APPENDIX A - POTABLE WATER REGULATORY COMPLIANCE

Current Regulations

As mentioned in Chapter 3, water treatment is regulated federally by the United States Environmental Protection Agency (USEPA). All drinking water regulations fall under the Safe Drinking Water Act (SDWA). The Florida Department of Environmental Protection (FDEP) is responsible for enforcing the requirements of the SDWA at the state level. The SDWA was passed by Congress in 1974 and applies to all public water systems. FDEP has primary (i.e., primary responsibility to enforce) for the SDWA and drinking water regulations in the State of Florida

SDWA states that all public water systems must have at minimum 15 service connections or serve at minimum 25 people per day for 60 days of the year. Drinking water standards are divided into two main groups: primary and secondary drinking water standards. Primary standards are health-based standards and include the four following categories: microbiological, disinfectants and disinfection byproducts (DBPs), inorganic compounds, and organic compounds. Secondary standards are primarily aesthetic in nature (color, taste, odor) and are not health-based standards. Florida drinking water regulations are contained in Chapters 62-550 F.A.C., 62-555 F.A.C. and 62-560 F.A.C.. A summary of current drinking water regulations applicable to the City is provided in this appendix.

Regulation	Description
62-550, FAC Drinking Water Standards, Monitoring, and Reporting	This section implements the requirements of the Florida Safe Drinking Water Act and acquires and maintains primacy for Florida under the Federal Act. This chapter adopts national primary and secondary drinking water standards of the Federal Government where possible and otherwise creates additional rules to fulfill state and Federal requirements.
62-555, FAC Permitting, Construction, Operation, and Maintenance of Public Water Systems	This section regulates source and siting requirements for Public Water Systems.
62-560, FAC Requirements for Public Water Systems That Are Out of Compliance	This section sets forth the requirements that a supplier must meet standards set forth by the SDWA and the actions that will need to be taken if a supplier is unable to meet these standards.

Inorganic Chemicals

Inorganic chemicals are required to be monitored at the entry point to the distribution system. Monitoring of the inorganic chemicals is required the first year of each compliance period for groundwater sources. Constituents such as nitrate, nitrite and asbestos have different monitoring schedules. Asbestos is required to be measured during the first year of each compliance cycle (once every nine years) unless the system is vulnerable to asbestos contamination. Nitrates and nitrites are required to be measured annually.

The regulated inorganic chemical compounds and their respective State of Florida maximum contaminate levels (MCLs) are listed in the ***Primary Inorganic MCL Standards*** Table below.

Primary Inorganic MCL Standards Table

Inorganic Chemicals	Florida State MCL (mg/L)
Antimony	0.006
Arsenic	0.010
Asbestos	7 MFL*
Barium	2
Beryllium	0.004
Cadmium	0.005
Chromium	0.1
Cyanide (as free cyanide)	0.2
Fluoride	4.0
Lead	0.015
Mercury	0.002
Nickel	0.1
Nitrate	10 (as N)
Nitrite	1 (as N)
Total Nitrate and Nitrate	10 (as N)
Selenium	0.05
Sodium	160
Thallium	0.002

*MFL = million fibers per liter greater than 10 microns

The detected inorganic chemicals issued in the 2021 Annual Drinking Water Quality Report for the City are shown in the ***Inorganic Chemical Concentrations in Distribution System (2010)*** Table. The remaining inorganic chemicals were not detected in the distribution system.

Inorganic Chemical Concentrations in Distribution System (2010) Table

Contaminant	Southwest RO Plant Detected Level (ppm)	North RO Plant Detected Level (ppm)	MCL Violation (Yes/No)
Barium	0.0037	0.0072	No
Fluoride	0.49	--	No
Sodium	n/a	n/a	No

Arsenic Rule

In accordance with State regulations, the maximum contaminant level for arsenic is 10 µg/L per FAC 62-550.310.(1).(a). Systems in violation of the MCL are required to increase sampling from one sample per compliance period to one sample quarterly until the sample is reliably and consistently below the MCL. Violations would also require the City to include a statement on the health effects of arsenic in their annual Consumer Confidence Reports (CCR, a.k.a. the annual water quality report). The latest sampling for arsenic in the City's distribution system was below detectable limits.

Asbestos Monitoring Requirements

In accordance with State regulations, the maximum contaminant level for asbestos is 7 MFL per FAC 62-550.310.(1).(a). Each community water system that is susceptible to asbestos contamination (e.g., source water contaminated by asbestos or use of asbestos-cement pipe within the distribution system) shall monitor for asbestos. A system susceptible to asbestos contamination due solely to corrosion of asbestos-cement pipe shall take one sample at a tap served by asbestos-cement pipe and under conditions where asbestos contamination is mostly likely to occur. The last asbestos sample collected by the City was below the detection limit for asbestos.

Disinfectant Residuals and Disinfection Byproducts

Disinfectants and Disinfection Byproducts Rules

The Stage 1 Disinfectants and Disinfection Byproducts Rule (DBPR) established MCLs, Maximum Contaminant Level Goals (MCLGs), Maximum Residual Disinfectant Levels (MRDLs) and Maximum Residual Disinfectant Level Goals (MRDLGs) for chemical disinfectants and the concentrations of disinfection byproducts (DBPs) in finished water and in drinking water distribution systems.

The Stage 1 DBPR also included MCLs for both bromate and chlorite, these contaminants are generally only a concern in those systems that utilize ozone or chlorine dioxide, respectively, for primary disinfection. The primary water quality challenge facing the City is the control of two groups of disinfection byproducts: total trihalomethanes (TTHMs) and the sum of five haloacetic acid species (HAA5). DBPs, such as TTHM and HAA5, are regulated as shown in the ***DBPR Summary*** Table. The DBPR Summary also presents MRDLs and MRDLGs for several disinfectants.

DBPR Summary

	MRDL	MRDLG	MCL	MCLG
Disinfectants				
Chlorine (mg/L as Cl_2)	4.0	4.0		
Chloramines (mg/L as Cl_2)	4.0	4.0		
Chlorine Dioxide (as ClO_2)	0.8	0.8		

Disinfection Byproducts				
TTHM[1] (µg/L)			80	
HAA5[2] (µg/L)			60	
Bromate (µg/L)			10	0
Chlorite (mg/L)			1.0	0.8

1. Total trihalomethanes is the sum of the concentrations of chloroform, bromodichloromethane, dibromochloromethane, and bromoform.
2. Haloacetic acids (five) is the sum of the concentrations of mono-, di-, and trichloroacetic acids and mono- and dibromoacetic acids.

Following implementation of the Stage 2 DBPR, compliance with the TTHM and HAA5 MCLs is based on a locational running annual average (LRAA) in which the average concentration at each compliance monitoring location must be less than the MCL. This approach is intended to provide more equitable water quality to a utility's customers relative to DBPs regardless of where they live in the distribution system. The reported chlorine, TTHM and HAA5 LRAAs at the City for 2021 are summarized in the ***Stage I DBPR Results (2021)*** Table.

Stage 1 DBPR Results (2021)

	Average Levels Detected	Range of Results	MCL or MRDL Violation (Yes/No)
Chlorine (mg/L as Cl_2)	1.3	0.26 – 2.0	No
TTHM[1] (µg/L)	35.27	20.18 – 41.00	No
HAA5[2] (µg/L)	6.36	4.70 – 7.90	No

Volatile Organic Chemicals

The presence of volatile organic chemicals (VOCs) is generally a sign of industrial contamination. Four consecutive quarterly samples for VOC are required every three years for groundwater sources. When VOCs are detected above 0.0005 mg/L, more frequent monitoring is required. The VOCs regulated by the State of Florida as well as their respective State MCLs are listed in the ***Volatile Organic Chemical MCLs*** Table below. There are no VOCs detected in the City's distribution system.

Volatile Organic Chemical MCLs

VOCs	Florida State MCL (mg/L)
1,1- Dichloroethylene	0.007
1,1,1-Trichloroethane	0.2
1,1,2-Trichloroethane	0.005
1,2-Dichloroethane	0.003
1,2-Dichloropropane	0.005
1,2,4-Trichlorobenzene	0.07
Benzene	0.001
Carbon Tetrachloride	0.003
cis-1,2-Dichloroethylene	0.07

VOCs	Florida State MCL (mg/L)
Dichloromethane	0.005
Ethylbenzene	0.7
Monochlorobenzene	0.1
0-Dichlorobenzene	0.6
para-Dichlorobenzene	0.075
Styrene	0.1
Tetrachloroethylene	0.003
Toluene	1.0
trans-1,2-Dichloroethylene	0.1
Trichloroethylene	0.003
Vinyl Chloride	0.001
Xylenes (total)	10.0

Synthetic Organic Chemicals

Synthetic organic chemicals (SOCs) are man-made compounds used for a variety of industrial and agricultural purposes. The State regulated MCLs for SOCs are listed in the ***Synthetic Organic Chemical MCLs*** Table below. Four consecutive quarterly samples for SOCs are required every three years for groundwater sources. When SOCs are detected at levels above the MCLs, more frequent monitoring is required. SOCs have not been detected in the City's distribution system.

