are based on served population estimates referenced from the City customer account records, and total City population estimates referenced from the United States Census Bureau (population estimate for July 1, 2022). The remainder of the City population relies on domestic self-supply wells for their potable water and irrigation water needs.

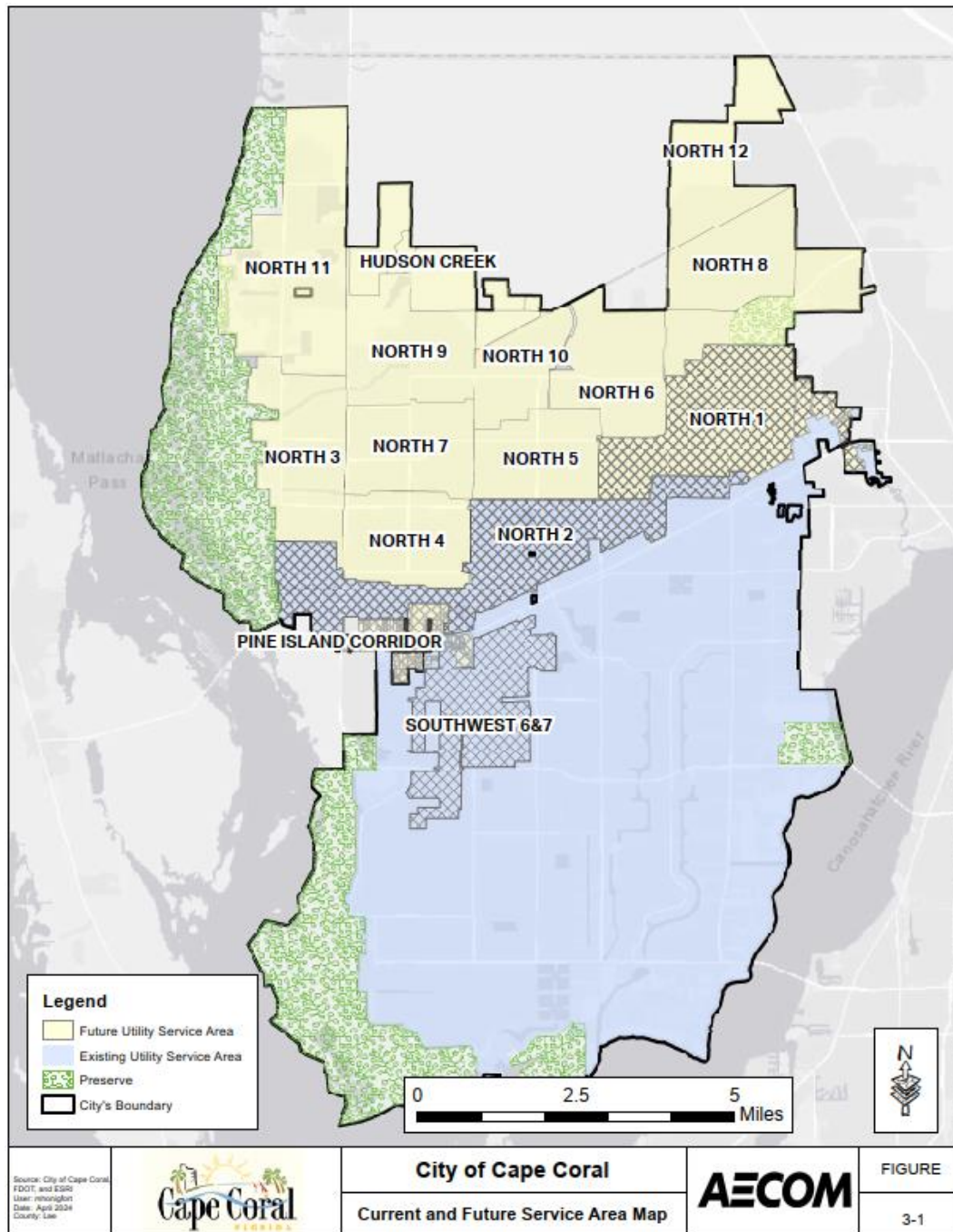
### 3.2 Current and Future Service Areas

As previously mentioned, the City is pursuing improvements to extend potable water, sanitary sewer, and IQ water utility service into unserved regions of the City's boundaries through the UEP program. The UEP program was initialized in 2000 following recommendations from the 1999 City Master Plan Update, and was later temporarily suspended before being restarted in 2012. The majority of development through the UEP program is focused on the northern

portion of the City’s boundaries, and future stages of the UEP will extend utility service to these areas. Since the restart of the program, the City has planned and executed the addition of the ‘Southwest 6 and 7’ and ‘North 2’ UEP expansion areas to the City’s utility service area, which are indicated by crosshatch and blue highlight in **Figure 3-1**. The City is currently executing design and initiating construction of the ‘North 1’ UEP expansion area (indicated by crosshatch and yellow highlight), one of many additional UEP expansion areas for northern regions of the City.

The City’s potable water and IQ water distribution networks are concentrated primarily in the southern portion of the service area, which has a higher population density. The IQ water service area is smaller than the potable water service area. The City’s goal is to extend service of both potable water and IQ water to the entirety of the City’s service area.

**Figure 3-1: Existing and Future Utility Service Area Map**



### 3.3 Level of Service Standards

#### 3.3.1 Potable Water Level of Service Standard

The City currently owns and operates two RO WTPs which produce and supply potable water to City residents: the North RO WTP and the Southwest RO WTP. Finished water produced at the WTPs is conveyed to four ground storage tanks (GSTs) for storage and re-pumping within the City’s potable water distribution system.

The City provided historical daily potable water production and distribution data for the two WTPs for the past five years for the purpose of establishing historical production trends. Additionally, historical billed potable water data for the past five years was also provided. The difference between water produced at the two WTPs and the related water billed is unaccounted for water (UFW). The UFW calculation considers water used to flush the distribution system and water lost due to leaks within the distribution system.

For the past five fiscal years (FYs) (FY 2018 – FY 2022), a portion of the water produced at the WTPs was also used to supplement the City’s IQ water system. The total water produced by the City’s WTPs (water produced for supplemental irrigation as well as water produced for the distribution system) for the past five-year period is provided in **Table 3-1**.

**Table 3-1: Recent Potable Water Distribution Trends**

Fiscal Year	Estimated Served Population <sup>1</sup>	Average Daily Total Combined Distribution <sup>2</sup>	Average Daily Potable Water Distribution	Average Daily Billed	Unaccounted for Water <sup>3</sup>	Potable Water Per-Capita Distributed	Per-Capita Billed	Maximum Daily Total Combined Distribution <sup>2</sup>	Total Combined Water Peaking Factor	Maximum Daily Potable Water Distribution	Potable Water Peaking Factor
		mgd	mgd	mgd	%	gpcd	gpcd	mgd		mgd	
2018	140,857	12.34	11.10	9.63	5.90%	78.80	68.36	17.50	1.42	13.43	1.21
2019	143,605	11.61	11.22	9.63	7.70%	78.13	67.06	16.69	1.44	12.86	1.15
2020	148,695	11.91	11.79	10.09	9.50%	79.29	67.88	17.86	1.50	16.27	1.38
2021	155,225	12.64	12.57	10.75	9.47%	80.98	69.24	17.21	1.36	15.28	1.22
2022	163,850	13.12	12.95	11.37	7.04%	79.04	69.40	20.29	1.55	17.52	1.35
Average		12.32	11.93	10.29	7.92%	79.25	68.39	17.91	1.45	15.07	1.26
Peak		13.12	12.95	11.37	9.50%	80.98	69.40	20.29	1.55	17.52	1.38

<sup>1</sup> Based on potable water customer accounts, 2.55 persons per household, and an occupancy rate of 86%.

<sup>2</sup> Total combined distribution includes water produced for supplemental irrigation.

<sup>3</sup> Unaccounted for water = 1-((Adjusted metered water for billing + Flushed/Leaked)/Finished water pumped to system).

The per-capita Level of Service Standard (LOSS) was evaluated based on historical potable water production data and served population estimates. Served population estimates were determined based on historical potable water customer accounts provided by the City, an estimated 2.55 persons per household, and an occupancy rate of 86%.

The City previously established and documented LOSSs for their utility system in the City of Cape Coral Design Procedure Manual and the infrastructure element of the Cape Coral Comprehensive Plan. These documents recommend that one potable water service connection is equivalent to 200 gallons per day of potable water demand on an annual average daily demand basis (AADD). This equates to a per-capita demand rate of approximately 91 gpcd based on demographics of 2.55 persons per household and an occupancy rate of 86%.

It should be noted that the Comprehensive Utilities Master Plan Update (November 2022) recently completed for the City recommended a per-capita demand rate of 80 gpcd (AADD). The Comprehensive Utilities Master Plan Update

performed a historical potable water production analysis for the period of 2010 through 2019 and recommended that the 80 gpcd demand rate be utilized for future treatment capacity determination purposes.

A summary of the ten-year historical per-capita potable water usage is presented in **Table 3-2**. Based on the historical demands for FY 2013 through FY 2022, per-capita demand rates (based on AADD) have fluctuated between 75 gpcd and 81 gpcd over the past ten fiscal years, and between 79 gpcd and 81 gpcd in the last three fiscal years. Additionally, the average per-capita demand rate for the past ten fiscal years was calculated to be approximately 78 gpcd. The recent stabilization of per-capita demand rates and the overall minor increase in demand rates over the past decade may be attributed to a combination of City water conservation policies, an ongoing program to replace aging pipes which reduces losses due to leaks, and the expansion of the City's IQ water distribution network as a separate system.

Based on this information, the 80 gpcd per-capita rate established by the Comprehensive Utilities Master Plan Update is still applicable and is recommended for the potable water per-capita LOSS. This includes per capita demands for all water produced (not including water for supplemental irrigation purposes), unaccounted for losses, and recorded operational losses.

**Table 3-2: Ten-Year Historical per-Capita Demand - Potable Water**

Fiscal Year	Estimated Permanent Served Population <sup>1</sup>	Annual Average Daily Demand (AADD) <sup>3</sup>		Maximum Month Daily Demand (MMDD) <sup>3</sup>		Maximum 3-Day Demand (M3DD) <sup>3</sup>		Maximum Daily Demand (MDD) <sup>3</sup>	
		Potable Water Demand	Per-Capita Demand <sup>2</sup>	Potable Water Demand	Per-Capita Demand <sup>2</sup>	Potable Water Demand	Per-Capita Demand <sup>2</sup>	Potable Water Demand	Per-Capita Demand <sup>2</sup>
		mgd	gpcd	mgd	gpcd	mgd	gpcd	mgd	gpcd
2013	123,748	9.38	76	10.37	84	11.31	91	11.85	96
2014	125,005	9.63	77	10.15	81	10.64	85	11.07	89
2015	127,111	9.81	77	10.61	83	11.93	94	12.20	96
2016	133,628	10.05	75	10.92	82	11.38	85	11.58	87
2017	137,256	10.88	79	12.09	88	13.12	96	13.31	97
2018	140,857	11.10	79	12.68	90	13.24	94	13.43	95
2019	143,605	11.22	78	11.98	83	12.58	88	12.86	90
2020	148,695	11.79	79	12.91	87	14.88	100	16.27	109
2021	155,225	12.57	81	14.11	91	14.86	96	15.28	98
2022	163,850	12.95	79	14.81	90	16.33	100	17.52	107
Average		10.94	78	12.06	86	13.03	93	13.54	96
Peak		12.95	81	14.81	91	16.33	100	17.52	109

<sup>1</sup> Based on potable water customer accounts, 2.55 persons per household, and an occupancy rate of 86%.

<sup>2</sup> Calculated by dividing potable water demands by estimated permanent served population.

<sup>3</sup> Based on finished water sent to potable water distribution system.

Potable water peak demands are used to identify reliable system capacity requirements. **Table 3-2** shows the historical AADDs, maximum month daily demands (MMDDs), maximum 3-day demands (M3DDs) and maximum daily demands (MDDs). The Ten States Standards recommend that reliable water treatment capacity be based on MDDs.

**Table 3-3** presents the historical total water production, including water produced to supplement the IQ water system, for the FY 2013 – FY 2022 time period. The total water production per-capita demand rate (AADD) peaked in FY 2017 at 94 gpcd due to severe drought conditions, and reached a minimum in FY 2016 at 75 gpcd. Starting in FY 2019, the per-capita demand rates have remained steady between 80 gpcd and 81 gpcd. MDD per-capita demand rates peaked in FY 2015 at 135 gpcd and most recently were 124 gpcd as of FY 2022.

**Table 3-3: Ten-Year Historical per-Capita Demand - Total Combined Water Including Supplemental Irrigation**

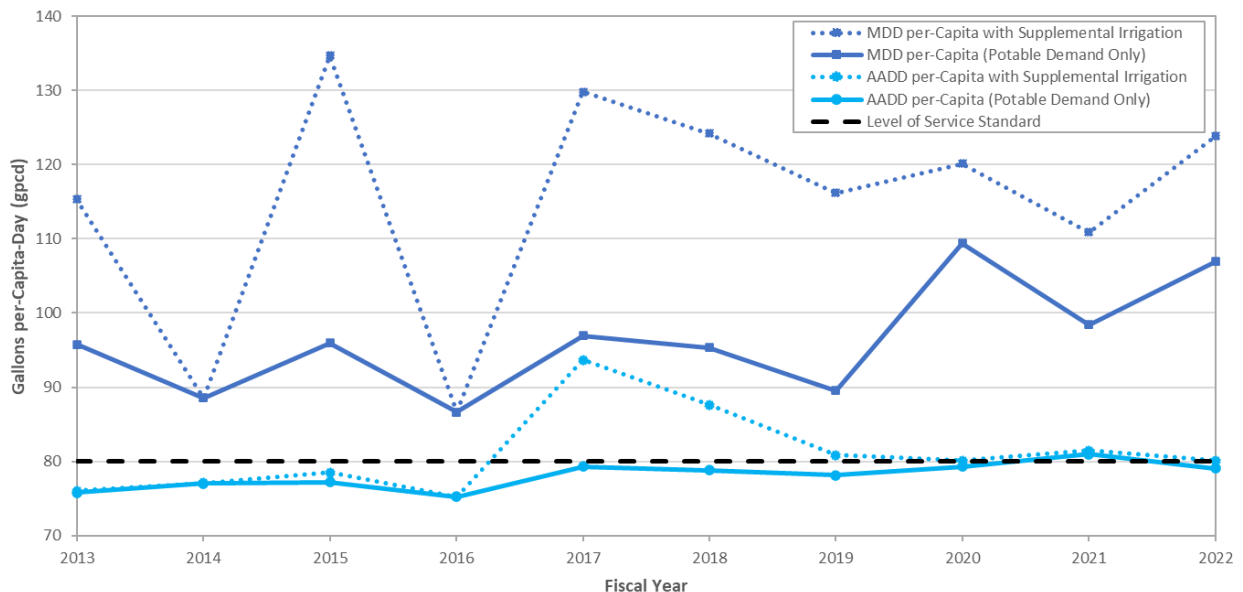
Fiscal Year	Estimated Permanent Served Population <sup>1</sup>	Annual Average Daily Demand (AADD)		Maximum Daily Demand (MDD)	
		Total Demand (With Supplemental Irrigation)	Per-Capita Demand <sup>2</sup>	Total Demand (With Supplemental Irrigation)	Per-Capita Demand <sup>2</sup>
		mgd	gpcd	mgd	gpcd
2013	123,748	9.41	76	14.27	115
2014	125,005	9.63	77	11.07	89
2015	127,111	9.98	79	17.12	135
2016	133,628	10.05	75	11.58	87
2017	137,256	12.86	94	17.82	130
2018	140,857	12.34	88	17.50	124
2019	143,605	11.61	81	16.69	116
2020	148,695	11.91	80	17.86	120
2021	155,225	12.64	81	17.21	111
2022	163,850	13.12	80	20.29	124
Average		11.36	81	16.14	115
Peak		13.12	94	20.29	135

<sup>1</sup> Based on potable water customer accounts, 2.55 persons per household, and an occupancy rate of 86%.

