



AECOM

COMPREHENSIVE UTILITIES MASTER PLAN UPDATE

2020 - 2040 Planning Horizon

November **2022**



CAPE CORAL

TABLE OF CONTENTS

EXECUTIVE SUMMARY	
1. INTRODUCTION	1-1
1.1 Background.....	1-1
1.2 Previous Plans and Studies.....	1-3
1.3 Project Vision	1-5
1.4 Data Collection.....	1-5
1.5 Project Tasks and Approach.....	1-5
2. POPULATION AND GROWTH PROJECTIONS / UEP AREAS	2-1
2.1 Service Areas.....	2-1
2.2 Population Projections.....	2-3
2.2.1 Interactive Growth Model® IGM	2-3
2.2.2 Delineation of Areas for Population Forecasts.....	2-3
2.2.3 UEP Sub-areas and Final Prioritization	2-6
2.2.4 Utility Extension Schedule	2-12
2.2.5 Served Population	2-13
3. POTABLE WATER SYSTEM	3-1
3.1 Raw Water	3-1
3.1.1 Southwest Wellfield	3-4
3.1.1.1 Southwest Wellfield Water Quality Considerations	3-5
3.1.1.2 Southwest Wellfield Production Capacity Considerations	3-6
3.1.2 North Wellfield	3-12
3.1.2.1 North Wellfield Water Quality Considerations	3-13
3.1.2.2 North Wellfield Production Capacity Considerations.....	3-13
3.1.3 General Summary of Wellfield Conditions	3-16
3.2 Treatment Facilities	3-17
3.2.1 North RO WTP	3-17
3.2.2 Southwest RO WTP.....	3-21
3.3 Water Storage and Pumping Facilities	3-25
3.4 Water Transmission and Distribution Network.....	3-25
3.5 Potable Water Regulatory Compliance	3-25
3.5.1 Current Regulations.....	3-26
3.5.2 New and Proposed Regulations	3-26
3.5.3 Lead and Copper Rule Revision	3-26

3.5.4	Poly-and Perfluoroalkyl Substances.....	3-28
3.5.5	Senate Bill 64	3-29
3.5.6	Potable Reuse.....	3-30
3.5.7	Microbial Protection and Disinfection Byproducts	3-31
3.6	Potable Water Historical and Projected Demands.....	3-32
3.6.1	Historical Potable Water Production.....	3-32
3.6.2	Nonrevenue Water	3-33
3.6.3	Per Capita Historical Water Demand.....	3-34
3.6.4	Supplemental Irrigation Water Demand.....	3-35
3.6.5	Peaking Factors.....	3-35
3.6.6	Potable Water Demand Projections	3-37
3.7	Level of Service Standards/Performance Criteria.....	3-39
3.8	Potable Water System Future Needs.....	3-41
3.8.1	Water Treatment Plant Capacity Gap Analysis.....	3-41
3.8.2	Brackish Supply and Infrastructure Needs.....	3-43
3.8.3	Concentrate Effluent Disposal Gap Analysis	3-52
3.8.4	Analysis of Transmission and Distribution Systems.....	3-54
3.8.4.1	North 1 Analysis	3-57
3.8.4.2	Hydraulic Modeling Analysis	3-67
4.	WASTEWATER SYSTEM.....	4-1
4.1	Existing System Description	4-1
4.1.1	Water Reclamation Facilities.....	4-1
4.1.2	Wastewater Collection and Conveyance System.....	4-14
4.2	Wastewater Regulatory Compliance.....	4-15
4.3	Wastewater Historical and Projected Flows	4-17
4.3.1	Historical Wastewater Flows	4-17
4.3.2	Wastewater Flow Per Capita.....	4-20
4.3.3	Peaking Factors.....	4-21
4.4	Level of Service Standards/Performance Criteria.....	4-26
4.5	Wastewater System Future Needs	4-27
4.5.1	Wastewater Flow Projections.....	4-28
4.5.2	WRF Treatment Capacity Gap Analysis	4-35
4.5.3	Deep Injection Well Capacity	4-40
4.5.4	Collection and Conveyance System.....	4-42
5.	IRRIGATION QUALITY WATER SYSTEM.....	5-1
5.1	IQ Water Supply.....	5-1