Synthetic Organic Chemical MCLs

Synthetic Organic Chemicals	Florida State MCL (mg/L)
2,3,7,8-TCDD (Dioxin)	3×10^{-8}
2,4-D	0.07
2,4,5-TP (Silvex)	0.05
Alachlor	0.002
Atrazine	0.003
Benzo[a]pyrene	0.0002
Carbofuran	0.04
Chlordane	0.002
Dalapon	0.2
Di (2-ethylhexyl) adipate	0.4
Di (2-ethylhexyl) phthalate	0.006
Dibromochloropropane (DBCP)	0.0002
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Ethylene dibromide (EDB)	0.00002
Glyphosate	0.7
Heptachlor	0.0004

Synthetic Organic Chemicals	Florida State MCL (mg/L)
Heptachlor epoxide	0.0002
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Lindane	0.0002
Methoxychlor	0.04
Oxamyl (Vydate)	0.2
Pentachlorophenol	0.001
Picloram	0.5
Polychlorinated biphenyls (PCBs)	0.0005
Simazine	0.004
Toxaphene	0.003

Microbial Contaminants

In accordance with State regulations, FAC 62-550.310, the maximum contaminant level for microbial contaminants is based on the presence or absence of total coliforms in a sample, rather than coliform density. The City is required to collect 120 samples per month. The City is considered in compliance if fewer than 5 percent of its samples test coliform positive. State regulations are based on the USEPA Total Coliform Rule (TCR).

1989 Total Coliform Rule

The TCR requires water systems to sample monthly at representative sites throughout the distribution system and perform routine monitoring for the presence of total coliforms. Total coliforms include both fecal coliforms and E. coli. Monitoring frequency depends on the population served by the supply system. Based on the most recent population estimates, the City would be required to monitor a minimum of 120 locations in the distribution system per month. The key components of the TCR are as follows:

- The maximum contaminant level goal for total coliform, fecal coliform, and E. coli is set as zero.
- For systems analyzing more than 40 samples per month, no more than 5 percent of the samples collected per month may be positive for total coliform.
- Every positive total coliform sample must be analyzed for fecal coliforms.

Either of the following two situations triggers immediate public notification:

- A routine sample tests positive for total coliform and for fecal coliform or E. coli and any repeat sample tests positive for total coliform;
- A routine sample tests positive for total coliform and negative for fecal coliform or E. coli and any repeat sample is positive for fecal coliform or E. coli.

The City samples monthly for bacteriological analyses. In 2021, the City had two positive total coliform results. For positive total coliform samples, duplicate samples must be taken and analyzed to confirm results.

Total Coliform Rule Revisions.

The USEPA published revisions to the 1989 TCR on February 2013. The purpose of the TCR revisions is to protect public health by ensuring the integrity of the drinking water distribution system and monitoring for the presence of microbial contamination. USEPA anticipates greater public health protection under the revised requirements, which are based on recommendations by a federal advisory committee.

The rule establishes a MCLG and an MCL for E. coli and eliminates the MCLG and MCL for total coliform, replacing it with a treatment technique for coliform that requires assessment and corrective action. E. coli is a more specific indicator of fecal contamination and potential harmful pathogens than total coliform as many of the organisms detected by total coliform methods are not of fecal origin and do not have any direct public health implication. However, under the proposed treatment technique for coliform, total coliform serves as an indicator of a potential pathway of contamination into the distribution system. A public water system (PWS) that exceeds a specified frequency of total coliform occurrence must conduct an assessment to determine if any sanitary defects exist and, if found, correct them. In addition, under the treatment technique requirements, a PWS that incurs an E. coli MCL violation must conduct an assessment and correct any sanitary defects found.

The rule eliminates monthly public notification requirements based only on the presence of total coliforms. Total coliforms in the distribution system may indicate a potential pathway for contamination but in and of themselves do not indicate a health threat. Instead, the rule requires public notification when an E. coli MCL violation occurs, indicating a potential health threat, or when a PWS fails to conduct the required assessment and corrective action.

Ground Water Rule

The Ground Water Rule (GWR) was promulgated in November 2006 and updated in 2010 to provide increased protection against microbial pathogens, specifically viral and bacterial pathogens, in PWSs that use groundwater sources. The rule applies to all PWSs that use groundwater sources in whole or in part (including consecutive systems that receive finished groundwater from another PWS), except for PWSs that combine all of their groundwater with surface water or groundwater under the direct influence (GWUDI) of surface water prior to treatment under the Surface Water Treatment Rule (SWTR).

The goal of the GWR is to identify and target groundwater systems that are susceptible to fecal contamination. The rule addresses risks through a risk-targeting approach that includes:

- Periodic sanitary surveys of groundwater systems that require the evaluation of eight critical elements and the identification of significant deficiencies.
- Source water monitoring to test for the presence of E. coli, enterococci, or coliphage in the sample
    - *Triggered monitoring* for systems that do not already provide treatment that achieves at least 99.99 percent (4-log) inactivation or removal of viruses and that have a total coliform-positive routine sample under Total Coliform Rule sampling in the distribution system.
    - *Assessment monitoring*- As a complement to triggered monitoring, a State has the option to require systems, at any time, to conduct source water assessment monitoring to help identify high risk systems.
- Corrective actions required for any system with a significant deficiency or source water fecal contamination. The system must implement one or more of the following corrective action options:
    - *Correct all significant deficiencies*
    - *Eliminate the source of contamination*
    - *Provide an alternate source of water*
    - *Provide treatment which reliably achieves 99.99 percent (4-log) inactivation or removal of viruses.*
- Compliance monitoring to ensure that treatment technology installed to treat drinking water reliably achieves at least 99.99 percent (4-log) inactivation or removal of viruses.

The City provides treatment that reliably achieves at least 99.99 percent (4-log) inactivation or removal of viruses.

Radionuclides

There are two sources of radioactive contamination in drinking water. The first source is soil where naturally occurring radionuclides are present. Some areas in Florida are susceptible to contamination from phosphate-rich soils and rock, making this source a potential concern for the City. The second source of radioactive contamination comes from man-made sources. There is no known radioactive man-made contamination of drinking water in Florida, and thus, this is not a concern for the City.

The MCLs and monitoring frequency for radionuclides are presented in the ***MCL and Monitoring Frequency*** Table below. The City's radionuclide levels for 2021 are listed in the ***Radiological Contaminants Levels*** Table below. As seen, the detections have been below the MCLs.

Radionuclides MCLs and Monitoring Frequency

Constituent	MCLG	MCL	MDL	Reduced Monitoring Frequency
Beta/Photon emitters*	0 mrem/yr	4 mrem/yr	4 pCi/L	One sample every 6 years
Gross Alpha (excluding Radon & Uranium)	0 pCi/L	15 pCi/L	3 pCi/L	One sample every 6 years
Combined Radium-226 228	0 pCi/L	5 pCi/L	1 pCi/L	One sample every 6 years
Uranium	0 µg/L	30 µg/L	1 ug/L	One sample every 6 years

pCi/L = picoCuries per Liter

2021 Radiological Contaminants Levels

Contaminant	Southwest RO Plant Level Detected	North RO Plant Level Detected	MCL Violation (Yes/No)
Alpha Emitters (pCi/L) Emitters Reduced	6.85	5.2	No
Combined Radium (pCi/L)50	2.50	3.1	No
Date of Last Sampling Event	3/6/17	1/7/20	--

Secondary Drinking Water Standards

The Secondary Drinking Water Standard contaminates are required to be monitored at the entry point to the distribution system. Monitoring of the secondary chemicals is required the first year of each compliance period for groundwater sources. The ***Secondary Drinking Water Standards*** Table below summarizes the secondary contaminants and respective MCLs. The City meets all secondary MCLs.

Secondary Drinking Water Standards

Contaminant	SMCL (mg/L)
Aluminum	0.2
Chloride	250
Copper	1
Fluoride	2.0
Iron	0.3
Manganese	0.05
Silver	0.1
Sulfate	250
Zinc	5
Color	15 color units
Odor	3 (threshold odor number)
pH	6.5 – 8.5
Total Dissolved Solids	500
Foaming Agents	0.5

Lead and Copper

The Lead and Copper Rule (LCR) was promulgated on June 7, 1991. Minor revisions, Lead and Copper Rule Minor Revisions (LCRMR), were added on April 11, 2000. Additional revisions, the Lead and Copper Short Term Revisions, have been adopted by FDEP and became effective October 1, 2010.

The rule establishes an action level (AL) of 0.015 mg/L for Pb and 1.3 mg/L for Cu based on 90th percentile level of tap water samples. An AL exceedance is not a violation but can trigger other requirements that include water quality parameter (WQP) monitoring, corrosion control treatment, source water monitoring/treatment, public education, and lead service line replacement.