<sup>2</sup> Calculated by dividing potable water demands by estimated permanent served population.

Figure 3-2 presents the historical per-capita demand rates calculated based on potable only and potable with supplemental irrigation demands, and provides a comparison with the 80 gpcd per-capita rate LOSS recommended by the City’s recent Comprehensive Utilities Master Plan Update. Based on the past three fiscal years (FY 2020 through FY 2022), per-capita demand rates on an AADD basis have remained steady around 80 gpcd with and without inclusion of supplemental irrigation water. However, on a MDD basis, per-capita demand rates have been higher than 80 gpcd when including supplemental irrigation water, thus showing the additional demand impact when potable water is required for supplemental supply to meet irrigation demand (Figure 3-2).

**Figure 3-2: Historical AADD and MDD per-Capita Water Demand Rate Trends**



The MDD peaking factor (PF) is utilized for planning purposes to ensure that the potable water system has adequate capacity to handle anticipated maximum daily demands. MDD PFs are correspondingly used for the designing and permitting of water treatment facilities. The City's PFs are established based on ten-year historical production data for the City's WTPs. Analysis of the historical MMDDs, M3DDs, and MDDs, and the associated PFs is presented in **Table 3-4**. A MDD PF for total demand (including supplemental irrigation) was also established for planning purposes.

The recommended PFs for MMDD, M3DD, and MDD were identified based on the respective highest observed PFs of the past ten fiscal years. The recommended PF for MDD with potable water for supplemental irrigation was identified based on the highest observed PF of the past three fiscal years to better reflect the City's recent usage of potable water for the IQ water system.

The City has been actively reducing the annual usage of potable water used to supplement the IQ water system, but still utilizes the resource during severe drought conditions. In FY 2022, the City experienced a severe drought in the middle of April which prompted the use of potable water to supplement irrigation supplies. However, the City has been pursuing an overall goal of eliminating the usage of potable water for irrigation system supplementation purposes, completely. The City achieved this goal in 2023.

**Table 3-4: Potable Water Demand Peaking Factor Analysis**

Fiscal Year	Estimated Permanent Served Population <sup>1</sup>	Annual Average Daily Demand (AADD) <sup>2</sup> mgd	Maximum Month Daily Demand (MMDD) <sup>2</sup>		Maximum 3-Day Demand (M3DD) <sup>2</sup>		Maximum Daily Demand (MDD) <sup>2</sup>		Maximum Daily Demand (MDD) (Including Supplemental Irrigation) <sup>3</sup>	
			System Demand	Peaking Factor	System Demand	Peaking Factor	System Demand	Peaking Factor	System Demand	Peaking Factor
			mgd	mgd	mgd		mgd		mgd	
2013	123,748	9.38	10.37	1.11	11.31	1.21	11.85	1.26	14.27	1.52
2014	125,005	9.63	10.15	1.05	10.64	1.10	11.07	1.15	11.07	1.15
2015	127,111	9.81	10.61	1.08	11.93	1.22	12.20	1.24	17.12	1.75
2016	133,628	10.05	10.92	1.09	11.38	1.13	11.58	1.15	11.58	1.15
2017	137,256	10.88	12.09	1.11	13.12	1.21	13.31	1.22	17.82	1.64
2018	140,857	11.10	12.68	1.14	13.24	1.19	13.43	1.21	17.50	1.58
2019	143,605	11.22	11.98	1.07	12.58	1.12	12.86	1.15	16.69	1.49
2020	148,695	11.79	12.91	1.09	14.88	1.26	16.27	1.38	17.86	1.51
2021	155,225	12.57	14.11	1.12	14.86	1.18	15.28	1.22	17.21	1.37
2022	163,850	12.95	14.81	1.14	16.33	1.26	17.52	1.35	20.29	1.57
Average		10.94	12.06	1.10	13.03	1.19	13.54	1.23	16.14	1.47
Peak		12.95	14.81	1.14	16.33	1.26	17.52	1.38	20.29	1.75
Recommended			1.14		1.26		1.38		1.57	

<sup>1</sup> Based on potable water customer accounts, 2.55 persons per household, and an occupancy rate of 86%.

<sup>2</sup> Potable water demand exclusively - adjusted to exclude water produced for supplemental irrigation purposes.

<sup>3</sup> Peaking factor calculated as (MDD with supplemental irrigation water demand)/(AADD without supplemental irrigation water demand).

### 3.3.2 Irrigation Quality Water Level of Service Standard

The City's IQ water is sourced from the City's freshwater canal system, the City's Everest and Southwest Water Reclamation Facilities (WRFs), and from outside entities through interlocal agreements (FGUA as well as CFM in the near future). During the dry season, the Southwest Aggregates Mine Reservoir (surface water source) has been utilized to supplement IQ water supply by conveyance into the City's freshwater canal system, and further supplemental IQ water is available on an as-needed basis through use of potable water produced at the WTPs.

The City provided monthly irrigation flow records for the past ten fiscal years and the latest irrigation customer account data as of July 2023. According to the July 2023 account data (**Table 3-5**), approximately 88% of all irrigation accounts were for single-family parcels, and approximately 12% for multifamily, commercial, and City account parcels.

**Table 3-5: Summary of Irrigation Accounts by Type - July 2023**

Account Description	Number of Accounts <sup>1</sup>	Percent of Total Accounts
		%
Single Family	55,220	88%
Duplex	4,373	7%
Multifamily - Metered	54	0%
Multifamily - Metered Fireline	11	0%
Multifamily - Non-Metered	1,113	2%
Commercial - Metered	489	1%
Commercial - Metered Fireline	13	0%
Commercial - Non-Metered	554	1%
City Accounts - Metered	35	0%
City Accounts - Non-Metered	733	1%
<b>Total</b>	<b>62,595</b>	<b>100%</b>

<sup>1</sup> Number of accounts as of July 31st, 2023 - Provided by City Financial Services Department.

The per-capita LOSS was evaluated based on historical IQ water usage data and served population estimates. Served population estimates were determined based on various sources. Population estimates for FY 2018 through FY 2022 were estimated using historical irrigation water customer accounts provided by the City, an estimated 2.55 persons per household, and an occupancy rate of 86%. Population estimates for FY 2013 through FY 2017 were calculated using linear interpolation between FY 2009 and FY 2018 population estimates (the FY 2009 population was referenced from the City's 2011 Irrigation and ASR Master Plan).

Irrigation usage over the past ten fiscal years was used to determine current average and peak per-capita demand rates. A summary of the City's historical ten-year IQ water demand is provided in **Table 3-6**. AADD per-capita rates have fluctuated between 228 gpcd (FY 2015) and 283 gpcd (FY 2022), with an average rate of approximately 249 gpcd for the FY 2013 – FY 2022 time period. In terms of MDDs, per-capita rates averaged approximately 395 gpcd for the past ten-year period, and peaked at 461 gpcd in FY 2021.

The City's recently completed Comprehensive Utilities Master Plan Update recommended a per-capita demand rate of 235 gpcd (AADD) for planning purposes. The per-capita rate was based on a historical demand analysis for the period of FY 2010 through FY 2019. Based on the most recent ten fiscal year period (FY 2013 – FY 2022), IQ water demands have increased and a per-capita demand rate of 250 gpcd is now more applicable. An IQ water per-capita LOSS of 250 gpcd is recommended accordingly.

**Table 3-6: Summary of Recent Historical IQ Water Demand**

Fiscal Year	Estimated Irrigation Population <sup>1</sup>	Total IQ Water Demand <sup>2</sup>	Annual Average Daily Demand (AADD)		Maximum Daily Demand (MDD)	
			IQ Water Demand <sup>2</sup>	Per-Capita Demand	IQ Water Demand <sup>2</sup>	Per-Capita Demand
		MG	mgd	gpcd	mgd	gpcd
2013	112,530	9,619	26.35	234	40.93	364
2014	112,656	9,943	27.24	242	44.26	393
2015	112,783	9,365	25.66	228	38.47	341
2016	112,910	7,070	25.90	229	42.55	377
2017	113,037	9,846	26.98	239	42.80	379
2018	113,164	10,185	27.90	247	43.73	386
2019	117,212	11,192	30.66	262	47.79	408
2020	118,635	11,142	30.44	257	46.98	396
2021	114,782	11,091	30.81	268	52.87	461
2022	118,280	12,221	33.48	283	52.23	442
Average		10,167	28.54	249	45.26	395
Peak		12,221	33.48	283	52.87	461

<sup>1</sup> For FY 2013 - FY 2017, based on linear interpolation between FY 2009 and FY 2018 estimated populations. FY 2009 population referenced from City's Irrigation and ASR Master Plan (2011).

<sup>1</sup> For FY 2018 - FY 2022, populations based on historical City irrigation customer data, 2.55 persons per household, and an 86% occupancy rate.

<sup>2</sup> Represents sum of reclaimed water production, freshwater canal pump station flows, FGUA reclaimed water flows, and supplemental potable water for irrigation purposes.

Because IQ water demands fluctuate seasonally by dry and wet periods of the year, historical demands were also evaluated on a seasonal basis for average day and maximum day demand conditions. As such, historical seasonal demand multipliers were also calculated. **Table 3-7** and **Table 3-8** summarize the historical monthly IQ water demands for the past ten fiscal years for the dry season and wet season, respectively. For the purpose of this analysis, the dry season is considered as the time period from December through May and the wet season is considered as the period from June through November.

Based on **Table 3-7** and **Table 3-8**, the seasonal average of the ten-year averages for monthly average day demands was approximately 30.79 mgd for the dry season and 26.45 mgd for the wet season. Similarly, the seasonal average of the ten-year averages for monthly maximum day demands was approximately 40.30 mgd for the dry season and 36.12 mgd for the wet season.

**Table 3-7: Historical Monthly IQ Water Demands – Dry Season**

Fiscal Year	December		January		February		March		April		May		
	Avg. Day	Max. Day	Avg. Day	Max. Day	Avg. Day	Max. Day	Avg. Day	Max. Day	Avg. Day	Max. Day	Avg. Day	Max. Day	
	mgd		mgd		mgd		mgd		mgd		mgd		
2013	28.8	38.8	28.0	37.0	29.3	36.7	28.6	35.8	26.6	35.7	29.4	38.1	
2014	27.4	34.8	25.4	33.6	25.8	34.0	28.1	35.6	28.8	38.6	33.3	44.3	
2015	27.3	33.5	29.4	36.7	29.2	38.5	31.0	38.4	28.4	37.9	25.7	33.5	
2016	<sup>1</sup>	<sup>1</sup>	23.2	32.0	23.2	30.8	26.3	35.5	30.9	39.8	31.8	42.6	
2017	36.5	42.4	33.3	42.6	32.6	40.7	33.2	42.8	31.6	41.7	23.9	33.4	
2018	26.4	33.2	28.8	39.3	32.3	39.8	33.8	43.7	33.7	43.7	28.1	40.6	
2019	30.4	39.8	30.3	39.0	29.5	38.4	31.7	40.7	31.6	41.5	33.5	44.5	
2020	30.0	41.5	30.7	38.7	30.1	39.3	33.7	43.0	33.8	44.1	28.5	42.4	
2021	27.5	36.0	30.5	40.6	32.8	42.7	33.8	47.6	36.0	46.2	42.6	52.9	
2022	36.7	47.5	37.0	50.0	37.5	48.7	38.8	52.2	37.0	50.1	33.6	46.3	
Ten-Year Average	30.1	38.6	29.7	39.0	30.2	39.0	31.9	41.5	31.8	41.9	31.0	41.8	
Dry Season (December – May) Average <sup>2</sup> (mgd)					30.79		Dry Season (December – May) Maximum Average <sup>3</sup> (mgd)					40.30	

<sup>1</sup> Daily demand data unavailable/incomplete.

<sup>2</sup> Dry season average of the ten-year average of the monthly average day demands.

<sup>3</sup> Dry season average of the ten-year average of the monthly maximum day demands.

**Table 3-8: Historical Monthly IQ Water Demands – Wet Season**

Fiscal Year	June		July		August		September		October		November		
	Avg. Day	Max. Day	Avg. Day	Max. Day	Avg. Day	Max. Day	Avg. Day	Max. Day	Avg. Day	Max. Day	Avg. Day	Max. Day	
	mgd		mgd		mgd		mgd		mgd		mgd		
2013	28.1	40.9	22.4	31.3	21.4	29.7	18.7	26.2	24.6	34.7	30.5	37.7	
2014	29.9	39.9	25.4	35.5	25.6	34.3	24.4	36.6	23.5	34.3	29.5	36.5	
2015	23.4	30.1	21.7	30.1	19.4	25.7	19.5	27.5	26.2	35.6	26.9	34.9	
2016	26.5	34.0	26.4	35.5	22.7	29.5	22.2	28.3	<sup>1</sup>	<sup>1</sup>	<sup>1</sup>	<sup>1</sup>	
2017	18.6	25.4	18.0	24.4	18.4	27.1	17.2	23.7	27.0	38.0	33.7	41.8	
2018	29.4	40.1	28.2	36.6	26.6	36.0	23.8	31.4	20.1	26.2	23.6	30.4	
2019	35.5	47.8	29.9	41.2	25.6	36.4	31.9	44.7	28.1	40.5	30.3	39.3	
2020	24.0	42.1	32.2	47.0	28.6	41.4	25.4	37.0	34.8	46.7	33.3	43.6	
2021	34.1	47.1	27.8	38.8	26.4	40.0	25.1	34.2	25.8	33.9	26.6	34.9	
2022	30.3	40.2	29.6	40.3	29.1	39.3	25.1	34.2	34.8	46.3	32.5	45.5	
Ten-Year Average	28.0	38.8	26.2	36.1	24.4	33.9	23.3	32.4	27.2	37.4	29.7	38.3	
Wet Season (June – November) Average <sup>2</sup> (mgd)					26.45		Wet Season (June - November) Maximum Average <sup>3</sup> (mgd)					36.12	

<sup>1</sup> Daily demand data unavailable/incomplete.

<sup>2</sup> Wet season average of the ten-year average of the monthly average day demands.

<sup>3</sup> Wet season average of the ten-year average of the monthly maximum day demands.