According to the annual water quality report, the City is currently on the triennial reduced monitoring schedule. Annual or Triennial samples must be collected in June, July, August, or September. The system must revert to standard monitoring if its corrosion control WQPs are out of the State-prescribed range for nine or more days or if the AL is exceeded.

The City currently monitors various sites in its distribution system for lead and copper on a triennial reduced monitoring schedule. Results from monitoring conducted in 2020 revealed that the 90th percentile concentration was 1.1 ug/L for lead and 0.025 mg/L for copper; values well below USEPA's ALs. The City has no lead water service lines in the distribution system. Consequently, any lead that is found in the system is the product of lead-bearing solder and/or brass fixtures in home plumbing systems.

Significant revisions were made to the Lead and Copper Rule in 2021. A summary of those revisions is provided in the next section.

New and Proposed Regulations

There are several recent drinking water regulatory developments at the federal level, most notably revisions to the Lead and Copper Rule and forthcoming regulations for poly-and perfluoroalkyl substances (PFAS). In addition, several additional updates to the Florida Administrative Code (F.A.C.) have been proposed regarding potable water and its treatment and distribution.

Regulations	Description
62-550.515, FAC Volatile Organic Monitoring Requirements	(1) Monitoring Frequency (a) Initial base point monitoring. Each community or non-transient non community water system shall take four consecutive quarterly samples for each contaminant listed in paragraph 62-550.310(4)(a), FAC during the first compliance period.
62-550.518, FAC Microbiological Monitoring Requirements	(1) All public water systems shall analyze for coliform bacteria to determine compliance with subsection 62-550.310, FAC. Public water systems shall collect total coliform samples at sites that are representative of water throughout the

	distribution system and in accordance with a written sampling plan that address location, timing, frequency, and rotation period. (2) Total coliform samples shall be taken at regular intervals and in numbers proportionate to the population served by the system.
62-555.314 Location of Public Water System Mains	(1) Horizontal Separation Between Underground Water Mains and Sanitary or Storm Sewers, Wastewater or Stormwater Force Mains, Reclaimed Water Pipelines, and Onsite Sewage Treatment and Disposal Systems. (a) New or relocated underground water mains shall be laid to provide a horizontal distance of at least 3 feet between he outside of the water main and the outside of any existing or proposed storm sewer, stormwater force main, or pipeline conveying reclaimed water under Part III and Part V of Chapter 62-610, FAC. (2) Vertical Separation Between Underground Water Mains and Sanitary or Storm Sewers, Wastewater or Stormwater Force Mains, and Reclaimed Water Pipelines. (4) Separation Between Fire Hydrant Drains and Sanitary or Storm Sewers, Wastewater or Stormwater Force Mains, Reclaimed Water Pipelines, and Onsite Sewage Treatment and Disposal Systems.

Proposed amendments also include efforts to prevent cross contamination of public water systems. Proximity of water mains to sanitary and stormwater sewer systems are specified to be of a certain distance of separation for any new or updated water mains.

Lead and Copper Rule Revisions

The Lead and Copper Rule (LCR) was designed to protect the public health by minimizing lead (Pb) and copper (Cu) levels in drinking water. Lead and copper are seldom present in appreciable concentrations in source water. Rather, the LCR addresses lead and copper by reducing corrosivity of the finished water. Unstable water can be corrosive to iron, lead, copper, and alloys that contain lead and copper as are often found in household plumbing or service lines. Lead service lines were an obvious source of lead corrosion that the LCR sought to address. When the LCR was first established in 1991, all community water systems were required to comply.

On November 13, 2019, the EPA published proposed revisions to the LCR and opened the public comment period. Since that time, almost 80,000 public comments were received. On June 10, 2021 the EPA signed the final rule to extend the effective date of the Lead and Copper Rule Revisions (LCRR) to December 16, 2021. This followed a brief delay to provide additional time for EPA to receive public comment on extending the effective date and for EPA to undertake its review of the rule in a deliberate and thorough manner consistent with the public health purposes of the Safe Drinking Water Act, current White House Administration Executive Orders, and in consultation with affected stakeholders. The final action resulted in a LCRR compliance date of October 16, 2024.

While the copper requirements under the rule remain essentially unchanged, this is not the case for lead. Though USEPA opted not to lower the lead action level (AL) from its current value of 15 ug/L, the revisions establish a new lead trigger level (TL) of 10 ug/L. Compliance and associated actions by a water system are based on the 90th percentile of lead monitoring results in comparison to the AL and TL.

In addition to the TL and AL changes, the LCRR includes substantive changes to streamline the rule requirements and improve public health protection while ensuring effective implementation, including development of service line inventories and lead service line (LSL) replacement plans, promoting corrosion control optimization, strengthening of tap sampling requirements, increasing transparency, sampling and schools and childcare facilities, and public education requirements. While the copper requirements under the rule remain essentially unchanged, this is not the case for lead. Though the current lead AL of 15 ug/L remains, the revisions establish a new lead TL of 10 ug/L. Compliance and associated actions by a water system are based on the 90th percentile of lead monitoring results in comparison to the AL and TL.

Compliance monitoring requirements have also been revised with an increased focus on single family structures (SFS) with LSLs. Under the current rule, sampling focuses on homes with copper service lines and lead solder installed before 1982, and SFS with LSLs to comprise up to 50 percent of a system's sampling pool. The new rule requires all sampling be conducted at SFS with LSLs if enough sites exist. In addition to the current collection of a first liter sample after six hours stagnation, the LCRR requires an additional fifth liter sample at homes served by LSLs, with the intention of collecting water from the LSL.

Based on system size and current corrosion control treatment (CCT) status, exceeding the AL or TL triggers certain actions. Generally, if a system has previously established CCT and exceeds the TL or AL, they must re-optimize CCT. However, if a system exceeds the TL and has not previously established CCT they must conduct a study to determine CCT. That CCT would be required to be implemented if the water system exceeds the AL in subsequent sampling.

Additional provisions include "find-and-fix" steps for locations where individual samples exceed the AL. This applies to both compliance monitoring locations and customer requested sampling sites. The process involves collecting follow up samples at the monitoring location and in the distribution system in the vicinity of the AL exceedance. The purpose of the sampling is to determine the source of the elevated lead concentration. Based on the determination of the cause of the elevated lead concentration, water system requirements will range from "no action" to distribution system management changes to adjusting of CCT. Associated timelines following the reported AL exceedance include customer notification within 24 hours, Water Quality Parameter sampling within 5 days, lead resampling within 30 days, and reporting of the findings and any corrective actions to the state within 6 months.

Service line materials of construction will be documented as part of materials inventory of all service lines. The rule requires the inventory to be made available via a publicly accessible website. In addition, all water

systems with LSLs will be required to develop a lead service line replacement (LSLR) plan. It does not require mandatory LSL replacement, though replacement is required when initiated by a customer. However, if a water system exceeds the TL, it must implement LSLR at an annual rate approved by the state regulatory agency. When a system exceeds the AL, it must implement its LSLR at a rate of 3 percent per year. In both scenarios, LSLR can be discontinued after two consecutive years of monitoring below the TL.

The revisions also require targeted sampling at elementary schools and licensed childcare facilities on a regular basis as a part of its increased focus on public education. Water systems must conduct sampling at 20% of elementary schools per year, 20% of childcare facilities per year, and at secondary schools on request for five years. After the first five years, water systems must conduct sampling at schools and childcare facilities on request.

Additional public education elements include public education for schools and childcare facilities on the risks of lead in drinking water. While the water system is responsible for conducting the sampling at these facilities, the results are not considered in the water system's compliance determination. Further, the water system is only required to provide the sampling results and remediation information to the facility within 30 days of receipt of the sampling results. Neither the water system nor school or childcare facility is required to act if results exceed the TL or AL. The requirements to sample these facilities can be waived if a state or local program to sample these facilities already exists.

EPA has initiated efforts to protect members of the community that are disproportionately impacted by drinking water quality. In April 2021, EPA leadership directed all offices to "clearly integrate environmental justice considerations into plans and actions" following a general directive for the federal government to pursue a comprehensive approach to advancing equity for all stakeholders. This follows EPA's determination that communities that are overburdened by pollution tend to be minority, indigenous and low-income. The following actions were outlined to support of the initiative:

- Strengthening enforcement of violations of environmental statutes;
- Incorporating environmental justice considerations into the assessment of impacts;
- Considering regulatory options to maximize benefits to these communities;
- Improving engagement with these communities; and
- Considering and prioritizing direct and indirect benefits to underserved communities in the development of requests for grant applications and in making grant award decisions, to the extent allowed by law.

APPENDIX B WASTEWATER REGULATORY COMPLIANCE

Current Regulations

Current effluent disposal was designed and is presently permitted by the Florida Administrative Code (FAC) procedures. The table below shows current notable regulations.