Average day and maximum day demand multipliers (peaking factors and scale-down factors) were calculated for the wet and dry seasons of the year to account for seasonal demand fluctuations. **Table 3-9** provides the respective dry season and wet season multipliers that are used to estimate monthly average day and monthly maximum day IQ water demand projections.

**Table 3-9: Seasonal IQ Water Demand Multiplier Analysis**

Season	Ten-Year AADD (Full Fiscal Years) <sup>1</sup>	Seasonal Average Day	Seasonal Maximum Day	Seasonal Average Day Multiplier <sup>2</sup>	Seasonal Maximum Day Multiplier <sup>3</sup>
	mgd	mgd	mgd		
Dry Season	28.54	30.79	40.30	1.08	1.41
Wet Season		26.45	36.12	0.93	1.27

<sup>1</sup> Refer to **Table 3-6** for Ten-Year AADD analysis.

<sup>2</sup> Multiplier calculated as (seasonal average day demand)/(ten-year full-year AADD)

<sup>3</sup> Multiplier calculated as (seasonal average maximum day demand)/(ten-year full-year AADD)

## 3.4 Population and Demand Projections

### 3.4.1 Planning Period

The 2022 LWC Water Supply Plan Update establishes population and potable water demand projections for utilities, municipalities, and local governments within the LWC Planning Area. Projections are provided for 2020 through 2045 (25-year planning horizon) on a five-year increment basis. To align with the planning horizon of the LWC Water Supply Plan Update, the Work Plan presents served potable water and served IQ water population projections, as well as potable water and IQ water service area demand projections, through FY 2045.

### 3.4.2 Population Forecast

Accurate population forecasting is critical for communities that have not been fully developed in order to correctly estimate and plan for infrastructure investments and maintain adequate service. The City of Cape Coral is in a unique position of having substantial area to grow before the City population reaches build-out capacity. As the UEP program continues to expand, the City's utilities will need to accommodate this growth as well as the existing populations that are currently unserved. The population growth models for the City of Cape Coral created through other reports and documents are general tools developed to assist in the update of the City's Work Plan. The following population projection resources were considered for this Work Plan update:

#### 3.4.2.1 City Comprehensive Utilities Master Plan Update Population Projections

The City's recent Comprehensive Utilities Master Plan Update (November 2022) utilizes permanent population projections developed by Metro Forecasting Models, LLC (MFM) for the period of 2020 through 2080, and build-out conditions in five-year increments. To forecast population, MFM used the Interactive Growth Model® (IGM) planning tool, a land use model that considers when and where growth is most likely to occur over time. Population projections were based on detailed research and meetings with the Cape Coral Planning Department to understand the potential for future development. Demographics were carefully analyzed from 30 years of census data. To determine residential demand, the IGM uses a series of complex algorithms to anticipate residential development and distribute it over the forecast period to the areas where it is most likely to occur. The disaggregated parcel databases are then aggregated into 447 Traffic Analysis Zones (TAZs/zones) for the population forecast. The IGM employs non-linear logistic growth analysis at the zone level to simulate population and housing unit development over time.

Overall, the population estimates and projections in the Comprehensive Utilities Master Plan Update are a product of housing units and household demographic characteristics. Lee County household demographics from the 1990, 2000 and 2010 decennial censuses were reviewed on a spatial basis and a trend analysis for the City of Cape Coral was completed. The average household size used for most zones in the IGM was 2.55 in the baseline year. Vacancy rate research did not show a definitive trend and while household sizes tend to change slowly over time (in areas with substantial development), vacancy rates often mirror the economy. Ultimately professional judgement was used to arrive at a total vacancy rate of 14% for most zones in the IGM.

A key element of the recent Comprehensive Utilities Master Plan Update was to identify areal limits and phasing for the future UEP program and the corresponding population projections for the future served areas. The currently unserved area of the UEP covers approximately 39 square miles and consists of 113 zones. Coordination with Utility Department leadership was utilized to develop population projections for the UEP expansion areas.

Adjustments were later made to the initial MFM forecast to account for new commercial and residential developments (Pine Island Road Corridor Development and Hudson Creek Development) that submitted planning applications while the Master Planning effort was ongoing. The initial population forecast accounted for these new developments. However, the proposed density of the new developments was greater and timing for the growth (according to the developers) was more accelerated. In addition, the infill population growth rate was increased to 2% for the existing potable water and wastewater areas to account for rapid growth and to provide a more conservative projection.

Seasonal variation in the City's population and the impacts of the influx of tourists and part time residents are accounted for in the Comprehensive Utilities Master Plan Update by the use of per-capita demands that are based on full years of historical usage data.

### **3.4.2.2 SFWMD Population Projections**

The SFWMD developed population projections for the elaboration of the LWC Water Supply Plan Update. Projections were established in coordination with stakeholder groups, other agencies, utilities, and local governments. The 2022 LWC Water Supply Plan Update uses census block populations from the 2020 Decennial Census (U.S. Census Bureau 2020) and 2020 public supply (PS) service area maps to estimate 2020 permanent resident populations for PS service areas. PS service area maps were developed based on relevant information from PS utilities, the SFWMD's WUP database, and coordination/correspondence with PS utilities staff. Service area maps were created for the year 2020 and the year 2045.

The LWC Water Supply Plan Update uses 2020 as the base year and provides populations projections in 5-year increments to 2045 – the future planning horizon. Population projections to 2045 were calculated using Future Utility Service Area distributions of population served with the 2020 Decennial Census (U.S. Census Bureau 2020). The population growth rate was provided by the county population projections (BEER medium) from BEER 2021 to project future populations (annual county growth rates).

### **3.4.2.3 Recommended Work Plan Population Projections**

For the purpose of this Work Plan, the population projections from the recently completed Comprehensive Utilities Master Plan Update are used for the development of the potable water and IQ water demand projections. The projections were established following a comprehensive review of Lee County Property Appraiser parcel data, City Geographic Information System (GIS) data, and Census and historic building permit data, in addition to comprehensive communication and coordination with City Planning staff and City Utilities staff.

The population projections account for anticipated new commercial and residential developments that include the Pine Island Road Corridor Development, the Hudson Creek Development, and the planned redevelopment of the Cape Coral Redevelopment Agency (CRA) area. The area of redevelopment by CRA is of special focus in the Comprehensive Utilities Master Plan Update as the area is anticipated to undergo land use changes and commercial development over the coming decades. These changes will impact the residential populations within the area. Additionally, the Comprehensive Utilities Master Plan Update establishes the population estimates of the UEP expansion areas which are the primary driver of future served City populations in the coming decades.

The 2% annual infill growth rate for existing service areas was appropriate at the time of the development of the Comprehensive Utilities Master Plan Update, and provided a more conservative estimate for the City's served population projection estimates. However, for the purpose of this Work Plan, the served potable water, IQ water, and wastewater population (used in the development of reclaimed water availability projections) projections were adjusted to reflect a 0.5% annual growth rate for existing service areas. This adjustment aligns better with recent growth rate trends observed. Similar to the population evaluation completed as part of the Comprehensive Utilities Master Plan Update, seasonal variation in the City's population and the impacts of the influx of tourists and part time residents are accounted for in the Work Plan through the use of per-capita demands that are based on full years of historical usage data.

The proposed utility extension schedule identified in the Comprehensive Utilities Master Plan Update reflects an aggressive construction schedule that adds approximately two UEP expansion areas every five years starting in 2025. Based on input from City staff, the anticipated construction timeline for the UEP program has changed and a schedule that adds one expansion area every five years better aligns with City plans for the program moving forward. The prioritization order of the UEP expansion areas will however remain unchanged from the Comprehensive Utilities Master Plan Update. As such, for the purpose of this Work Plan, served population projections will reflect a construction schedule where one expansion area is added every five years.

**Figure 3-3** provides a comparison of the served potable water population forecast used for this Work Plan (adjusted projections from the Comprehensive Utilities Master Plan Update) and the SFWMD's served population forecast from the 2022 LWC Water Supply Plan Update, on a five fiscal year interval basis. As shown in the figure, the two population forecasts are fairly comparable until FY 2025. Following FY 2025, the SFWMD's forecast begins to deviate and predict an overall higher served population estimate for the remainder of the planning horizon. This difference is attributable to the recent change to the UEP construction schedule which will not have been captured during the development of the 2022 LWC Water Supply Plan Update.

**Figure 3-3: Served Potable Water Population Projections Comparison**

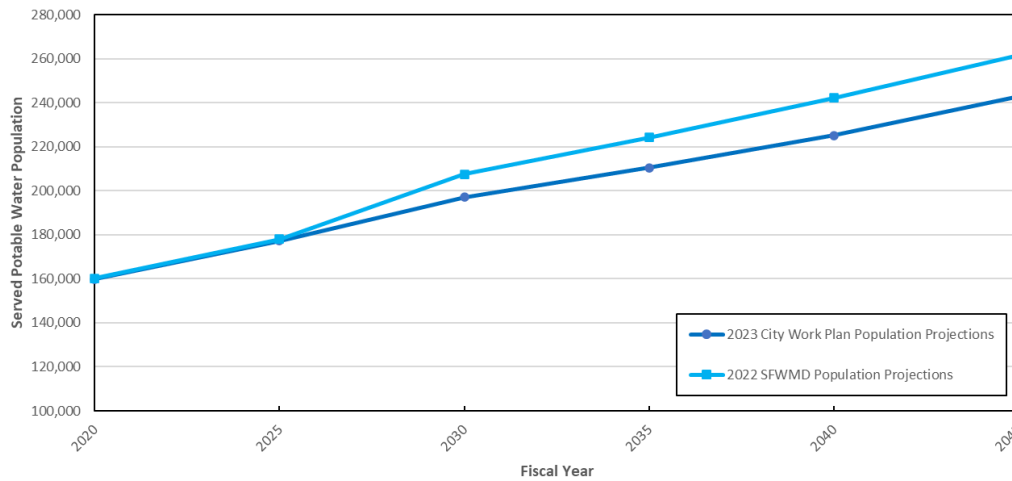
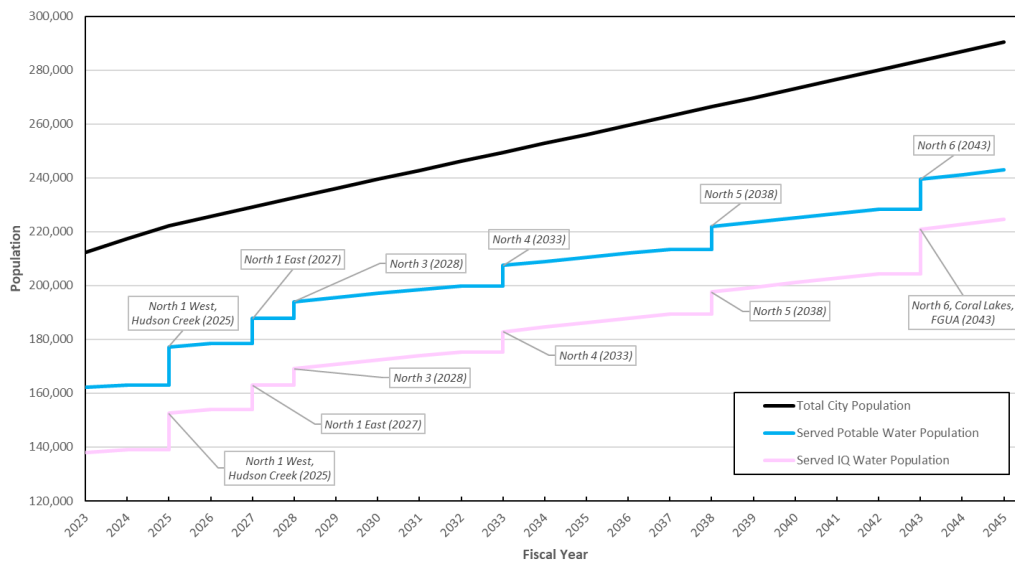


Figure 3-4 shows the projected total City populations (referenced from the Comprehensive Utilities Master Plan Update), projected served potable water populations (adjusted from Comprehensive Utilities Master Plan Update), and the projected served IQ water populations (adjusted from the Comprehensive Utilities Master Plan Update) on an annual fiscal year basis from FY 2023 through FY 2045. The ‘step’ increases shown in the figure reflect the anticipated timing of service availability for the UEP expansion areas and their additions to the City utility service area.

The UEP construction schedule adding one expansion area every five years is proposed to start in FY 2028 with the construction completion of the ‘North 3’ UEP expansion area. Regarding the ‘North 1’ UEP expansion area, the service area was divided into two sub-areas with sections west of Del Prado Blvd being considered as ‘North 1 West’, and sections east of Del Prado Blvd being considered as ‘North 1 East’. This division separates out the construction schedule into two individual timelines established by City staff (completion by FY 2025 and by FY 2027, respectively), and helps to alleviate concerns regarding the large size of the UEP expansion area.

**Figure 3-4: Total City Population and Utility Service Population Projections**



### 3.4.3 Potable Water Demand Projections

Potable water demand projections were developed for the time period of FY 2023 through FY 2045 based on the per-capita demand rate of 80 gpcd and MMDD, M3DD, MDD peaking factors of 1.14, 1.26, and 1.38, respectively. Additionally, a peaking factor of 1.57 is used for MDD conditions accounting for supplemental irrigation water usage. Both the per-capita rate and the various peaking factors were determined from the ten-year historical demand analysis (FY 2013 – FY 2022) provided in **Section 3.3.1**.

Annual fiscal year projections are shown in **Table 3-10** and establish projected MDDs of 19.57 mgd in 2025, 21.75 mgd in 2030, 23.24 mgd in 2035, 24.86 mgd in 2040, and 26.82 mgd in 2045. It should be noted that the MDD projections with supplemental irrigation usage anticipate that IQ water system supplementation (using potable water) will be reduced to zero in FY 2025 with the implementation of other IQ water sources.

**Table 3-10: Potable Water Demand Projections**

Fiscal Year	Projected Served Population	Potable Water <sup>1</sup> ADD	Potable Water <sup>1</sup> MMDD	Potable Water <sup>1</sup> M3DD	Potable Water <sup>1</sup> MDD	Total Demand MDD <sup>2</sup> (With Supplemental Irrigation)
		mgd	mgd	mgd	mgd	mgd
A	B	C	D = C x 1.14	E = C x 1.26	F = C x 1.38	G = C x 1.57 G = C x 1.38
2023	162,321	12.99	14.80	16.36	17.92	20.39
2024	163,121	13.05	14.88	16.44	18.01	20.49
2025	177,220	14.18	16.16	17.86	19.57	19.57
2026	178,418	14.27	16.27	17.98	19.70	19.70
2027	187,726	15.02	17.12	18.92	20.72	20.72
2028	193,972	15.52	17.69	19.55	21.41	21.41
2029	195,510	15.64	17.83	19.71	21.58	21.58
2030	197,049	15.76	17.97	19.86	21.75	21.75
2031	198,428	15.87	18.10	20.00	21.91	21.91
2032	199,807	15.98	18.22	20.14	22.06	22.06
2033	207,430	16.59	18.92	20.91	22.90	22.90
2034	208,971	16.72	19.06	21.06	23.07	23.07
2035	210,512	16.84	19.20	21.22	23.24	23.24
2036	211,993	16.96	19.33	21.37	23.40	23.40
2037	213,474	17.08	19.47	21.52	23.57	23.57
2038	221,938	17.76	20.24	22.37	24.50	24.50
2039	223,559	17.88	20.39	22.53	24.68	24.68
2040	225,179	18.01	20.54	22.70	24.86	24.86
2041	226,746	18.14	20.68	22.86	25.03	25.03
2042	228,312	18.26	20.82	23.01	25.21	25.21
2043	239,453	19.16	21.84	24.14	26.44	26.44
2044	241,211	19.30	22.00	24.31	26.63	26.63
2045	242,969	19.44	22.16	24.49	26.82	26.82

<sup>1</sup> Based on per-capita demand rate of 80 gpcd and MMDD, M3DD, MDD peaking factors of 1.14, 1.26, and 1.38, respectively.

<sup>2</sup> Based on MDD (with supplemental irrigation) peaking factor of 1.57 for FY 2023 and FY 2024. Based on MDD peaking factor of 1.38 from FY 2025 onward - anticipates that IQ water system supplementation with potable water will be reduced to zero in FY 2025.

### 3.4.3.1 Domestic Self-Supply Water

As the City continues to expand its potable water, sanitary sewer, and IQ water utility service through the UEP program, the number of City residents utilizing domestic self-supply wells for potable water supply is expected to decrease. The majority of self-supply users are located in northern areas of the City where public utilities are not available. **Table 3-11** shows the estimated potable water demands for self-supply users on a five-year basis, through FY 2045. The self-supply potable water demands were calculated based on a per-capita demand rate of 80 gpcd.

The population utilizing domestic self-supply wells for potable water supply was calculated based on the City population percentage that remains unserved as of 2022 (24%), and a linear decreasing trend projection to 2% by FY 2075. It is anticipated that all UEP expansion areas will be constructed by FY 2073. However, based on a review of data from the 'Southwest 6 and 7' and 'North 2' UEP expansion areas, a lag time of approximately two years is estimated for a majority of the properties within an expansion area to connect to the City's potable water utilities (accounting for the transition from self-supply wells). Therefore, it is estimated that 98% of the customers located within the UEP expansion areas will be served by FY 2075, anticipating that 2% of the City's population within future service areas will remain unserved by FY 2075.

As utility service expands with the service availability timing of UEP expansion areas, self-supply wells are assumed to no longer be utilized. The unserved population percentage was determined based on the estimated 2022 served population percentage (76%), which was calculated using City population estimates from the United States Census Bureau and City potable water customer account records. Irrigation water demand from self-supply wells is discussed in **Section 3.4.4.1**.

**Table 3-11: Unserved Potable Water (Self-Supply) Population and Demand**

Fiscal Year	Unserved Potable Water Population <sup>1,2</sup> (Domestic Self-Supply Users)	Annual Average Day Demand <sup>3</sup>
		mgd
2025	51,595	4.13
2030	50,506	4.04
2035	48,604	3.89
2040	46,027	3.68
2045	42,796	3.42

<sup>1</sup> Based on estimated population utilizing domestic self-supply wells (24%) as of 2022, and a linear interpolation to 2% by FY 2075 when UEP expansion areas are anticipated to provide utility supplied service.

<sup>2</sup> 2% of the population within future service areas is anticipated to remain unserved by FY 2075.

<sup>3</sup> Based on per-capita demand rate of 80 gpcd.

### 3.4.4 Irrigation Quality Water Demand Projections

Seasonal IQ water demand projections were developed for the dry season and wet season from FY 2023 through FY 2045. Monthly average day demand and monthly maximum day demand projections were calculated based on the per-capita IQ water demand rate of 250 gpcd and seasonal average day demand multipliers of 1.08 for the dry season and 0.93 for the wet season, and seasonal average maximum day demand multipliers of 1.41 for the dry season and 1.27 for the wet season. Both the per-capita rate and the seasonal demand multipliers were determined from the seasonal ten-year historical demand analysis (FY 2013 – FY 2022) provided in **Section 3.3.2**. To account for the implementation of smart irrigation systems (SISs) and higher efficiency irrigation systems by new irrigation customers (2023 amendments to the City's Code of Ordinances now require that systems achieve a minimum 70% efficiency; refer to **Section 3.7.2.1**), a 20% reduction to IQ water demands was applied to populations associated with new UEP expansion

areas. This approach aligns with IQ water modeling efforts from the Comprehensive Utilities Master Plan Update where a 15% to 30% reduction in demands was applied to certain scenarios to account for SISs. No demand reduction was applied to existing service area populations. As shown in **Table 3-12**, monthly average day demands are estimated to increase from 36.85 mgd/31.73 mgd (dry season/wet season) in FY 2023 to 56.35 mgd/48.53 mgd in FY 2045. Similarly, monthly maximum day demands are estimated to increase from 48.10 mgd/43.33 mgd in FY 2023 to 73.57 mgd/66.27 mgd in FY 2045.

**Table 3-12: IQ Water Demand Projections – Seasonal Basis**

Fiscal Year	Projected Served Population	IQ Water Monthly Average Day Demand <sup>1</sup>		IQ Water Monthly Maximum Day Demand <sup>2</sup>	
		Dry Season	Wet Season	Dry Season	Wet Season
		mgd		mgd	
2023	138,054	36.85	31.73	48.10	43.33
2024	138,995	37.08	31.93	48.41	43.61
2025	152,571	40.05	34.49	52.29	47.10
2026	153,908	40.37	34.77	52.71	47.48
2027	162,948	42.36	36.48	55.31	49.82
2028	169,081	43.72	37.65	57.08	51.41
2029	170,741	44.12	37.99	57.60	51.88
2030	172,401	44.51	38.33	58.11	52.34
2031	173,911	44.87	38.64	58.58	52.77
2032	175,421	45.24	38.95	59.06	53.19
2033	182,864	46.88	40.37	61.20	55.13
2034	184,528	47.28	40.71	61.72	55.59
2035	186,192	47.67	41.05	62.24	56.06
2036	187,794	48.05	41.38	62.74	56.51
2037	189,397	48.44	41.71	63.24	56.96
2038	197,633	50.25	43.27	65.61	59.10
2039	199,367	50.67	43.63	66.15	59.58
2040	201,102	51.08	43.98	66.69	60.06
2041	202,747	51.47	44.32	67.20	60.53
2042	204,391	51.87	44.66	67.71	60.99
2043	220,890	55.47	47.76	72.42	65.23
2044	222,768	55.91	48.15	72.99	65.75
2045	224,645	56.35	48.53	73.57	66.27

<sup>1</sup> Based on per-capita demand rate of 250 gpcd and seasonal average day demand multipliers of 1.08 for the dry season and 0.93 for the wet season. Accounts for 20% reduction to demands associated with new UEP expansion areas using SISs or higher efficiency irrigation systems.

<sup>2</sup> Based on per-capita demand rate of 250 gpcd and seasonal average maximum day demand multipliers of 1.41 for the dry season and 1.27 for the wet season. Accounts for 20% reduction to demands associated with new UEP expansion areas using SISs or higher efficiency irrigation systems.

### 3.4.4.1 Domestic Self-Supply Irrigation Water

With the continued expansion of the City’s utility service through the UEP program, the number of City residents utilizing domestic self-supply wells for irrigation water supply is expected to decrease. The majority of self-supply users are located in northern areas of the City where public utilities are not available. **Table 3-13** shows the estimated irrigation water demands for self-supply users on a five-year basis, through FY 2045. Demands were calculated based on a per-capita demand rate of 250 gpcd and do not account for any potential reductions associated with SISs or higher efficiency irrigation systems.

The population utilizing domestic self-supply wells for irrigation water supply was calculated based on the City population percentage that remains unserved as of 2022 (45%), and a linear decreasing trend projection to 5% by FY 2075 (accounting for a two-year lag time for City residents to transition from self-supply wells). As utility service expands with the service availability timing of UEP expansion areas, self-supply wells are assumed to no longer be utilized. It is anticipated that 5% of the City’s population within future service areas will remain unserved as connection to the City’s IQ water system is not mandatory through the UEP program. The remaining unserved population is expected to receive irrigation water supply from neighborhood lakes and other private supplies, instead. The unserved population percentage was determined based on the estimated 2022 served population percentage (55%), which was calculated using City population estimates from the United States Census Bureau and City irrigation customer account records.

**Table 3-13: Unserved Irrigation Water (Self-Supply) Population and Demand**

Fiscal Year	Unserved IQ Water Population <sup>1,2</sup> (Domestic Self-Supply Users)	Annual Average Day Demand <sup>3</sup>
		mgd
2025	96,000	24.00
2030	94,279	23.57
2035	91,090	22.77
2040	86,687	21.67
2045	81,114	20.28

<sup>1</sup> Based on estimated population utilizing domestic self-supply wells (45%) as of 2022, and a linear interpolation to 5% by FY 2075 when UEP expansion areas are anticipated to provide utility supplied service.

<sup>2</sup> Neighborhood lakes and other private supplies are expected to provide for the remaining 5% of the City population within future service areas.

<sup>3</sup> Based on per-capita IQ water demand rate of 250 gpcd.

Although historical seasonal data on self-supply irrigation water demands is unavailable, the seasonal average day demand and maximum day demand multipliers for the served IQ water population may be used to estimate seasonal self-supply irrigation water demands. **Table 3-14** provides the projected self-supply monthly average day demands and monthly maximum day demands based on seasonal average day demand multipliers of 1.08 for the dry season and 0.93 for the wet season, and seasonal average maximum day demand multipliers of 1.41 for the dry season and 1.27 for the wet season.

**Table 3-14: Unserved Irrigation Water (Self-Supply) Population and Demand - Seasonal Basis**

Fiscal Year	Unserved IQ Water Population <sup>1,2</sup> (Domestic Self-Supply Users)	Monthly Average Day Demand <sup>3</sup>		Monthly Maximum Day Demand <sup>4</sup>	
		Dry Season	Wet Season	Dry Season	Wet Season
		mgd		mgd	
2025	96,000	25.92	22.32	33.84	30.48
2030	94,279	25.46	21.92	33.23	29.93
2035	91,090	24.59	21.18	32.11	28.92
2040	86,687	23.41	20.15	30.56	27.52
2045	81,114	21.90	18.86	28.59	25.75

<sup>1</sup> Based on estimated population utilizing domestic self-supply wells (45%) as of 2022, and a linear interpolation to 5% by FY 2075 when UEP expansion areas are anticipated to provide utility supplied service.

<sup>2</sup> Neighborhood lakes and other private supplies are expected to provide for the remaining 5% of the City population within future service areas.

<sup>3</sup> Based on per-capita demand rate of 250 gpcd and seasonal average day demand multipliers of 1.08 for the dry season and 0.93 for the wet season.

<sup>4</sup> Based on per-capita demand rate of 250 gpcd and seasonal average maximum day demand multipliers of 1.41 for the dry season and 1.27 for the wet season.

### 3.5 Water Supply Provided by Local Government

The City’s water supply system is separated into two individual systems (dual water system) as a condition of the September 1984 WUP issued by the SFWMD. The primary system, the drinking water system, utilizes brackish groundwater aquifers as the raw water source processed to produce potable water by the City’s two RO WTPs. Initially, the secondary system, the irrigation water system, utilized water from the City’s extensive network of freshwater canals only, to provide non-potable (irrigation and limited fire protection) water for the City. The City has long-term plans to remove fire protection from the IQ water system and to expand the potable water system to provide fire protection to these areas instead. In November 1989, a public referendum endorsed the use of reclaimed water for residential reuse. At that point, the secondary system was expanded to include reclaimed water to supplement the canal water for non-potable purposes. Use of the secondary water system for irrigation has enabled the City to lower its annual per-capita demand for potable water.

#### 3.5.1 Drinking Water System

The primary water system utilizes an RO system to treat brackish groundwater from the Upper Floridan aquifer. Brackish raw water is obtained from a total of 56 production wells (although only 52 are operational at this time) and supplied to the two WTPs via three raw water transmission systems. The City’s SFWMD WUP #36-00046-W permits a raw water withdrawal allocation of up to 1,312 million gallons (MG) monthly or 14,326 MG per year. The City’s WUP will expire on October 22, 2029.

The City owns and operates two RO WTPs: the Southwest RO WTP with a permitted production capacity of 18.1 mgd, and the North RO WTP with a permitted production capacity of 12 mgd. The City also operates two storage and booster pump stations which are used to increase water pressure in the potable water transmission and distribution system. These are the Van Loon Storage and Booster Pump Station and the Palm Tree Storage and Booster Pump Station. The two storage and booster pump stations also provide additional potable water storage capacity with a 1-MG GST located at the Van Loon site and a 2-MG GST located at the Palm Tree site.

The Southwest RO WTP is comprised of two plants and is equipped with three 5.0-MG prestressed concrete GSTs. Plant No.1 was built in 1977 with a 3.0 mgd production capacity, and was subsequently expanded to a 6.0 mgd

production capacity in 1980. The three-stage RO process of the plant consists of ten treatment trains, each of which is composed of 10 first-stage pressure vessels, seven second-stage pressure vessels, and four third-stage pressure vessels. Plant No. 1 is currently supplied with raw water from 12 production wells. Plant No. 2 at the Southwest RO WTP is a 12.1 mgd, two-stage RO process plant built in 1985 and is currently supplied by 20 production wells (of a total of 22 production wells). Plant No. 2 originally possessed a 9.0-mgd production capacity prior to facility modifications in 2007, which increased capacity to 12.1 mgd. Plant No. 2 consists of eight treatment trains, each composed of 20 first-stage pressure vessels and 10 second-stage pressure vessels. The combined permitted production capacity of the Southwest RO WTP is 18.1 mgd and the combined firm capacity is 16 mgd. The firm capacity of Plant No.1 with one of the 10 membrane process trains out of service is 5.4 mgd and the firm capacity of Plant No. 2 with one of the eight membrane process trains out of service is 10.6 mgd.