Current Notable Wastewater Regulations

Regulation	Description
62-600, FAC Domestic Wastewater Facilities	Provides requirements for construction, operation, and permitting of domestic wastewater treatment facilities. It establishes the minimum treatment requirements for domestic wastewater facilities, including those required for Class I reliability. Treatment and disinfection requirements for reuse of reclaimed water are established in Rules 62-600.420, .440, .445 as well as 62-610, FAC. Domestic wastewater must meet, at minimum, a treatment standard of secondary treatment and basic disinfection and pH control to be reused as reclaimed water.
62-160, FAC Quality Assurance	Defines the minimum field and laboratory quality assurance and methodological and reporting requirements.
62-296, FAC Stationary Sources – Emission Standards	Defines general pollutant emission limiting standards. The treatment management, transportation, use, land application, or disposal of biosolids shall not cause a violation of the odor prohibition in this section.
62-610, FAC Reuse of Reclaimed Water and Land Application	Establishes rules to govern reuse and land application in Florida. Rule 62-610.810, FAC distinguishes reuse of reclaimed water projects from effluent disposal.
62-611, FAC Wetland Application	Provides state regulations and standards for domestic wastewater discharges to man-made and natural wetlands, including monitoring criteria.
62-620, FAC Wastewater Facility and Activities Permitting	Provides procedures to receive a permit to construct, operate or modify domestic wastewater facilities.
62-625, FAC Pretreatment Requirements for Existing. and Other Sources of Pollution	Provides procedures to restrict pollutants from industrial discharges to inhibit interference with domestic wastewater treatment operation.
62-699, FAC Treatment Plant Classification and Staffing	Establishes minimum staffing requirements for wastewater facilities based on treatment capacity and type of process.
62-701, FAC Solid Waste Management Facilities	Establishes standards for the construction, operation, and closure of solid waste management facilities to minimize their threat to public health and the environment. This pertains to the SRWRF permit for the disposal of biosolids, septage, and "other solids" in the solid waste disposal facility, or disposal by placement on land for purposes other than soil conditioning or fertilization.
62-640, FAC Biosolids	This section regulates the distribution, marketing, and land application of biosolids.

New and Proposed Regulations

In 2020, the Florida legislature passed the Clean Waters Act, Senate Bill 712. The Florida Department of Environmental Protection (FDEP) has introduced rulemaking in response to this legislation with the assistance of the Florida Environment Association (FWEA) Utility Council and Florida Rural Water Association. This response includes amendments to Chapter 62 of the Florida Administrative Code (FAC).

The Water Quality Improvements section of this legislation requires FDEP to set rules to limit, reduce or eliminate leaks, seepages, or inputs into wastewater collections systems, increases penalties regarding sanitary sewer overflows (SSOs), and requires studies related to SSOs, leaks, and infiltrations. The FDEP is also required by this legislation to initiate rule amendments based on the Potable Reuse Commission's 2020 potable reuse implementation report; adopt specific recommendations from the Blue-Green Algae Task Force; and implement rules for biosolids management. Biosolids management now prohibits the application of biosolids within 15 cm of the seasonal high-water table and increases monitoring requirements.

Under Senate Bill 712, the Department of Health shall provide yearly reports to the Governor, the President of the Senate, and the Speaker of the House of Representatives regarding the Onsite Sewage Program with the following material:

- The average number of permits issued each year.
- The number of department employees conducting work on or related to the program each year.
- The program's costs and expenditures, including but not limited to salaries and benefits, equipment costs, and contracting costs.

Updates to regulations and future regulatory considerations are summarized in the table below.

New and Proposed Regulations for Wastewater

Regulation	Description
Updates to Chapter 62-600, Domestic Wastewater Facilities	
62-600.400, FAC Design Requirements	(b) For new facilities and modifications of existing facilities, it shall be the design objective to select treatment processes and equipment that will efficiently and reliably meet required reclaimed water or effluent limitations. Unless otherwise stated, new or modified wastewater treatment and biosolids treatment, handling, and dewatering facilities shall provide Class III reliability as described in paragraph 62-600.300(2)(1), FAC. The minimum Class III requirement shall only apply to the new or modified portions of the facilities.
62-600.405, FAC Planning for Wastewater Facilities Expansion	(2) The permittee shall routinely compare flows being treated at the wastewater facilities with the permitted capacities of the treatment, biosolids, reuse, and disposal facilities. Collection system flows shall be routinely reviewed as part of the pipe assessment, repair, and replacement plan required in Rule 62-600.710, FAC.
62-600.410, FAC Operation and Maintenance Requirements	(7) Permittees of domestic wastewater treatment facilities with a permitted flow of 100,000 gallons per day (gpd) or greater shall develop a written emergency preparedness/response plan by no later than (one year after the effective date of the rule), and shall update and implement the plan as necessary thereafter.
62-600.520, FAC Discharge to Surface Waters – (Coastal and Open Ocean)	(6) The discharge of domestic wastewater through ocean outfalls is prohibited after December 31, 2025, except as a backup discharge that is part of a functioning reuse system or other wastewater management system authorized by the department. A backup discharge may occur only during periods of reduced demand for reclaimed water in the reuse system, such as periods of wet weather, or as a result of peak flows from other wastewater management systems, and must comply with the advanced wastewater treatment requirements of paragraph 403.086(9)(b).
62-600.700, FAC General Permitting	(4) Public utilities or their affiliated companies shall submit annual reports regarding transactions or allocations of common costs and expenditures on pollution mitigation and prevention among utility's permitted wastewater systems, including the prevention of sanitary sewer overflows, collection and transmission system pipe leakages, and inflow and infiltration.

62-600.710, FAC **Collection Systems – Facilities**	The facility permittee for a wastewater treatment facility shall develop a pipe assessment, repair, and replacement action plan, referred to hereafter in this section as the “collection system action plan” or “plan,” with at least a 5-year planning horizon for all collection/transmission systems under the utility’s control to mitigate sanitary sewer overflows and underground pipe leaks to the extent technically and economically feasible. 1. The plan shall provide a deliberate, proactive approach to evaluating or surveying the pipes, manholes, pump stations, and other equipment for the collection/transmission systems under the facility’s control during the 5-year planning horizon period. 9. The plan shall identify by no later than the first new permit, permit renewal, or substantial permit revision application after December 21, 2025, all satellite collection systems connected to the facility collection including the name of each satellite collection system, the ownership type of each identified satellite collection system, a unique identifier number for each satellite collection system, whether the satellite collection system is under the control of the facility, and population served by the satellite collection system. The plan shall describe the measures, if any, to require or encourage owners/operators of satellite collection systems to minimize inflow and infiltration from their satellite collection systems that cause or contribute to sanitary sewer overflows in the facility’s collection system. 10. The plan shall describe the resiliency of the collection/transmission systems that considers sea-level rise and the planned or completed flood mitigation and stormwater control actions by the facility permittee or governmental entities that the facility permittee identified as reducing the potential for inflow and infiltration into the facility permittee’s collection/transmission system
Updates to Chapter 62-604	
62-604.130, FAC **Prohibitions**	The following acts and causing thereof are prohibited. (1) The release or disposal of excreta, sewage, or other wastewaters or biosolids without providing proper treatment approved by the Department (FDEP); construction or operation of a wastewater collection system not in compliance with this rule; or any act otherwise violating provisions of this rule or any other rules of the Department.
62-604.400, FAC **Design/Performance Considerations**	(1) All new collection/transmission systems and modifications of existing systems for which construction permits are required by the Department shall be designed: (c) Except as provided in Chapter 62-532, FAC to be located no closer than 100 feet from a public drinking water supply well and no closer than 75 feet from a private drinking water supply well unless the applicant provides documentation accompanying the permit application showing that alternative will result in an equivalent level of reliability and public health protection. (g) Sewers and force mains shall be laid to provide the minimum or greater horizontal separation distances from water mains equal to the horizontal separation distances for water mains to sewers and force mains established in subsection 62-555.314(1), FAC. Sewers and force mains shall be laid at least three feet horizontally from any existing or proposed reclaimed water line permitted under Part III and Part V of Chapter 62-610, FAC. (h) Sewers and force mains shall cross under water mains, unless there is no alternative. Sewers and force mains shall be laid to provide the minimum vertical separation distances from water mains equal to the vertical separation distances for water mains to sewers and force mains established in subsection 62-555.314(20), FAC shall be laid to provide the minimum vertical separation distances from water mains equal to the vertical separation distances for water mains to sewers and force mains established in subsection 62-555.314, FAC.