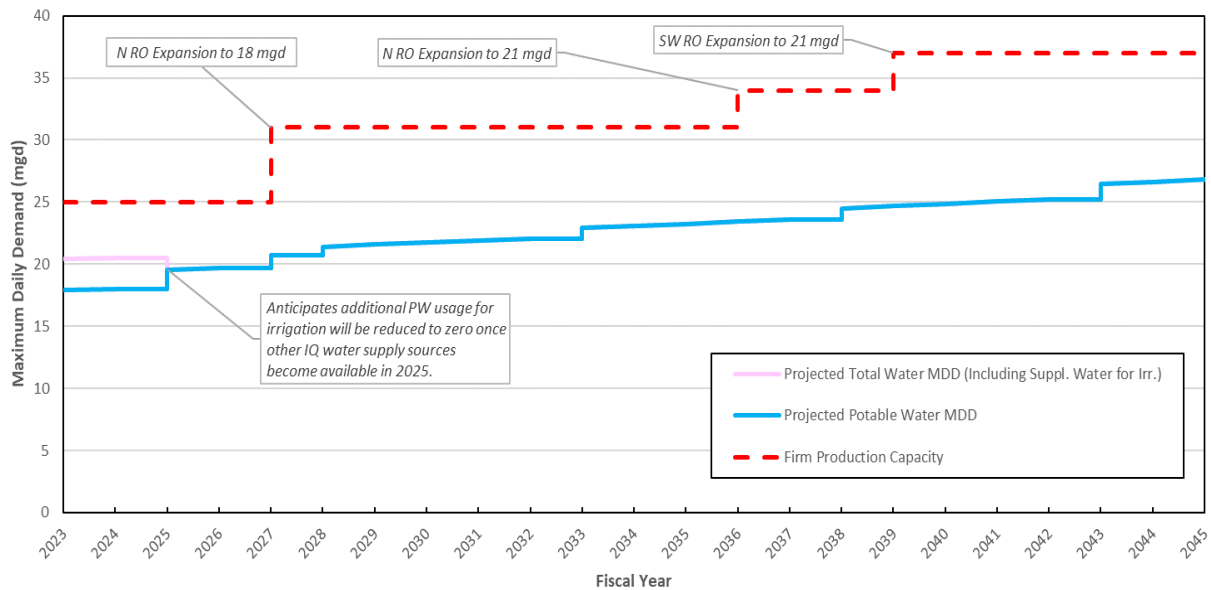
Construction of the 12.0 mgd North RO WTP began in 2006 and was completed during 2010. The firm capacity of the WTP is 9.0 mgd with one of the four membrane process trains out of service. The treatment process consists of four membrane treatment trains, each with 48 first-stage pressure vessels (expandable to 54) and 24 second-stage pressure vessels (expandable to 27). The plant is equipped with a 12-MG prestressed concrete GST. The North RO WTP is currently supplied by 20 operational production wells (of a total of 22 production wells).

### 3.5.1.1 Future Drinking Water Needs

Using the served population projections established in earlier sections, a potable water system production capacity gap analysis was performed to evaluate the City's future demands for comparison to WTP production capacities and permitted raw water allocations. The reliable/firm water treatment capacity, defined as the treatment capacity with the largest process unit offline, is compared to the projected MDDs to determine if the system has a surplus or deficit.

The results of the production capacity gap analysis are shown in **Figure 3-5** and **Table 3-15**. The future system firm production capacities are based on the recommended WTP expansions proposed in the City's recent Comprehensive Utilities Master Plan Update. The 'step' increases in demand shown in **Figure 3-5** reflect the utility service availability timings of the future UEP expansion areas and the associated increases in demands. MDD projections with supplemental irrigation usage anticipate that system supplementation with potable water will be reduced to zero in FY 2025. Based on the gap analysis, the City has sufficient system production capacity (firm) to accommodate MDDs through FY 2045. By FY 2045, the City is estimated to have a firm production capacity surplus of 10.18 mgd.

**Figure 3-5: Potable Water System Production Capacity Gap Analysis**



With regard to permitted raw water consumption (**Table 3-15**), the City’s WUP allocation is sufficient to accommodate MDDs through FY 2045, assuming a system recovery efficiency of 80% is maintained. The 80% recovery efficiency is based on the average system efficiency for the past three fiscal years (80.47%; FY 2020 – FY 2022). By FY 2045, the City is estimated to have a raw water allocation surplus of approximately 5.72 mgd (assuming the permitted raw water allocation remains unchanged with future WUP renewals).

**Table 3-15: Potable Water System Production Capacity Gap Analysis**

Description		Historical		Projected						
		Fiscal Year	2015	2019	2023	2025	2030	2035	2040	2045
Potable Water Service Area Population	A	127,111	143,605	162,321	177,220	197,049	210,512	225,179	242,969	
Potable Water per-Capita Demand (gpcd)	B	77	78	80	80	80	80	80	80	
Potable Water AADD (mgd)	C	9.81	11.22	12.99	14.18	15.76	16.84	18.01	19.44	
Potable Water MDD (mgd)	D	12.20	12.86	17.92	19.57	21.75	23.24	24.86	26.82	
Total Water MDD (mgd) (With Suppl. Irrigation Water Supply)	E	17.12	16.69	20.39	19.57	21.75	23.24	24.86	26.82	
Firm Production Facilities Capacity <sup>1</sup> (mgd)	F	25.0	25.0	25.0	25.0	31.0	31.0	37.0	37.0	
Production Facilities Capacity Surplus/Deficit (mgd)	Potable Water	G = F - D	12.80	12.14	7.08	5.43	9.25	7.76	12.14	10.18
	Total Water	H = F - E	7.88	8.31	4.61	5.43	9.25	7.76	12.14	10.18
Raw Water Requirement <sup>2</sup> (mgd)	Potable Water	I = D / 80%	15.25	16.08	22.40	24.46	27.19	29.05	31.07	33.53
	Total Water	J = E / 80%	21.40	20.86	25.48	24.46	27.19	29.05	31.07	33.53
Permitted WUP Annual Allocation <sup>3</sup> (mgd)	K	39.25	39.25	39.25	39.25	39.25	39.25	39.25	39.25	
Permitted WUP Surplus/Deficit (mgd)	Potable Water	L = K - I	24.00	23.17	16.85	14.79	12.06	10.20	8.17	5.72
	Total Water	M = K - J	17.85	18.39	13.76	14.79	12.06	10.20	8.17	5.72

<sup>1</sup> Firm capacity is defined as the treatment capacity with the largest process unit offline.

<sup>2</sup> 80% recovery efficiency based on average system efficiency for past three fiscal years (FY 2020 – FY 2022).

<sup>3</sup> WUP (36-00046-W) for 39.25 MGD annual average expires October 22, 2029. Annual average calculated dividing 14,326 MG annual allocation by 365 days.

## 3.5.2 Irrigation Quality Water System

### Reclaimed Water

The City currently operates two WRFs: the Everest WRF, which has a permitted treatment capacity of 13.4 mgd, and the Southwest WRF, which has a permitted treatment capacity of 15.0 mgd. Reclaimed water from the two WRFs is utilized as the primary source of IQ water for the City's IQ water system. There are two 5.0-MG storage tanks located at the Everest WRF and three 5.0-MG storage tanks located at the Southwest WRF, which temporarily store reclaimed water prior to distribution into the IQ water system. Both WRFs pump excess effluent into deep injection wells, and the Everest WRF may also discharge effluent into the Caloosahatchee River. The City maintains a National Pollutant Discharge Elimination System (NPDES) permit that allows for surface water body discharge of effluent from the Everest WRF. However, it is only utilized as a back-up option to deep-well injection, and it hasn't been used since 2008.

The City also obtains additional reclaimed water from external entities through interlocal agreements. The City has agreements with the FGUA and the CFM for the purchase and acceptance of reclaimed water to supplement the City's IQ water system.

### Freshwater Canal Water

An additional main source for the City's IQ water is its network of freshwater canals. Water is withdrawn from the City canals via six canal pump stations, which pump directly into the City's IQ water distribution system following filtration/screening and liquid chlorine injection. As water levels decline in the southern canals, a transfer pump station is utilized to convey water from canals north of Pine Island Road into the southern canal system. During the dry season, surface water from the Southwest Aggregates Mine Reservoir is also used to supplement the freshwater canal system. Pending construction of the permanent pump station and pipeline, water from the Southwest Aggregates Mine Reservoir is conveyed to the City freshwater canal system using the US-41 drainage swales. The City's six currently operated canal pump stations have the combined total pumping capacity to provide approximately 79,453 gpm (114.4 mgd) of IQ water.

To optimize and effectively maintain and operate the IQ water system, reduce demands on the freshwater canal network, and manage IQ water demands, the City is actively pursuing and evaluating various improvements and alternatives which include the following:

- Development of a hydrogeological model to determine the feasibility of implementing an Aquifer Storage and Recovery (ASR) program for the temporary storing of excess water during the wet season.
- Full rehabilitation of the North-South Transfer Station as well as control structure replacements/installations, modifications, and improvements to select canal system weirs. Regarding the North-South Transfer Station, rehabilitation efforts involve the electrical systems, control systems, and pump capacity improvements among other items. A total of eleven weirs are also planned to undergo improvements intended to improve operational flexibility, storage, and provide instrumentation and control.
- Construction of an interconnect pipeline across the Caloosahatchee River to convey excess reclaimed water from the CFM to the City's Everest WRF.
- Construction of a pipeline for conveyance of water from the Southwest Aggregates Mine Reservoir to eliminate water lost by using the US-41 drainage swales as a temporary conveyance mechanism.
- Conceptual design permitting and Basis of Design Report preparation for wet season conveyance of excess surface water from Babcock Webb Wildlife Management Area to the Southwest Aggregate Mine Reservoir.

Includes mine reservoir perimeter berm improvements. Project goal is to maximize the volume of water storage in the reservoir during the wet season to enhance the volume of water available from reservoir storage during the dry season. An additional benefit is a decrease in the amount of excess inundation of the southwest Babcock Webb Wildlife Management Area during the wet season.

The City has also recently completed several IQ water system improvements. The primary improvements include the following:

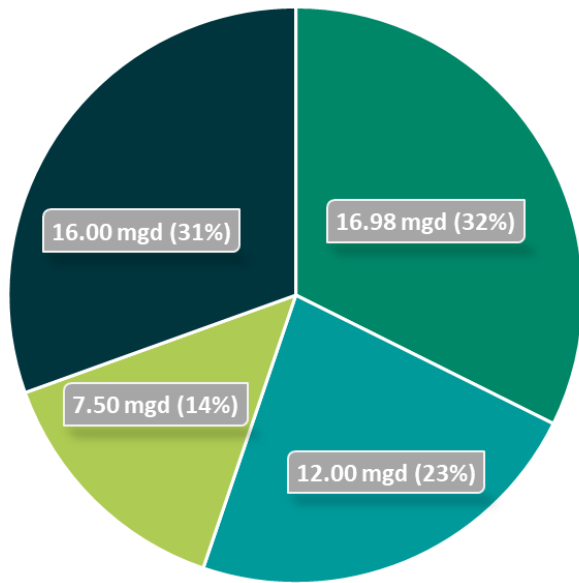
- Construction completion of Canal Pump Station Number 10 (CPS-10). This facility provides additional IQ water system pumping capacity of approximately 16,667 gpm.
- Construction completion of a new irrigation storage and pumping facility: the Southwest Pine Island Road Irrigation Tanks and High Serve Pump Station. The facility provides additional IQ water system storage capacity with two 5.0-MG GSTs and additional distribution system pressure with six high service pumps.
- Construction completion of Weir 29, which provides additional storage capacity for the City's canal network.

### 3.5.2.1 Future IQ Water Needs

The City's existing and future sources of IQ water were used to estimate future IQ water availability on a seasonal basis from FY 2023 through FY 2045. Total annual IQ water availability is provided on a monthly average day basis (**Table 3-16**) and a monthly maximum day basis (**Table 3-17**) for the wet and dry seasons of the year. Total IQ water availability is calculated as the sum of City and externally sourced reclaimed water, City canal water, externally sourced surface water, and supplemental potable water. On a monthly average day basis, total IQ water availability is estimated to reach 73.33 mgd during the wet season and 57.96 mgd during the dry season, in FY 2045. On a monthly maximum day basis, availability is estimated to reach 86.67 mgd during the wet season and 57.96 mgd during the dry season.

**Figure 3-6** and **Figure 3-7** provide a graphical break-down of the City's IQ water supplies by source during the dry season and wet season, respectively. Based on the two figures, which are representative of projected availability in FY 2025, IQ water supplies during the dry season are estimated to be relatively evenly distributed among reclaimed water from the City's WRFs, canal water from the City's freshwater canal network, surface water from the Southwest Aggregates Mine Reservoir, and external sources of reclaimed water from CFM and FGUA. Comparatively, during the wet season, the largest supply of IQ water is estimated to be canal water from the City's freshwater canal network followed by reclaimed water from the City's WRFs and from external entities which share a similar projected IQ water supply availability.

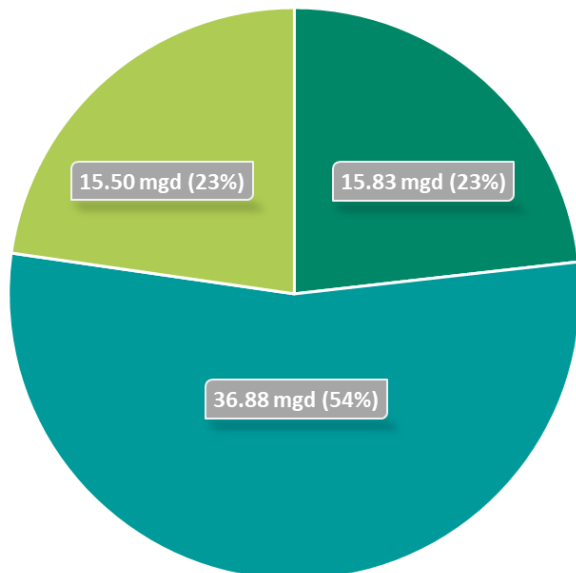
Figure 3-6: Projected IQ Water Availability by Source (Dry Season - FY 2025)



### Dry Season

- Reclaimed Water from City WRFs (16.98 mgd [32%])
- Freshwater Canals (12.00 mgd [23%])
- Externally Sourced Reclaimed Water (7.50 mgd [14%])
- Externally Sourced Surface Water (16.00 mgd [31%])

Figure 3-7: Projected IQ Water Availability by Source (Wet Season - FY 2025)



### Wet Season

- Reclaimed Water from City WRFs (15.83 mgd [23%])
- Freshwater Canals (36.88 mgd [54%])
- Externally Sourced Reclaimed Water (15.50 mgd [23%])

**Table 3-16: Projected IQ Water Availability - Seasonal Monthly Average**

Fiscal Year	Projected Served Wastewater Population <sup>1</sup>	IQ Water Sources (mgd)										Total Irrigation Water Availability (mgd)	
		City Reclaimed Water <sup>2</sup>		Freshwater Canal Network <sup>3</sup>		Externally Sourced Reclaimed Water <sup>3</sup>		Externally Sourced Surface Water <sup>3</sup>		Supplemental Potable Water <sup>4</sup>			
		Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season
2023	168,940	16.27	15.17	12.00	36.88	1.50	3.50	16.00	0.00	1.90	0.00	47.67	55.55
2024	173,080	16.62	15.50	12.00	36.88	7.50	15.50	16.00	0.00	1.90	0.00	54.03	67.88
2025	177,220	16.98	15.83	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	52.48	68.21
2026	181,186	17.31	16.14	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	52.81	68.52
2027	185,151	17.64	16.45	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	53.14	68.83
2028	189,117	17.97	16.76	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	53.47	69.14
2029	193,083	18.30	17.07	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	53.80	69.45
2030	197,049	18.63	17.38	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	54.13	69.76
2031	199,741	18.86	17.59	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	54.36	69.97
2032	202,434	19.09	17.80	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	54.59	70.18
2033	205,127	19.32	18.01	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	54.82	70.39
2034	207,819	19.54	18.23	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	55.04	70.61
2035	210,512	19.77	18.44	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	55.27	70.82
2036	213,445	20.02	18.67	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	55.52	71.05
2037	216,379	20.26	18.89	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	55.76	71.27
2038	219,312	20.50	19.12	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	56.00	71.50
2039	222,246	20.74	19.35	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	56.24	71.73
2040	225,179	20.99	19.57	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	56.49	71.95
2041	228,852	21.28	19.85	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	56.78	72.23
2042	232,524	21.58	20.12	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	57.08	72.50
2043	236,196	21.87	20.40	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	57.37	72.78
2044	239,869	22.17	20.67	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	57.67	73.05
2045	243,541	22.46	20.95	12.00	36.88	7.50	15.50	16.00	0.00	0.00	0.00	57.96	73.33

<sup>1</sup> Served wastewater population projections from recent City Comprehensive Utilities Master Plan Update. Adjusted to utilize a 0.5% annual growth for existing service areas and a UEP construction schedule where one UEP expansion area is added every five years.