62-604.500, FAC **Operation and Maintenance**	(1) Rule 62-604.500, F.A.C., is applicable to both new and existing domestic wastewater collection/transmission facilities. (2) All collection/transmission systems shall be operated and maintained so as to provide uninterrupted service as required by this rule. All pump stations shall be operated and maintained to provide the emergency pumping capability requirements in paragraph 62-604.400(2)(a), F.A.C., the lightning and transient voltage surge protections in paragraph 62-604.400(2)(b), F.A.C., and the design and signage requirements in paragraph 62-604.400(2)(d), F.A.C. (3) All equipment, pipes, manholes, pump stations, and other appurtenances necessary for the collection/transmission of domestic wastewater, including equipment provided pursuant to subsection 62-604.400(2), F.A.C., shall be maintained so as to function as intended. In the event odor, noise or lighting adversely affect neighboring developed areas at levels prohibited by paragraph 62-604.400(2)(c), F.A.C., corrective action (which may include modifications of the collection/transmission system) shall be taken by the permittee. Other corrective action may be required to ensure compliance with rules of the Department. (4)(b) The detail of the operation and maintenance manual shall be consistent with the complexity of the system. The technical document identified in paragraph 62-604.300(4)(i), F.A.C., provides guidance for the development of an operation and maintenance manual. The manual shall provide the operator with adequate information and description regarding the design, operation, and maintenance features of the facility involved, including an emergency response plan. The emergency response plan shall assess system security including cybersecurity; water quality monitoring for sanitary sewer overflows affecting surface waters; and, hurricane and severe storm preparedness and response. (4)(c) The operation and maintenance manual shall be revised periodically to reflect any alterations performed or to reflect experience resulting from operation. Also, the owner/operator of a collection/transmission system shall evaluate and update the emergency response plan portion of the operation and maintenance manual annually. (5) Collection/transmission systems shall be maintained to minimize excessive infiltration and inflow into the collection/transmission system, as well as excessive leakage from the collection/transmission system. The owner/operator of a collection/transmission system shall take corrective actions when infiltration, inflow, or leakage is excessive. (5)(a) Infiltration and inflow are considered excessive if one or both cause or contribute to sanitary sewer overflows. Inflow shall not be considered excessive if the collection/transmission system owner/operator demonstrates that the inflow is not representative of collection/transmission system performance. Examples include extreme weather, such as a hurricane, beyond the control of the owner/operator of the collection/transmission system. (5)(b) Leakage, or exfiltration, is considered excessive if it causes or contributes to a violation of surface water quality standards or ground water quality standards. (6) All collection/transmission systems shall be operated and maintained to prevent sanitary sewer overflows to the extent that is technically and economically feasible. Owners/operators of collection/transmission systems that experience a sanitary sewer overflow shall evaluate the cause of the overflow and potential corrective measures to avoid future sanitary sewer overflows. Corrective actions shall be taken by the owner/operator of the collection/transmission system if excessive inflow and infiltration causes a sanitary sewer overflow. The owner/operator of a satellite collection system shall take corrective actions for a sanitary sewer overflow in the receiving collection system resulting from excessive inflow and infiltration in the satellite collection system.

Amendments to Chapter 62-640 FAC	
• Amending the nutrient management plan to comply with basin management action plans and change the determination of application rates. • Requiring water extractable phosphorus (WEP) monitoring for biosolids. • Restricting certain land applications of biosolids during wet seasons. • Requiring all biosolids sites to enroll in a FDACS Best Management Practices (BMP) Program. • Altering certain septage flows to reduce pathogens and vector attractions.	
Potential Effluent Parameters to be Regulated	
Per- and polyfluoroalkyl substances (PFAS)	Perfluorooctanoic acid (PFOA) and Perfluorooctane Sulfonate (PFOS), which are two artificial chemicals that are part of this chemical group. FDEP with the assistance of the Department of Defense (DOD) is investigating the potential risk to public health from land application of wastewater residuals containing PFAS. FDEP and DOD will continue efforts to study and understand PFAS in the environment and the ecological and human health risks associated with PFAS contamination.
Microconstituents	Monitoring for specific microconstituents may soon became part of the standard testing procedure as the reclaimed water use for indirect potable reclaimed water applications increase. It might also be possible that future regulations may require a reduction of microconstituents from wastewater.

Legislation that is becoming effective in July 1, 2021 is Senate Bill 178 (SB 178). SB 178 requires completion of a Sea Level Impact Projection (SLIP) Study prior to new state-financed construction of structures located in the coastal building zone. The assessment conducted in Task 10 – Climate Resilience, supports the goal of this legislation.

Additional legislation that is still yet to be passed is Senate Bill 64: Reclaimed Water. This bill, if passed, will require certain domestic wastewater utilities to submit to FDEP by a specified date a plan for eliminating nonbeneficial discharges as part of its permit application; providing that potable reuse is an alternative water supply and that projects relating to such reuse are eligible for alternative water supply funding; requiring counties, municipalities, and special districts to authorize graywater technologies under certain circumstances and to provide certain incentives for the implementation of such technologies, etc.

APPENDIX C PRELIMINARY NORTH 1 MODELING

The initial hydraulic modeling analyses that was completed using the populations and flows in Section 4.5.4.1 for North 1 evaluated conditions when utility services were extended to one UEP area every five years (referred herein as the 5 Year UEP Implementation Schedule). Three alternatives were evaluated to determine the best available route to convey flows from the North 1 UEP area and additional developments to the City's existing WRFs. The alternatives were developed using existing infrastructure and minimizing the need for improvements outside of the project area while avoiding adverse impacts to the existing system. Simulations were performed for AADF and PHF conditions for the following planning horizons for 2025, 2030, 2040 and buildout.

Routing Alternatives for North 1 Flows

Various alternatives were evaluated to determine the best available route to convey flows from the North 1 UEP area and additional developments to the City's Water Reclamation Facilities. The alternatives were developed using existing infrastructure and minimizing the need for improvements outside of the project area while avoiding adverse impacts to the existing system. A description of the alternatives is as follows:

Alternative 1

Convey North 1 UEP and additional flows south to the Everest WRF via the existing force main along Andalusia Blvd, across Pine Island Blvd down to the force main located along Hancock Bridge Pkwy. This alternative is presented as Route 1 in **Figure: Routing Alternatives for North 1 Analysis (Alternatives 1, 2, and 3).**

Alternative 2

Convey North 1 UEP flows to the Southwest WRF via the force main running east-west along NE 7th Terrace and Tropicana Pkwy E that was recently constructed as part of the North 2 UEP. This alternative is presented as Route 2 in **Figure: Routing Alternatives for North 1 Analysis (Alternatives 1, 2, and 3).**

Alternative 3

Convey North 1 UEP flows to both WRFs by splitting flows from North 1 UEP at the junction located at NE 7th Avenue and NE 7th Terrace. This alternative also includes additional force main along Veterans which is presented in **Figure: Routing Alternatives for North 1 Analysis (Alternatives 1, 2, and 3)** as Route 3. Alternative 3 is a combination of all three routes.

Simulations were performed for the buildout conditions for all 3 alternatives. Alternative 3 showed to be viable based on results. Alternatives 1 and 2 did not provide the necessary capacity to convey buildout flows, resulting in pressure conditions that would exceed City standards. Sections of the existing force main along with various MPSs would require upgrades to accommodate additional flows under either alternative.

Simulations were performed for AADF and PHF conditions for the following planning horizons under alternative 3:

2025 - Existing + North 1

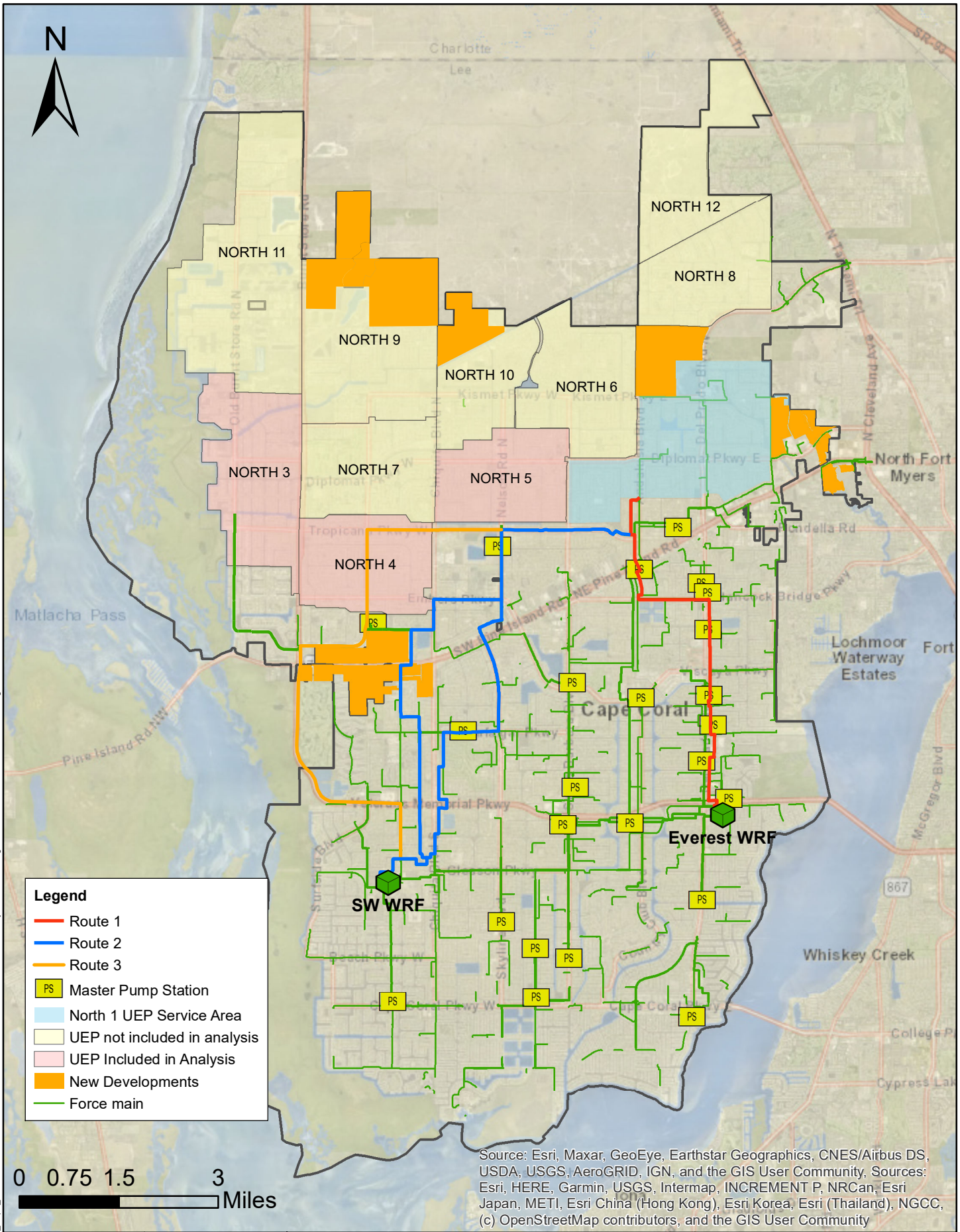
2030 - Existing + North 1 + North 3

2040 - Existing + North 1 + North 3 + North 4 (North WRF and North 5 expected to be online by 2040, North 5 flows conveyed to the North WRF)

Buildout - Existing + North 1 + North 3 + North 4 (Remaining UEPs projected to be conveyed to the North WRF)

These horizons were based on a 5 year per UEP implementation schedule. Additional modeling simulations were completed for an accelerated UEP schedule and are detailed later herein.

Flow projections for the simulations noted above determined that a new North WRF is required by 2037, and it was included in the facilities in the 2040 and buildout scenarios. The North 1 flows were also modeled to be conveyed to the new WRF to determine required main sizes that would allow more operational flexibility.



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User: kkaragoz
Source: City of Cape Coral
Date: Feb 2021

CITY OF CAPE CORAL

Routing Alternatives for North 1 Analysis (Alternatives 1, 2, and 3)

AECOM

FIGURE

Results and Findings for Initial North 1 Analysis

It was determined based on estimated flow rates that two MPS would be required to serve the North 1 UEP service area, MPS 720 (N1C) and MPS 725 (N1E). The results indicated below are based on the selected alternative 3.

2025 Scenario

This scenario evaluates the hydraulic conditions for the two MPSs in 2025, which convey the flows south to both WRFs using the existing 24-in force main interconnect along Tropicana Parkway. The force main pressure was able to remain within an acceptable range.

2025 Scenario

MPS	PHF (gpm)	Pressure (psi)	Areas Served	Improvements in North 1 UEP	Improvements Outside UEP
720 (N1C)	1,602	58	Existing + North 1 + North 2 Developments on E Pine Island Pine Island Corridor Hudson Creek (50%)	20-in FM downstream of N1E - 8,000 LF 20-in FM downstream of N1C - 3,600 LF 24-in FM along Andalusia Blvd. – 3,200 LF	16” main on Tropicana Pkwy – 16,000 LF 12” main on Old Burnt Store Rd – 11,000 LF 12” main on Kismet Pkwy – 5,500 LF 12” main on Burnt Store Rd – 11,000 LF 30-in FM along Veterans Parkway W - 22,000 LF
725 (N1E)	2,549	61			

2030 Scenario

This scenario evaluates the hydraulic conditions for the two MPSs in 2030 conveying the flows to both WRFs using the existing 24-in force main interconnect along Tropicana Parkway. It is assumed that North 3 UEP and a 30-in force main along the west end of Veterans Parkway will be constructed by this time.

2030 Scenario

MPS	PHF (gpm)	Pressure (psi)	Areas Served	Improvements in North 1 UEP	Improvements Outside UEP
720 (N1C)	1,763	58	Existing + North 1 + North 2 + North 3 Developments on E Pine Island Pine Island Corridor Hudson Creek (100%)	None	12” main (4,600 LF) and 20” main (10,900 LF) along Nelson Road
725 (N1E)	2,647	62			

2040 Scenario

This scenario evaluates the hydraulic conditions for the two MPSs for the year 2040 conveying the flows to both WRFs using the existing 24-in force main interconnect along Tropicana Parkway. Additional areas served include UEP areas 4 and 5. The North WRF is expected to be online, and UEP 5 was modeled to be conveyed to the North WRF.

2040 Scenario

MPS	PHF (gpm)	Pressure (psi)	Areas Served	Improvements in North 1 UEP	Improvements Outside UEP
720 (N1C)	2,071	62	Existing + North 1 + North 2 + North 3 + North 4* Developments on E Pine Island Pine Island Corridor Hudson Creek (100%)	None	North WRF online Force main to convey flows to WRF (4,800 LF 36" FM along Kismet Pkwy, and 14,00 LF 42" FM along NW 14th Ave) Force main to serve Entrada (4,600 LF 12" and 3,600 LF 20" along Del Prado Blvd, 5,600 LF of 30" FM and 5,267 LF of 36" FM along Kismet Pkwy.)
725 (N1E)	2,833	65			

** North WRF and UEP 5 expected to be online by 2040 as well, UEP 5 to be conveyed to North WRF.*

Buildout Scenario

This scenario evaluates the hydraulic conditions for the two MPSs at buildout conditions conveying the wastewater flows from the area to both WRFs using the 24-in force main interconnect along Tropicana Parkway. All UEPs are assumed to be online under this scenario, UEPs 6 through 11 were modeled to be conveyed to the North WRF.

Buildout Conditions Scenario

MPS	PHF (gpm)	Pressure (psi)	Areas Served	Improvements in North 1 UEP	Improvements Outside UEP
720 (N1C)	2,071	62	Entire Service Area Developments on E Pine Island Pine Island Corridor Hudson Creek (100%)	None	None
725 (N1E)	2,833	65			

** Flow from UEPs 5 -12 to be conveyed to future North WRF.*

Conclusions and Recommendations for the North 1 Analysis

Based upon the hydraulic modeling results presented, it was recommended that the new North 1 UEP MPSs be constructed to convey the proposed flows to both Everest WRF and SW WRF following the routes described in the analysis for Alternative 3.

Based upon a UEP program where a UEP is online every 5 years, new infrastructure outside of the North 1 Service area that is critical to maintain acceptable pressure conditions is the 30-in force main along Veterans Pkwy W by 2030. The North WRF was assumed to be online by 2040 during the time of this initial hydraulic modeling analysis.

With these infrastructure improvements, flows from North 3, North 4 and North 5 UEPs can also be routed to the existing WRFs while maintaining acceptable pressures throughout the system. However, any additional flows would require further improvements to the conveyance system.

Based upon the hydraulic modeling results, it was recommended that the North 1 UEP service area be served by two MPSs and that the flows are conveyed to both the Everest WRF and SW WRF via the existing interconnect at Andalusia Blvd and Tropicana Parkway E. New infrastructure outside of the North 1 service area that is critical to maintain acceptable pressure conditions in the system is a 30-in force main along Veterans Pkwy West which is recommended to be placed in service by 2025 when the North 3 UEP is provided wastewater service. With these infrastructure improvements, wastewater flows from North 1 can be conveyed south until the North WRF is online, at which point flows from North 1 UEP will be conveyed to the North WRF.