<sup>2</sup> Availability based on wastewater population projections, per-capita flow rates of 110 gpcd for existing service areas and 91.2 gpcd for newly constructed areas, and seasonal minimum day flow scale-down factors of 0.83 for the wet season and 0.89 for the dry season (based on historical wastewater flow analysis of past ten fiscal years).

<sup>3</sup> Availabilities for the wet/dry season based upon City input, engineering judgement, WUP permit, FGUA/CFM contracts, and freshwater canals SFWMD permit (wet season).

<sup>4</sup> Supplemental potable water for FY 2023 and FY 2024 estimated based on historical FY 2017 – FY 2022 usage and is anticipated to be zero starting in FY 2025 as other IQ water sources are implemented by the City.

**Table 3-17: Projected IQ Water Availability - Seasonal Monthly Maximum**

Fiscal Year	Projected Served Wastewater Population <sup>1</sup>	IQ Water Sources (mgd)										Total Irrigation Water Availability (mgd)	
		City Reclaimed Water <sup>2</sup>		Freshwater Canal Network <sup>3</sup>		Externally Sourced Reclaimed Water <sup>3</sup>		Externally Sourced Surface Water <sup>3</sup>		Supplemental Potable Water <sup>4</sup>			
		Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season
2023	168,940	16.27	15.17	12.00	50.22	1.50	3.50	16.00	0.00	3.99	0.00	49.76	68.89
2024	173,080	16.62	15.50	12.00	50.22	7.50	15.50	16.00	0.00	3.99	0.00	56.11	81.22
2025	177,220	16.98	15.83	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	52.48	81.55
2026	181,186	17.31	16.14	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	52.81	81.86
2027	185,151	17.64	16.45	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	53.14	82.17
2028	189,117	17.97	16.76	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	53.47	82.48
2029	193,083	18.30	17.07	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	53.80	82.79
2030	197,049	18.63	17.38	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	54.13	83.10
2031	199,741	18.86	17.59	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	54.36	83.31
2032	202,434	19.09	17.80	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	54.59	83.52
2033	205,127	19.32	18.01	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	54.82	83.73
2034	207,819	19.54	18.23	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	55.04	83.95
2035	210,512	19.77	18.44	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	55.27	84.16
2036	213,445	20.02	18.67	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	55.52	84.39
2037	216,379	20.26	18.89	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	55.76	84.61
2038	219,312	20.50	19.12	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	56.00	84.84
2039	222,246	20.74	19.35	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	56.24	85.07
2040	225,179	20.99	19.57	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	56.49	85.29
2041	228,852	21.28	19.85	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	56.78	85.57
2042	232,524	21.58	20.12	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	57.08	85.84
2043	236,196	21.87	20.40	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	57.37	86.12
2044	239,869	22.17	20.67	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	57.67	86.39
2045	243,541	22.46	20.95	12.00	50.22	7.50	15.50	16.00	0.00	0.00	0.00	57.96	86.67

<sup>1</sup> Served wastewater population projections from recent City Comprehensive Utilities Master Plan Update. Adjusted to utilize a 0.5% annual growth for existing service areas and a UEP construction schedule where one UEP expansion area is added every five years.

<sup>2</sup> Availability based on wastewater population projections, per-capita flow rates of 110 gpcd for existing service areas and 91.2 gpcd for newly constructed areas, and seasonal minimum day flow scale-down factors of 0.83 for the wet season and 0.89 for the dry season (based on historical wastewater flow analysis of past ten fiscal years).

<sup>3</sup> Availabilities for the wet/dry season based upon City input, engineering judgement, WUP permit, FGUA/CFM contracts, and freshwater canals SFWMD permit (wet season).

<sup>4</sup> Supplemental potable water for FY 2023 and FY 2024 estimated based on historical FY 2017 – FY 2022 usage and is anticipated to be zero starting in FY 2025 as other IQ water sources are implemented by the City.

An IQ water system gap analysis was conducted to evaluate the City's projected available IQ water supplies for comparison to the projected IQ water demands. Monthly average day demands, and monthly maximum day demands were evaluated on a seasonal basis to identify potential supply deficits. On a monthly average basis, the City's IQ water system is projected to satisfy demands through FY 2045 during the wet seasons and dry seasons. On a monthly maximum basis, the IQ water system is projected to satisfy demands through FY 2045 during the wet seasons. However, a supply deficit occurs during the dry seasons starting in FY 2030. Although there has been a continued annual increase in IQ water demands and per-capita demands in recent fiscal years, **Table 3-18** shows a different projected schedule for the occurrence of IQ water supply deficits when compared to the gap analysis performed in the City's 2022 Comprehensive Utilities Master Plan Update. This is attributable to the revision of the UEP program construction schedule and a decrease in the projected per-capita demand for future customers. The per-capita demand decrease is due to new irrigation system efficiency requirements included in the City's irrigation ordinance, and due to the implementation of SISs.

**Table 3-18: IQ Water System Gap Analysis – Seasonal Basis**

Description			Projected											
			2023		2025		2030		2035		2040		2045	
Fiscal Year			Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season	Dry Season	Wet Season
IQ Water Service Area Population	Existing SA	A	130,104		131,386		134,671		138,037		141,488		145,025	
	New UEPs	B	7,950		21,185		37,730		48,155		59,614		79,620	
	Total SA	C = A + B	138,054		152,571		172,401		186,192		201,102		224,645	
IQ Water per-Capita Demand (gpcd)	Existing SA	D	250		250		250		250		250		250	
	New UEPs <sup>1</sup>	E = D x 80%	200		200		200		200		200		200	
IQ Water Demand (mgd)	Annual Avg. Day	F = (A x D) + (B x E)	34.12		37.08		41.21		44.14		47.29		52.18	
	Monthly Avg. Day <sup>2</sup>	G = (F x 1.08) & (F x 0.93)	36.85	31.73	40.05	34.49	44.51	38.33	47.67	41.05	51.08	43.98	56.35	48.53
	Monthly Max. Day <sup>3</sup>	H = (F x 1.41) & (F x 1.27)	48.10	43.33	52.29	47.10	58.11	52.34	62.24	56.06	66.69	60.06	73.57	66.27
Available IQ Water Supply (mgd) <sup>4</sup>	Monthly Avg. Day	I	47.67	55.55	52.48	68.21	54.13	69.76	55.27	70.82	56.49	71.95	57.96	73.33
	Monthly Max. Day	J	49.76	68.89	52.48	81.55	54.13	83.10	55.27	84.16	56.49	85.29	57.96	86.67
IQ Water Surplus/Deficit (mgd)	Monthly Avg. Day	K = I - G	10.82	23.82	12.43	33.73	9.62	31.43	7.60	29.77	5.41	27.97	1.61	24.80
	Monthly Max. Day	L = J - H	1.65	25.56	0.19	34.46	(3.98)	30.76	(6.97)	28.10	(10.20)	25.23	(15.61)	20.40

<sup>1</sup> Per-capita demand rate associated with New UEPs accounts for 20% demand reduction resulting from use of SISs and higher efficiency customer irrigation systems.

<sup>2</sup> Dry season and wet season average per-capita demand rates based on seasonal average day demand multipliers of 1.08 for the dry season and 0.93 for the wet season, respectively.

<sup>3</sup> Dry season and wet season maximum per-capita demand rates based on seasonal maximum day demand multipliers of 1.41 for the dry season and 1.27 for the wet season, respectively.

<sup>4</sup> Supply availability based on reclaimed water produced at City WRFs, fresh water from the City's canal network, externally sourced reclaimed water and surface water, and supplemental City potable water. Refer to **Table 3-16** and **Table 3-17**.

It should be noted that seasonal monthly maximum conditions represent a worst-case scenario, and that the City is actively addressing the increasing IQ water maximum daily demands through modifications to the year-round watering schedule (refer to **Section 3.7.2.1**). New efficiency requirements for customer irrigation systems and the implementation of SISs by new customers further promote IQ water conservation and also help to reduce IQ water demands (refer to **Section 3.7.2.1**). Additionally, the City is also evaluating the feasibility of an ASR program for the temporary storage of excess water during the wet season, for recovery and use during the dry season.

## 3.6 Water Supply Provided by Other Entities

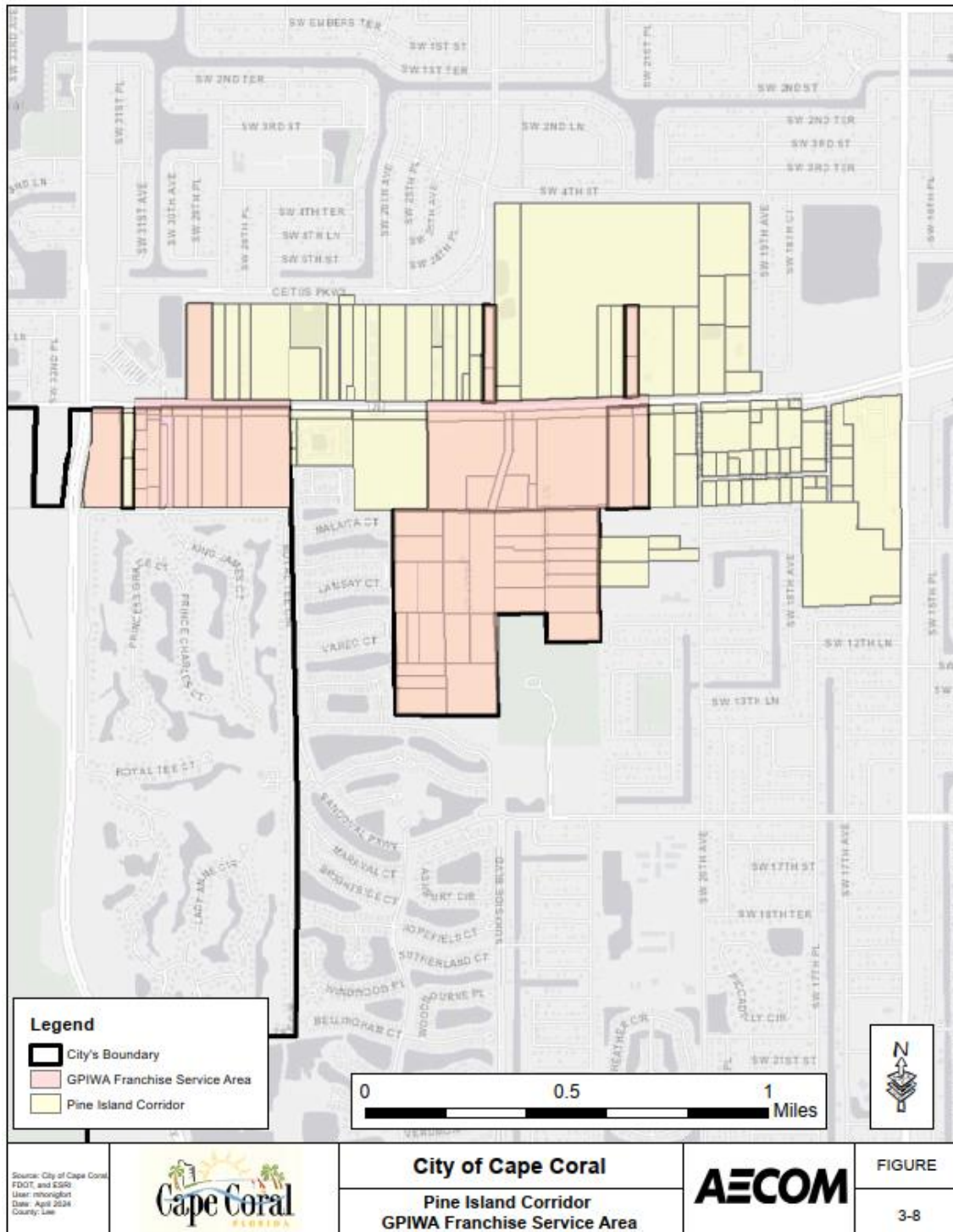
Lee County has an existing franchise agreement with the GPIWA in which potable water utility service is provided to some developed parcels within the Pine Island Road Corridor, by the GPIWA. The Pine Island Road Corridor is a small development area situated on the western side of Cape Coral and outside of any UEP expansion areas. The franchise agreement was extended by Lee County in 2020 and is now effective for a period of thirty years, until 2050. The franchise area within the Pine Island Road Corridor is bound on the north by Ceitus Parkway, on the east by Southwest 20<sup>th</sup> Avenue, on the south by Saddlewood Lane, Anguilla Drive, and Royal Tee Circle, and on the west by Bridle Lane and Veteran's Memorial Parkway. The extent of the GPIWA franchise area within the Pine Island Road Corridor is shown in **Figure 3-8**. The City currently does not have any plans to purchase and take ownership of the GPIWA potable water infrastructure prior to the expiration of the franchise agreement with Lee County.

With regard to IQ water, the City has entered into interlocal agreements with the FGUA and the CFM for the supply of reclaimed water, and has also received a WUP from the SWFWMD for the use of a seasonal surface water supply source (Southwest Aggregates Mine Reservoir). The 2017 agreement with the FGUA replaces a previous agreement from 2004 between the City and North Fort Myers Utility, Inc, and provides the City with a minimum reclaimed water flow of 1.5 mgd (AADF), a maximum flow of 3.5 mgd (AADF), and a peak flow of 6.0 mgd (AADF).

The interlocal agreement with CFM provides the City with a minimum reclaimed water supply of 6 mgd and a maximum of 12 mgd. The City has started to receive reclaimed water from the CFM in the beginning of 2024 with the completion of a new transmission main across the Caloosahatchee River.

The Southwest Aggregates Mine Reservoir WUP supplies the City with seasonal surface water to supplement the IQ water system. The WUP permits a peak monthly usage of 16 mgd for up to 90 days per year during the dry season. Following the completion of a pilot study in 2017, the City has pumped water from the reservoir each year since 2020 to supplement the City's freshwater canals.

**Figure 3-8: Pine Island Road Corridor GPIWA Franchise Service Area**



### 3.7 Conservation Efforts

The City has implemented several water conservation programs primarily directed toward reducing the amount of potable water that is used by City residents to irrigate lawns and landscaped areas. The City also has programs promoting household water conservation.