APPENDIX D PLANNNING LEVEL COST ESTIMATES

North RO 6 MGD Expansion to 18 MGD (FY 2027)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Cost per 3 MGD RO Train + 20% Overhead	LS	$ 2,520,000	2	$ 5,040,000
12 MG Storage Tank and HSP	$/gal	$ 1.14	12,000,000	$ 13,680,000
Brackish Raw Water Supply Wells (Raw Water Mains)	$/well	$ 1,700,000	20	$ 34,000,000
DIW for North RO & North WRF	LS	$ 7,500,000	1	$ 7,500,000
Subtotal				$ 60,220,000
Contingency (30%)				$ 18,066,000
Permitting, Design, and Construction Support (10%)				$ 7,828,600
			Total	**$ 86,114,600**
			Use (Mil $)	**$86.2 M**

East Reservior Storage Tank and HSP (FY 2030)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
One 2.5 MG Storage Tank and HSP	$/gal	$ 1.14	2,500,000	$ 2,850,000
Contingency (30%)				$ 855,000
Permitting, Design, and Construction Support (10%)				$ 370,500
			Total	**$ 4,075,500**
			Use (Mil $)	**$4.1 M**

Southwest RO 18 MGD Replacement (FY 2036)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Total Construction Cost	LS	$ 100,000,000	1	$ 100,000,000
Permitting, Design, and Construction Support (20%)				$ 20,000,000
			Total	**$ 120,000,000**
			Use (Mil $)	**$120.0 M**

North RO 3 MGD Expansion to 21 MGD (FY 2036)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Cost per 3 MGD RO Train + 20% Overhead	LS	$ 2,520,000	1	$ 2,520,000
12 MG Storage Tank and HSP	$/gal	$ 1.14	12,000,000	$ 13,680,000
Brackish Raw Water Supply Wells	$/well	$ 1,700,000	18	$ 30,600,000
Subtotal				$ 46,800,000
Contingency (30%)				$ 14,040,000
Permitting, Design, and Construction Support (10%)				$ 6,084,000
			Total	**$ 66,924,000**
			Use (Mil $)	**$67.0 M**

Southwest RO 3 MGD Expansion to 21 MGD (FY 2039)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Cost per 3 MGD RO Train + 20% Overhead	LS	$ 2,520,000	1	$ 2,520,000
5 MG Storage Tank and HSP	$/gal	$ 1.14	5,000,000	$ 5,700,000
Brackish Raw Water Supply Wells	$/well	$ 1,700,000	6	$ 10,200,000
15% Miscellaneous	LS	$ -	-	$ 378,000
Subtotal				$ 18,798,000
Contingency (30%)				$ 5,639,400
Permitting, Design, and Construction Support (10%)				$ 2,443,740
			Total	**$ 26,881,140**
			Use (Mil $)	**$26.9 M**

Southwest RO 3 MGD Expansion to 24 MGD (FY 2049)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Cost per 3 MGD RO Train + 20% Overhead	LS	$ 2,520,000	1	$ 2,520,000
5 MG Storage Tank and HSP	$/gal	$ 1.14	5,000,000	$ 5,700,000
Brackish Raw Water Supply Wells	$/well	$ 1,700,000	5	$ 8,500,000
Miscellaneous	LS	$ -	-	$ 378,000
Subtotal				$ 17,098,000
Contingency (30%)				$ 5,129,400
Permitting, Design, and Construction Support (10%)				$ 2,222,740
			Total	**$ 24,450,140**
			Use (Mil $)	**$24.5 M**

North RO 3 MGD Expansion to 24 MGD (FY 2061)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Cost per 3 MGD RO Train + 20% Overhead	LS	$ 2,520,000	1	$ 2,520,000
Brackish Raw Water Supply Wells	$/well	$ 1,700,000	4	$ 6,800,000
15% Miscellaneous	LS	$ -	-	$ 378,000
Subtotal				$ 9,698,000
Contingency (30%)				$ 2,909,400
Permitting, Design, and Construction Support (10%)				$ 1,260,740
			Total	**$ 13,868,140**
			Use (Mil $)	**$13.9 M**

West Reservior Storage Tank and HSP (Buildout)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
One 2.5 MG Storage Tank and HSP	$/gal	$ 1.14	2,500,000	$ 2,850,000
Contingency (30%)				$ 855,000
Permitting, Design, and Construction Support (10%)				$ 370,500
			Total	**$ 4,075,500**
			Use (Mil $)	**$4.1 M**

Required Linear Improvements Outside UEPs (FY 2025)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Hudson Creek Phase 1 Total Construction Cost	LS	$ 9,959,000	1	$ 9,959,000
Subtotal				$ 9,959,000
Miscellaneous (15%)				$ 1,493,850
Contingency (30%)				$ 3,435,855
Permitting, Design, and Construction Support (20%)				$ 2,977,741
			Total	**$ 17,866,446**
			Use (Mil $)	**$17.9 M**

Required Linear Improvements Outside UEPs (FY 2027)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Hudson Creek Phase 2 Total Construction Cost	LS	$ 1,076,400	1	$ 1,076,400
Subtotal				$ 1,076,400
Miscellaneous (15%)				$ 161,460
Contingency (30%)				$ 371,358
Permitting, Design, and Construction Support (20%)				$ 321,844
			Total	**$ 1,931,062**
			Use (Mil $)	**$2.0 M**

SW WRF 5 MGD Expansion to 20 MGD (FY 2025)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
5 MGD Total Construction Cost	LS	$ 21,007,866	1	$ 21,007,866
5 MG Reuse Storage Tank and HSP	$/gal	$ 1.14	5,000,000	$ 5,700,000
Subtotal				$ 26,707,866
Contingency (30%)				$ 8,012,360
Permitting, Design, and Construction Support (10%)				$ 3,472,023
			Total	**$ 38,192,248**
			Use (Mil $)	**$38.2 M**

Hudson Creek Master Pump Station (FY 2025)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Total Construction Cost	LS	$ 3,250,000	1	$ 3,250,000
Subtotal				$ 3,250,000
Contingency (30%)				$ 975,000
Permitting, Design, and Construction Support (10%)				$ 422,500
			Total	**$ 4,647,500**
			Use (Mil $)	**$4.7 M**

Hudson Creek Master Pump Station (FY 2027)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Total Construction Cost	LS	$ 3,250,000	1	$ 3,250,000
Subtotal				$ 3,250,000
Contingency (30%)				$ 975,000
Permitting, Design, and Construction Support (10%)				$ 422,500
			Total	**$ 4,647,500**
			Use (Mil $)	**$4.7 M**

New North WRF 4 MGD Facility (FY 2035)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Construction Cost per 1 MGD	LS	$ 18,500,000	4	$ 74,000,000
Connecting FM on Kismet	LS	$ 1,563,655	1	$ 1,563,655
Subtotal				$ 75,563,655
Contingency (30%)				$ 22,669,097
Permitting, Design, and Construction Support (20%)				$ 19,646,550
			Total	**$ 117,879,302**
			Use (Mil $)	**$117.9 M**

North WRF 2 MGD Facility Expansion to 6 MGD (FY 2037)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Construction Cost per 1 MGD	LS	$ 18,500,000	2	$ 37,000,000
Subtotal				$ 37,000,000
Contingency (15%)				$ 5,550,000
Permitting, Design, and Construction Support (10%)				$ 4,255,000
			Total	**$ 46,805,000**
			Use (Mil $)	**$46.9 M**

North WRF 2 MGD Facility Expansion to 8 MGD (FY 2040)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Construction Cost per 1 MGD	LS	$ 18,500,000	2	$ 37,000,000
Subtotal				$ 37,000,000
Contingency (15%)				$ 5,550,000
Permitting, Design, and Construction Support (10%)				$ 4,255,000
			Total	**$ 46,805,000**
			Use (Mil $)	**$46.9 M**

North WRF 4 MGD Facility Expansion to 12 MGD (Buildout)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Construction Cost per 1 MGD	LS	$ 18,500,000	4	$ 74,000,000
Subtotal				$ 74,000,000
Contingency (15%)				$ 11,100,000
Permitting, Design, and Construction Support (10%)				$ 8,510,000
			Total	**$ 93,610,000**
			Use (Mil $)	**$93.7 M**

Required Linear Improvements Outside UEPs (FY 2025)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Hudson Creek Phase 1 Total Construction Cost	LS	$ 8,517,590	1	$ 8,517,590
Subtotal				$ 8,517,590
Miscellaneous (15%)				$ 1,277,639
Contingency (30%)				$ 2,938,569
Permitting, Design, and Construction Support (20%)				$ 2,546,759
			Total	**$ 15,280,556**
			Use (Mil $)	**$15.3 M**

Required Linear Improvements Outside UEPs (FY 2025)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Veterans Pkwy 30" Main Total Construction Cost	LS	$ 6,083,500	1	$ 6,083,500
Subtotal				$ 6,083,500
Miscellaneous (15%)				$ 912,525
Contingency (30%)				$ 2,098,808
Permitting, Design, and Construction Support (20%)				$ 1,818,967
			Total	**$ 10,913,799**
			Use (Mil $)	**$11.0 M**

Required Linear Improvements Outside UEPs (FY 2027)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Hudson Creek Phase 2 Total Construction Cost	LS	$ 3,015,300	1	$ 3,015,300
Subtotal				$ 3,015,300
Miscellaneous (15%)				$ 452,295
Contingency (30%)				$ 1,040,279
Permitting, Design, and Construction Support (20%)				$ 901,575
			Total	**$ 5,409,448**
			Use (Mil $)	**$5.5 M**