### 3.7.1 Countywide/Regional Efforts

The 2022 LWC Water Supply Plan Update identifies various water conservation programs that are administered on a countywide, regional, or district level. Provided below is a list of some water conservation programs that are applicable to the LWC Planning Area, and are referenced from the SFWMD 2022 LWC Water Supply Plan Update. The SFWMD Cooperative Funding Program and the Regulatory Initiatives appear to be the most applicable to the City.

- **SFWMD Cooperative Funding Programs (Water Conservation Component)** – Offers funding incentives for local governments and utilities to introduce technology-based and hardware-based water conservation projects. The water conservation component of the program has helped fund 60 projects with a combined total of approximately \$3 million following the 2017 LWC Water Supply Plan Update. Within the LWC Planning Area, the program has helped fund 3 conservation projects which has resulted in an estimated water savings of approximately 0.08 mgd, since 2017.
- **Regulatory Initiatives** – The SFWMD has established various regulatory requirements intended to promote water conservation on a district level. The SFWMD requires that users applying for a WUP include a water conservation plan as a part of their permit application. Specific water conservation requirements for the WUP vary by the intended water use category. Additionally, the SFWMD has established the Mandatory Year-Round Landscape Irrigation Conservation Measures Rule (Chapter 40E-24, F.A.C.), which conditionally restricts the weekly number of permitted irrigation days for landscape irrigation usage.
- **Agricultural Best Management Practices Program** – The Florida Department of Agriculture and Consumer Services (FDACS) has established a best management practices (BMP) program for various agricultural operations, and awards agricultural water users that pioneer environmentally-conscious farming practices. Approximately 534,966 acres of land within the LWC Planning Area are registered in the program as of March 2022.
- **Agricultural Mobile Irrigation Labs** – The FDACS also provides agricultural water users with free irrigation system assessments through the department's mobile irrigation labs. The labs evaluate system efficiencies and provide a resulting list of recommended improvements intended to further increase system effectiveness. Improvements may include changes to irrigation scheduling, system management, or system technology/equipment. There is currently one mobile irrigation lab designated for Charlotte County, Collier County, Glades County, Hendry County, and Lee County.

### 3.7.2 Local Government Specific Actions, Programs, Regulations, and Opportunities

The City has implemented a number of water conservation elements including restrictions on permitted water usage, use of Florida-friendly planting principles, requirement of ultra-low volume plumbing in new construction, a water conservation based rate structure, a meter replacement program, rain sensor over-rides for new lawn sprinkler systems, and public educational programs. Summary information on each of these elements is provided below.

#### 3.7.2.1 Restrictions on Permitted Water Use

The City has implemented the following year-round irrigation conservation measures that are more stringent than the statutory measures detailed in Chapter 40E-24 F.A.C.

### Year-Round Watering Schedule

As of June 2022, the City has executed a new year-round two-day irrigation watering schedule. The updated schedule, which is intended to manage City resident watering demands more effectively, adds eight additional watering timeslots and adds Tuesday as a permitted lawn watering day (previously a non-watering day). These schedule changes reduce the number of City residents irrigating simultaneously by 40%.

Included below is the list of days and timeslots that City residents are permitted to use for watering. All City residents are allowed to water two days per week regardless of the source for the irrigation water. Permitted watering times are regulated by the last number of the property address.

For addresses ending in 0:	Monday and Thursday, 8 p.m. to 11:59 p.m.
For addresses ending in 1:	Monday and Thursday, midnight to 4 a.m.
For addresses ending in 2:	Monday and Thursday, 4 a.m. to 8 a.m.
For addresses ending in 3:	Tuesday and Friday, 8 p.m. to 11:59 p.m.
For addresses ending in 4:	Tuesday and Friday, midnight to 4 a.m.
For addresses ending in 5:	Tuesday and Friday, 4 a.m. to 8 a.m.
For addresses ending in 6:	Wednesday and Saturday, 8 p.m. to 11:59 p.m.
For addresses ending in 7:	Wednesday and Saturday, midnight to 4 a.m.
For addresses ending in 8:	Wednesday and Sunday, 4 a.m. to 8 a.m.
For addresses ending in 9:	Thursday and Sunday, 8 p.m. to 11:59 p.m.

For properties or developments up to and including five acres in size that have an irrigation system that simultaneously irrigates multiple properties with different watering times including, but not limited to, duplexes, multi-family units, compound use and mixed-use units, the watering schedule shall be allowed on Thursday and Sunday from 12:00 a.m. to 4:00 a.m.

For properties or developments more than five acres in size that have an irrigation system that simultaneously irrigates multiple properties with different watering times including, but not limited to, multi-family, compound use and mixed use units, the watering schedule shall be allowed on Mondays and Fridays from 12:00 a.m. to 8:00 a.m.

### Other Watering Restrictions

Watering of new lawns and landscaping during a 30-day establishment period shall be permitted on Monday, Tuesday, Wednesday, Thursday, Saturday and Sunday from 2:00 a.m. to 8:00 a.m. Irrigation of new landscaping which has been in place for thirty-one (31) to ninety (90) days shall be permitted on Monday, Wednesday, Thursday and Saturday from 2:00 a.m. to 8:00 a.m.

During any time change from Standard to Daylight Savings or vice versa, a 30-day grace period shall be in effect to allow residents to reset their sprinkler timers. Residents will not be cited for watering within one hour before the beginning or one hour after the end times provided above within the 30-day grace period.

Additionally, businesses with watering times between 8 p.m. to 11:59 p.m. may water between 12:00 a.m. and 4:00 a.m. so as not to interfere with normal business operations.

The City's Code of Ordinances includes requirements for restrictions on water use during times an "emergency situation" is declared by SFWMD or when the City of Cape Coral Commission determines a reduction in water consumption is necessary to alleviate a local water shortage within the City of Cape Coral's water system. In such cases, the City will apply an Emergency Water Conservation Plan in order to ensure and preserve an adequate supply of water resources for irrigation purposes in order to protect the health, safety, and welfare of the citizens.

Water restrictions may include reduction of hours and days allowed for irrigation, washing of vehicles, washing of outdoor surfaces, operation of ornamental fountains, operation of air conditioning without a recirculation system, limitations on filling and use of swimming pools, limitations on escapement of water through defective plumbing, restrictions on hotels and restaurants as to the minimum amount of water necessary to conduct operations and other restrictions as necessary.

### **2023 Revisions to City Code of Ordinances, Chapter 19, Article VII**

In June 2023, Chapter 19, Article VII (Water Management) of the City's Code of Ordinances was amended to establish new requirements that primarily target improved irrigation system efficiency and enhanced irrigation system installation/modification documentation and standards. Provided below is a summary list of changes that were included with this 2023 amendment:

#### ***Permits***

A permit shall be required for new installation of landscape irrigation systems, and modifications to an existing irrigation system that cost \$2,500.00 or greater in labor and material based on invoice value. City Council shall establish, by resolution, a landscape irrigation permit fee.

#### ***Design Drawings***

Design drawings shall be provided for the installation of irrigation systems prior to start of construction of the irrigation system. Design drawings shall be prepared by a licensed professional engineer, licensed plumbing/irrigation contractor or licensed landscape architect. Design drawings for single family homes may be neatly hand drawn and to scale.

A design drawing shall be required for irrigation systems installed on non-residential, multi-family residential, and residential developments or buildings, and shall contain the following information:

- a. Location, type and size of all components including sprinklers, micro-irrigation, main and lateral piping, master valves, valves, moisture sensors, rain sensors, controllers, pump start relays, backflow prevention devices, pumps, wells, etc.
- b. The flow rate, application rate (inches per hour), and the manufacturer's specifications for operating pressure for the sprinklers and micro-irrigation within each zone.
- c. The name, address, phone, email, professional license or certification number of the installation contractor and date of installation.
- d. Design drawings for non-residential and multi-family residential buildings shall also include pump station size, pump station location, design operating pressure per manufacturer's specifications, and flow rate per zone, precipitation rate per zone, locations of pipe, controllers, valves, sprinklers, sleeves, gate valves, sensors, etc.

### ***Irrigation System Inspection***

New irrigation systems or modifications to existing irrigation systems shall be inspected by the City after installation of a new, or modification of an existing irrigation system. Development Services Department inspectors shall be responsible for irrigation system plan reviews, approval, and inspection services.

### ***Irrigation Design Standards***

The irrigation system shall be designed to achieve a minimum of 70% efficiency by providing sprinkler head placement and nozzle selection that are within manufacturer's specifications. Irrigation systems shall be designed to comply with Title XXVIII, Chapter 373, Section 228, Florida Statutes, and the standards adopted by the City and reference the Florida Building Code, Plumbing Volume, Appendix F.

### ***Completion of Installation or Substantial Modification***

A property owner or licensed irrigation contractor who installs an irrigation system shall conduct final testing and adjustments to achieve design specifications prior to completion of the system. A property owner or licensed irrigation contractor who installs or performs work on an automatic irrigation system shall test for the correct operation of each technology that inhibits or interrupts operation of the system during periods of sufficient moisture. If such devices or switches are not installed in the system or are not in proper operating condition, the property owner or licensed irrigation contractor shall install new ones or repair the existing ones and confirm that each device or switch is in proper operating condition before completing other work on the system.

### ***Maintenance of Irrigation Systems***

Upon irrigation system completion, a licensed irrigation contractor responsible for installing or substantially modifying an irrigation system shall provide the property owner with a maintenance checklist affixed to or near the controller and accompanied by accurate design drawings, recommended maintenance schedule, proper irrigation system settings according to season, recommendations for checking technology that inhibits or interrupts operation of the system during periods of sufficient moisture, filter cleaning recommendations, if applicable, and information on the current water restrictions. These contractor requirements will not impede the inspection process if not completed at time of final inspection.

The following items are exempted from the above requirements, but should follow applicable Florida Friendly Best Management Practices for Protection of Water Resources by Green Industries:

- a. Bonafide agricultural activities.
- b. Athletic fields.
- c. Golf course play areas.
- d. Nurseries.
- e. Required watering in of lawn chemicals.
- f. Pressure washing, car, truck or trailer washing, boat washing, and flushing boat motors after salt water use.
- g. Low volume hand watering.

- h. Water use for cleaning, adjusting, and repair or irrigation systems provided that an attendant is on site and for not more than ten minutes per week for the entire irrigation system (if the irrigation system is not divided into areas or “zones”) or for not more than ten minutes per area or “zone” per week (if the irrigation system is divided into areas or “zones”).

### *Use of Florida-Friendly Landscape Principles*

The City sponsors the Florida Friendly Landscaping Program/ Florida Yards and Neighborhoods Program in Cape Coral. The program is a partnership between the landscape industry, the University of Florida Cooperative Extension Service, Florida’s National Estuary Programs, Florida’s Sea Grant College Program, and various State and local environmental agencies. The program focuses on yards, as they are the first line of defense for estuaries, rivers, lakes, aquifers and the City’s canal system.

The Florida Friendly Landscaping program adheres to the nine (9) basic principles that, if implemented properly, are designed to reduce the adverse impacts of a yard on storm water quality. Each principle contains a series of actions that landowners can take to improve the environmental health of the waterways these yards drain to. Through implementation of the principles and actions program participants are awarded points, or ‘inches.’ When a participating yard achieves 36 inches (a ‘yard’), the yard receives a plaque, which can be placed in the yard to let everyone know that the subject property is a “Certified Florida Yard.” The program’s 9 principles are:

1. Right plant, right place. Plants selected to suit a specific site will require minimal amounts of water, fertilizer and pesticides.
2. Water efficiently. Irrigate only when lawn and landscape need water.
3. Fertilize appropriately. Less is often better. Over-use of fertilizer can be hazardous to your yard and the environment.
4. Mulch. Maintaining a layer of mulch will help retain soil moisture, prevent erosion and suppress weeds.
5. Attract wildlife. Plants in private yards that provide food, water and shelter can conserve Florida’s diverse wildlife.
6. Manage yard pests responsibly. Unwise use of pesticides can harm people, pets, beneficial organisms, and the environment.
7. Recycle yard waste. Grass clippings, leaves, and yard trimmings recycled onsite provide nutrients to the soil and reduce waste disposal.
8. Reduce stormwater runoff. Water running off from private yards can carry pollutants such as soil, debris, fertilizer, and pesticides that can adversely impact water quality.
9. Protect the waterfront. Waterfront property is very fragile and should be carefully protected to maintain freshwater and marine ecosystems.

More information on these nine principles can be found on the City’s website through the following link: [www.capecoral.gov/departments/public\\_works/florida\\_yards\\_and\\_neighborhoods.php](http://www.capecoral.gov/departments/public_works/florida_yards_and_neighborhoods.php).

### **Requirement of Ultra-Low Volume Plumbing in New Construction**

The City has adopted the Florida Building Code (FBC) which contains plumbing flow restriction requirements. The Code prohibits an ENTITY within its jurisdiction from enacting standards less stringent from the FBC. The City's Building and Inspection Services Division also includes in their procedures provisions for new construction to have water conservation control devices installed per the Florida Plumbing Code, as a condition for granting certificates of occupancy.

### **Water Conservation Based Rate Schedule**

The City of Cape Coral has a conservation-based water rate structure, which includes an increasing rate with increasing use, as a means of reducing demand.

### **Meter Replacement Program**

Unaccounted for water summaries are submitted to the District annually. The average annual estimated unaccounted water loss for the years 2018 - 2022 was 7.92 percent.

### **Rain Sensors Overrides for New Lawn Sprinkler System**

The City has adopted the FBC, which requires the installation of rain sensors on new irrigation systems. Additionally, the City abides by all of the County's landscape Code requirements regarding rain sensors on automatic lawn sprinkler systems.

### **Public Information Program**

This program provides water conservation information and practices to the City's residents and customers through the City's webpage, the annual Water Quality Report, and the City's Publication, "On The Move". The City speaks to schools and community groups on water issues as well as participates in "Green" events at local schools. The City airs videos on reuse as well as water issues. The City will coordinate future water conservation efforts with the SFWMD. In addition, the City will continue to support and expand existing goals, objectives and policies in the comprehensive plan promoting water conservation in a cost-effective and environmentally sensitive manner. The City will continue to actively support the SFWMD in the implementation of new regulations or programs designed to conserve water during the dry season.

## **3.8 Reuse**

State law supports reuse efforts. Florida's utilities, local governments, and water management districts have led the nation in the quantity of reclaimed water reused and public acceptance of reuse programs. Section 373.250(1) F.S. provides "the encouragement and promotion of water conservation and reuse of reclaimed water, as defined by the department, are state objectives and considered to be in the public interest."

Following the adoption of Senate Bill 64 pertaining to reclaimed water, Section 373.250(3)(d) F.S. establishes that "the SFWMD shall require the use of reclaimed water made available by the elimination of wastewater ocean outfall discharges as provided for in Section 403.086(10) in lieu of surface water or groundwater when the use of reclaimed water is available; is environmentally, economically, and technically feasible; and is of such quality and reliability as is necessary to the user." Section 403.086(10) further states that "the discharge of domestic wastewater through ocean outfalls wastes valuable water supplies that should be reclaimed for beneficial purposes to meet public and natural

systems demands". Overall, state law finds that "reuse is a critical component of meeting the state's existing and future water supply needs while sustaining natural systems", per Section 403.064(1), F.S.