Required Linear Improvements Outside UEPs (FY 2035)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Entrada Service Main Total Construction Cost	LS	$ 5,642,705	1	$ 5,642,705
Subtotal				$ 5,642,705
Miscellaneous (15%)				$ 846,406
Contingency (30%)				$ 1,946,733
Permitting, Design, and Construction Support (20%)				$ 1,687,169
			Total	**$ 10,123,013**
			Use (Mil $)	**$10.2 M**

New Canal Pump Station #9 (FY 2030)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Total Construction Cost	LS	$ 7,900,000	1	$ 7,900,000
Subtotal				$ 7,900,000
Contingency (30%)				$ 2,370,000
Permitting, Design, and Construction Support (10%)				$ 1,027,000
			Total	**$ 11,297,000**
			Use (Mil $)	**$11.3 M**

NSTS ASR Expansion (FY 2030)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
ASR Pilot Test Program, Modeling, Cycle Testing and Construction	$/Well	$ 1,750,000	5	$ 8,750,000
Subtotal				$ 8,750,000
Contingency (30%)				$ 2,625,000
Permitting, Design, and Construction Support (10%)				$ 1,137,500
			Total	**$ 12,512,500**
			Use (Mil $)	**$12.6 M**

Everest WRF ASR Expansion (FY 2035)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
ASR Pilot Test Program, Modeling, Cycle Testing and Construction	$/Well	$ 1,750,000	6	$ 10,500,000
Subtotal				$ 10,500,000
Contingency (30%)				$ 3,150,000
Permitting, Design, and Construction Support (10%)				$ 1,365,000
			Total	**$ 15,015,000**
			Use (Mil $)	**$15.1 M**

New Canal Pump Station #11 (FY 2040)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Total Construction Cost	LS	$ 7,900,000	1	$ 7,900,000
Subtotal				$ 7,900,000
Contingency (30%)				$ 2,370,000
Permitting, Design, and Construction Support (10%)				$ 1,027,000
			Total	**$ 11,297,000**
			Use (Mil $)	**$11.3 M**

Northwest Storage Tanks and HSP (Buildout)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Total Construction Cost	$/gal	$ 1.14	10,000,000	$ 11,400,000
Subtotal				$ 11,400,000
Contingency (30%)				$ 3,420,000
Permitting, Design, and Construction Support (10%)				$ 1,482,000
			Total	**$ 16,302,000**
			Use (Mil $)	**$16.4 M**

Northwest Storage Tanks and HSP (Buildout)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Total Construction Cost	$/gal	$ 1.14	10,000,000	$ 11,400,000
Subtotal				$ 11,400,000
Contingency (30%)				$ 3,420,000
Permitting, Design, and Construction Support (10%)				$ 1,482,000
			Total	**$ 16,302,000**
			Use (Mil $)	**$16.4 M**

Mid-Hawthorn Supplemental Wells Phase 2 (Buildout)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Supplemental Well Pump, Control, and Piping	$/Well	$ 50,000	6	$ 300,000
Subtotal				$ 300,000
			Total	**$ 300,000**
			Use (Mil $)	**$0.3 M**

Required Linear Improvements Outside UEPs (FY 2025)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
Hudson Creek Phase 1 Total Construction Cost	LS	$ 15,690,600	1	$ 15,690,600
Subtotal				$ 15,690,600
Miscellaneous (15%)				$ 2,353,590
Contingency (30%)				$ 5,413,257
Permitting, Design, and Construction Support (20%)				$ 4,691,489
			Total	**$ 28,148,936**
			Use (Mil $)	**$28.2 M**

Required Linear Improvements Outside UEPs (FY 2035)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
North WRF Reclaim Transmission Mains to North 6	LS	$ 2,254,000	1	$ 2,254,000
Subtotal				$ 2,254,000
Miscellaneous (15%)				$ 338,100
Contingency (30%)				$ 777,630
Permitting, Design, and Construction Support (20%)				$ 673,946
			Total	**$ 4,043,676**
			Use (Mil $)	**$4.1 M**

Required Linear Improvements Outside UEPs (FY 2040)				
Description	**Units**	**Unit Cost**	**Quantity**	**Subtotal**
North WRF Reclaim Transmission Mains to North 9	LS	$ 1,105,000	1	$ 1,105,000
Subtotal				$ 1,105,000
Miscellaneous (15%)				$ 165,750
Contingency (30%)				$ 381,225
Permitting, Design, and Construction Support (20%)				$ 330,395
			Total	**$ 1,982,370**
			Use (Mil $)	**$2.0 M**

APPENDIX E CITY'S UTILITIES 5-YEAR CAPITAL IMPROVEMENT PLAN

Project Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
ADM-34 Irr to PW (Fire Hydrants)	1,125,000	1,125,000	-	1,497,400	1,650,000	-
ADM-62 Fiber Optics	75,000	75,000	100,000	200,000	200,000	200,000
WRE-20 EWR Headworks Rebuild	850,000	-	-	-	-	-
ADM-22 Infiltrn & Inflow	425,000	425,000	425,000	475,000	475,000	475,000
NRO-10 Rehab/Rpl Raw Wtr Well (10 wells)	3,000,000	7,500,000	7,500,000	7,500,000	7,500,000	7,500,000
NRO-XX New Raw Wtr Well (10 wells) & mains						
WRC-5 LS Odor Control Rehab	50,000	50,000	75,000	75,000	75,000	76,500
WRE-18 EWR Blower Bldg Rehab	225,000	-	-	-	-	-
WRE-19 EWR Clarifier Catwalks	225,000	-	-	-	-	-
WRE-20 EWR Headworks Rebuild	250,000	-	-	-	-	-
WRE-XX EWR Reuse Pump Station Replacement	100,000	450,000	7,500,000	-	-	-
SRO-22 Plant 1 Roof Replacement	800,000	-	-	-	-	-
ADM-29 ASR/IRR Supply	-	250,000	250,000	250,000	250,000	250,000
ADM-76 Nchls/Cntry Club Repipe	2,250,000	-	10,200,000	-	-	-
IRR-1 Weir Improvements	2,770,000	1,000,000	1,000,000	1,000,000	1,000,000	1,000,000
NSRO-3 Replace Membranes	-	950,000	-	-	-	-
Phase 2 Palm Tree Water Line Replacement			9,600,000			
Phase 3 Palm Tree Water Line Replacement	-	-		-	8,600,000	-
Phase 1 - Neighborhood WM/IM Replacement -(Nicholas Pkwy to Dominica Canal)				700,000	11,900,000	
Phase 2 - Neighborhood WM/IM Replacement -(Dominica Canal to Damao Canal)			730,000	12,200,000		
Phase 3 - Neighborhood WM/IM Line Replacement -(Damao Canal to Veterans Pkwy)	900,000	14,900,000	-	-		-
Phase 4 - Neighborhood WM/IM Replacement -(Veterans Pkwy to Wayne Canal)	-	1,000,000	16,800,000	-		-
UCD-12 Road Resurfacing Adj	375,000	375,000	562,500	562,500	500,000	500,000
WRSW-22 Reject Tank Construct	3,000,000	-	-	-	-	-
WRSW-9 Reroute Clar Pipe-ABW	100,000	500,000	-	-	-	-
WRSW-19 Chlorine Chamber Cvrs						
North RO Distribution Pump and Motor			300,000	1,100,000		
North Util Complex UCD Administartion and Warehouse; Site improvements, Stormwater permitting - entire site	-	2,840,000	6,000,000	4,000,000	3,000,000	-
UCD-5 Manhole Rehab	-	-		-	-	-
WRE-8 Rehab Biosolids Bldg	-	-	-	-	-	-
WRSW-20 Launder Cvrs & Baffles	-	-	-	-	-	-
WRSW-21 CROM Tank M/H Drain	-	-	-	-	-	-

Project Description	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	FY 2028
ADM-24 Land Purchases						
Canel Weir 7						
ADM-24 Land Purchases	-	-	-	-	300,000	300,000
ADM-24 Land Purchases	150,000	150,000	150,000	150,000	150,000	150,000
ADM-24 Land Purchases	50,000	50,000	50,000	50,000	50,000	50,000
IRR-17 Reuse River Crossing	250,000	-	-	-	-	-
WRC-2 Lift Station Rehab	-	1,600,000	3,750,000	1,600,000	1,600,000	1,600,000
WRC-7 Rehab Master LS 200	1,500,000	300,000	-	-	-	-
NRO-6 Perimeter Wall	1,000,000	-	-	-	-	-
ADM-36 Palm Tree Bl Phase 1						
North Util Complex Utili Admin Bld	-		1,200,000	6,000,000	4,000,000	-
Coating System - WR Storage Tanks	500,000	-	-	-	-	-
Viscaya Water Line Replacement- Nicholas Pkwy to Del P		7,300,000				
ADM-56 US 41 Conveyance	6,000,000	6,000,000	-	-	-	-
Country Club Pipe Replacement				10,000,000		
Gleason Parkway WAS & FO	2,700,000	-	-	-	-	-
Total	28,670,000	46,840,000	66,192,500	47,359,900	41,250,000	12,101,500