The City has been able to significantly reduce its average daily potable water demands by constructing and operating a reclaimed water system. The Water Independence for Cape Coral program was started in the late 1980s and continues to reduce the impact irrigation has on the Mid Hawthorn Aquifer.

### **3.8.1 Local Government Specific Actions, Programs, Regulations, and Opportunities**

The City supports water reuse initiatives under consideration by both the SFWMD and Lee County, and the implementation of new regulations or programs designed to increase the volume of reclaimed water used and to increase public acceptance of reclaimed water. The City's water conservation program encourages both conservation of water and use of alternative water supplies, such as reclaimed water for irrigation.

The City's IQ water system is primarily supplied by treated effluent from the City's two WRFs and by freshwater canal water pumped from six City-operated freshwater canal pumping stations. The City's Water Reclamation Division operates and maintains the 13.4 mgd Everest WRF, the 15.0 mgd Southwest WRF, 340 wastewater lift stations throughout the City, and 6 freshwater canal pump stations that pump canal water into the IQ water system. The Water Reclamation Division is responsible for processing wastewater so that, following treatment, it meets and/or exceeds all standards and permit requirements established by the Environmental Protection Agency (EPA) and the Florida Department of Environmental Protection (FDEP) for deep-well injection, reuse for the City's IQ water system, or surface water body discharge (for the Everest WRF only).

The City's freshwater canal system provides storage through an extensive system of weirs and pumping stations. Twenty-nine weirs strategically located within the canal network and five canal inter-connections provide the ability to store water during the rainy season for dry season use. The freshwater canal system also provides management of excess storm water flows, which protect the sensitive estuary environment and provide flood control. During the dry season, the City may supplement freshwater canal levels by introducing surface water from the Southwest Aggregates Mine Reservoir to the canal network by way of the Gator Slough Canal.

## **3.9 Intergovernmental Coordination Activities**

For the purpose of this Work Plan, intergovernmental coordination activities are considered to primarily refer to the existing potable water and IQ water (reclaimed water and surface water) agreements, permits, and coordination efforts between the City and neighboring utilities as well as with the SFWMD.

The City has interlocal reclaimed water purchase agreements with the FGUA and CFM, as well as a surface water WUP from the SWFWMD for the Southwest Aggregates Mine Reservoir, in order to supplement the City's IQ water supplies. The agreements align with the City's goals in maintaining reliable IQ water LOSSs and do not require revisions at this time to maintain adequate utility service or compliance with regulations.

Lee County's franchise agreement with the GPIWA stipulates that the GPIWA provide potable water service to a small western area of Cape Coral currently not being served by the City's potable water utilities. The GPIWA will continue to serve this area until 2050 based on an extension of the agreement in 2020. The franchise agreement aligns with the City's goals in maintaining reliable potable water LOSSs and does not require revisions at this time to maintain adequate utility service or compliance with regulations.

# 4. Capital Improvements

## 4.1 Work Plan Projects

The City actively updates its Capital Improvement Program (CIP) on an annual basis to ensure that necessary improvements and programs are included to maintain a reliable utility service that meets the City's adopted LOSSs. The City's recent CIP for FY 2024 to FY 2028 is provided in **Table 4-1**, but has been modified to only include relevant potable water and IQ water projects. Based on the potable water and IQ water analyses performed in earlier sections, the City has a sufficient raw water WUP allocation to sustain potable water service through FY 2045. With regard to system production capacity, the City has sufficient potable water production capacity through FY 2045 with the recommended facility expansions identified in the recent City Comprehensive Utilities Master Plan Update and noted herein.

IQ water demands vary seasonally. The City's IQ water system is estimated to be capable of satisfying IQ water demands through FY 2045 on a monthly average basis during both dry seasons and wet seasons. On a monthly maximum demand basis, the IQ system is able to satisfy demands through FY 2045 during wet seasons, but begins to reach a supply deficit during the dry season starting in FY 2030. The City has been pro-active in addressing potential future deficits by implementing modifications to the year-round watering schedule, and by implementing more stringent customer irrigation system requirements which institute higher system efficiencies. Modifications to the watering schedule are expected to reduce maximum daily demands through the addition of more watering time slots. The City is also assessing the potential of an ASR program to temporarily store excess water during the wet season, for recovery and use during the dry season.

Included below is a list of major potable water and IQ water improvements and programs that were submitted by the City and have been included in the 2022 LWC Water Supply Plan Update for the City of Cape Coral:

### Potable Water

- **Southwest RO WTP Replacement** – Replacement of the City's Southwest RO WTP due to facility age, condition, and a concern pertaining to the existing RO membranes no longer being manufactured. The replacement WTP will maintain the same treatment capacity as the original facility.
- **North RO WTP Back-up Deep Injection Well** – Construction of a back-up deep injection well for the North RO WTP. The facility currently only has one deep injection well for concentrate disposal.
- **North RO WTP Wells** – Construction of additional raw water production wells in the City's North Wellfield. A total of twenty production wells are planned across three phases with new raw water transmission mains and associated improvements planned as needed.

### Non-Potable Water

- **Reuse Interconnect with Fort Myers** – Construction of an interconnect pipeline across the Caloosahatchee River to convey excess reclaimed water from the CFM to the City's Everest WRF.
- **Southwest WRF Upgrade** – Refurbishment of the Southwest WRF to maximize the 15.0 mgd treatment capacity to accommodate future projected flows. Refurbishment includes modifications to or replacement of the existing headworks facility and existing WRF filters. Additionally, evaluations of and modifications to the

existing power distribution and controls system, and modifications to convert feed power from the Generator 2 building to MCC-1 will be completed.

- **North WRF Phase I** – Construction of a new ‘North’ WRF to accommodate future projected flows from northern areas of the City’s future service area.
- **ASR Wells for irrigation Water Supply** – Improvements to store excess surface water in proposed ASR wells.

In addition to the above listed improvements, the City is also planning the following major potable water and IQ water projects which are not listed in the 2022 LWC Water Supply Plan Update:

- **Utilities Expansion Program** – Continued extension of utilities to unserved areas of the City through the UEP prioritization list established in the recent Comprehensive Utilities Master Plan Update. Current efforts are focused on the ‘North 1’ expansion area which includes new reuse storage tanks and a new pumping system.
- **North-South Transfer Station Rehabilitation and Select Canal System Weir Improvements** – Previously mentioned in **Section 3.5.2**; full rehabilitation of the North-South Transfer Station including electrical systems, control systems, and pump capacity improvements among other items. This project also includes control structure replacements/installations, modifications, and improvements to eleven weirs within the City’s canal network (Weir-58, Weir-9, Weir-4, Weir-8, Weir 1, Weir-2, Weir-7, Weir-11, Weir-13, Weir-14, and Weir-15).
- **North RO WTP Expansion and GST Construction** – Expansion of the North RO WTP production capacity from 12.0 mgd to 18.0 mgd (6.0 mgd expansion) through the addition of two new RO production trains. This project also includes construction of a new 12.0 MG potable water GST.
- **Southwest Aggregates Mine Reservoir Conveyance Improvements** – Previously mentioned in **Section 3.5.2**; construction of a pipeline for conveyance of water from the Southwest Aggregates Mine Reservoir to eliminate water lost by using the US-41 drainage swales as a temporary conveyance measure.
- **Southwest Aggregates Mine Reservoir Storage Enhancement** – Previously mentioned in **Section 3.5.2**; Conceptual design, permitting and Basis of Design Report preparation for wet season conveyance of excess surface water from Babcock Webb Wildlife Management Area to the Southwest Aggregate Mine Reservoir to maximize storage volumes and decrease excess inundation.
- **Pine Island Road Corridor Main improvements** – Construction of new potable water and IQ water mains (as well as sanitary sewer mains and lift stations) within the Pine Island Road Corridor West.
- **Viscaya Water Line Replacement** – Construction and installation of a new 16-inch ductile iron potable water main along Country Club Boulevard and Viscaya Parkway from Nicholas Parkway to Del Prado Boulevard. This project includes approximately 5,700 feet of 16-inch potable water main and 600 feet of horizontal directional drill.
- **Neighborhood Water Line Replacements** – Phased construction and installation of new potable water and IQ water mains along Nicholas Parkway to Dominica Canal, Dominica Canal to Damao Canal, Damao Canal to Veterans Canal, and Veterans Canal to Wayne Canal.
- **Everest WRF Reuse Pump Station Replacement** – Replacement of the existing reuse pump station at the Everest WRF.

**Table 4-1: FY 2024 - FY 2028 Capital Improvement Program**

Project Title	FY 2024 (\$)	FY 2025 (\$)	FY 2026 (\$)	FY 2027 (\$)	FY 2028 (\$)	Project Total (\$)
North 1 East UEP Fiber Optics Conduit	\$3,612,578	-	-	-	-	\$3,612,578
North 3 UEP Fiber Optics Conduit	\$553,011	\$4,977,094	-	-	-	\$5,530,105
North 4 UEP Fiber Optics Conduit	-	-	-	\$5,381,788	-	\$5,381,788
NRO RO WTP Expansion Phase II & 12 MG PW Storage Tank	-	-	\$41,421,680	-	-	\$41,421,680
Veterans Parkway Transmission	-	\$47,000,000	-	-	-	\$47,000,000
ADM-56 US 41 Conveyance	\$5,000,000	-	-	-	-	\$5,000,000
ADM-56 US-41 Conveyance	\$14,000,000	-	-	-	-	\$14,000,000
Viscaya Water Line Replacement – Nicholas Pkwy to Del P	-	\$17,837,315	-	-	-	\$17,837,315
Country Club Pipe Replacement	-	\$20,000,000	-	-	-	\$20,000,000
NRO-10 Rehab/Rpl Raw Wtr Well	\$10,200,000	\$10,200,000	\$14,700,000	\$14,700,000	\$14,700,000	\$64,500,000
WRE-XX EWR Reuse Pump Station Rep	\$450,000	\$10,000,000	-	-	-	\$10,450,000
IRR-1 Weir Improvements	-	\$6,666,667	\$6,666,667	\$6,666,667	-	\$20,000,001
Phase 2 Palm Tree Water Line Replacement	-	\$19,200,000	-	-	-	\$19,200,000
Phase 3 Palm Tree Water Line Replacement	-	-	-	\$10,200,000	-	\$10,200,000
North Deep Injection Well (DIW)	\$4,000,000	\$8,500,000	\$9,500,000	-	-	\$22,000,000
North RO Distribution Pump and Motor	-	\$2,800,000	\$15,360,000	\$9,200,000	-	\$27,360,000
Phase 1 – Neighborhood Water Line Replacement (Nicholas to Dominica Canal)	-	-	\$1,000,000	\$12,000,000	-	\$13,000,000
Phase 2 – Neighborhood Water Line Replacement (Dominica to Damao Canal)	-	\$1,000,000	\$12,200,000	-	-	\$13,200,000
Phase 3 – Neighborhood Water Line Replacement (Damao to Veterans Canal)	\$900,000	\$14,900,000	-	-	-	\$15,800,000

Project Title	FY 2024 (\$)	FY 2025 (\$)	FY 2026 (\$)	FY 2027 (\$)	FY 2028 (\$)	Project Total (\$)
Phase 4 – Neighborhood Water Line Replacement (Veterans to Wayne Canal)	\$1,000,000	\$16,800,000	-	-	-	\$17,800,000
North Area 1 East Potable Water Transmission	-	\$13,336,467	-	-	-	\$13,336,467
North Area 1 East Irrigation Transmission	-	\$17,146,887	-	-	-	\$17,146,887
North Area 3 Potable Water Transmission	\$3,571,611	-	\$10,598,555	-	-	\$14,170,166
North Area 3 Irrigation Transmission	\$2,742,693	-	\$8,138,789	-	-	\$10,881,482
North Area 4 Potable Water Transmission	-	-	-	-	\$8,855,072	\$8,855,072
North Area 4 Irrigation Transmission	-	-	-	-	\$14,188,256	\$14,188,256
North Area 1 West Potable Water Transmission	\$13,792,672	-	-	-	-	\$13,792,672
North Area 1 West Irrigation Transmission	\$14,413,357	-	-	-	-	\$14,413,357
Annual Fiscal Year Grand Total (\$)	\$74,235,922	\$210,364,430	\$119,585,691	\$58,148,455	\$37,743,328	\$500,077,826

# 5. Comprehensive Plan

## 5.1 Goals, Objectives, and Policies

The goals, objectives, and policies (GOPs) of the City's Comprehensive Plan have been reviewed for consistency with the Work Plan. The Work Plan continues to be consistent with the City's Comprehensive Plan and thus no modifications to the plan are needed. No changes are proposed to the City's goals, objectives and policies.

The following GOPs were adopted in the original Work Plan and have been reviewed to identify the need for any updates or revisions:

- Coordination of land and future land use changes with the availability of water supplies and water supply facilities.
- Revision to potable water level of service standards for residential and non-residential users.
- Provision for the protection of water quality in the traditional and new alternative water supply sources.
- Revision of priorities for the replacement of facilities, correction of existing water supply and facility deficiencies, and provision for future water supply and facility needs.
- Provision for conserving potable water resources, including the implementation of reuse programs and potable water conservation strategies and techniques.
- Provision for improved or additional coordination between a water supply provider and the recipient local government concerning the sharing and updating of information to meet ongoing water supply needs.
- Coordination between local governments and the water supply provider in the implementation of alternative water supply projects, establishment of level of service standards and resource allocations, changes in service areas, and potential for annexation.
- Coordination of land uses with available and projected fiscal resources and develop a financially feasible schedule of capital improvements for water supply and facility projects.
- Additional revenue sources to fund water supply and facility projects.
- Coordination with the respective regional water supply plan entities.
- Update the Work Plan within 18 months following the approval of a regional water supply plan.
- Concurrency requiring water supplies at the building permit stage.

## 5.2 Work Plan Incorporation and Adoption

The 2023 Water Supply Facilities Work Plan will be incorporated into the City's Comprehensive Plan as a standalone document that is referenced within the Comprehensive Plan and attached as a supporting appendix. The City will update Policy 2.3.5 of Chapter 5, the Infrastructure Element, to reflect adoption of the 2023 Water Supply Facilities Work Plan once the document has been finalized.

## 6. References

AECOM Technical Services, Inc (2022), *Comprehensive Utilities Master Plan Update: 2020 – 2040 Planning Horizon*, Prepared for the City of Cape Coral, November 2022.

AECOM Technical Services, Inc (2019), *2017 Water Supply Facilities Work Plan*, Prepared for the City of Cape Coral, May 2019.

MWH, Inc (2011), *IRR-2 Irrigation and ASR Master Plan*, Prepared for the City of Cape Coral, June 2011.

MWH, Inc (2005), Letter to the SFWMD pertaining to the Water Use Permit Modification (*Permit No. 36-00998-W, Application No. 021217-1*). January 31, 2005.

South Florida Water Management District (SFWMD) (2022), *2022 Lower West Coast Water Supply Plan Update Planning Document/Appendices*, December 2022.

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