5.2	IQ Water Storage and Distribution System.....	5-5
5.3	IQ Water System Regulatory Compliance.....	5-5
5.3.1	Current Regulations.....	5-5
5.3.2	New and Proposed Regulations	5-6
5.3.3	Impacts to the City	5-6
5.4	IQ Water Historical and Projected Demands	5-7
5.4.1	Historical IQ Water System.....	5-7
5.4.2	IQ Water Flow Projections	5-12
5.5	Level of Service Standards/Performance Criteria.....	5-13
5.6	IQ Water System Future Needs.....	5-16
5.6.1	IQ Water Supply Gap Analysis.....	5-16
5.6.1.1	Seasonal Monthly Average Daily Demand Basis	5-16
5.6.1.2	Seasonal Monthly Max Day Demand Basis.....	5-17
5.6.2	IQ Source Management Plan.....	5-20
5.6.3	Conveyance System.....	5-21
5.6.3.1	North 1 Analysis	5-21
5.6.3.2	Future Conveyance System Analysis.....	5-22
5.6.3.3	Hydraulic Modeling Results and Findings.....	5-23
5.6.3.4	Conclusions and Recommendations	5-40
6.	WATER RESOURCES	6-1
6.1	Existing City Water Resource Infrastructure.....	6-1
6.2	Groundwater Resources.....	6-2
6.2.1	Surficial Aquifer System.....	6-2
6.2.2	Intermediate Aquifer System.....	6-6
6.2.2.1	Sandstone Aquifer	6-6
6.2.2.2	Mid-Hawthorn Aquifer	6-6
6.2.3	Floridian Aquifer System.....	6-10
6.2.3.1	Upper Floridian Aquifer	6-10
6.2.3.2	Lower Floridian Aquifer	6-15
6.3	Surface Water Resources.....	6-16
6.3.1	Caloosahatchee River	6-17
6.3.2	Cape Coral Canal System	6-17
6.3.3	Southwest Aggregates Mine Reservoir	6-24
6.3.4	Reclaimed Water	6-27
6.4	Aquifer Storage and Recovery.....	6-30
6.4.1	ASR Target Zones Evaluation Criteria.....	6-33

6.4.2	Potential ASR Storage Zones	6-33
6.4.2.1	Lower Hawthorn Aquifer	6-34
6.4.2.2	Upper Suwannee Aquifer.....	6-34
6.4.2.3	Lower Suwannee Aquifer.....	6-35
6.4.2.4	Avon Park Aquifer.....	6-35
6.4.3	ASR Options.....	6-36
6.5	Summary and Recommendations.....	6-37
7.	RECOMMENDED UTILITY IMPROVEMENT PROJECTS & POTENTIAL FUNDING SOURCES ..	7-1
7.1	Growth Related Utility Improvements.....	7-1
7.1.1	Opinion of Probable Cost for Improvements.....	7-1
7.1.2	Unit Cost Development.....	7-1
7.1.3	Cost Estimating Markups	7-2
7.1.4	Assessed vs. Non-Assessed Costs.....	7-2
7.1.5	Summary of UEP Cost Estimates.....	7-3
7.2	Repair and Rehabilitation Projects.....	7-8
7.3	Potential Funding Sources.....	7-8
7.3.1	Funding by Others	7-8
7.3.2	State Revolving Funds (SRF)	7-8
7.3.3	Water Infrastructure Finance and Innovation Act.....	7-8
7.3.4	Municipal Bonds	7-10
7.3.5	Special Assessments.....	7-10
7.3.6	User Charges	7-10
7.4	Typical Funding Approach.....	7-10
7.5	Cost Summary of all Recommended Improvements.....	7-11

FIGURES

Figure 1-1: City of Cape Coral Boundary	1-2
Figure 1-2: Master Plan Approach	1-6
Figure 2-1: Utility System Service Area Map	2-2
Figure 2-2: Detailed Service Area.....	2-4
Figure 2-3: Environmentally Sensitive Area.....	2-8
Figure 2-4: Septic Density Map with UEPs Overlaid	2-11
Figure 2-5: UEP Subarea Prioritization and Construction Timeline.....	2-13
Figure 2-6: Potable Water Total vs. Served Population.....	2-17
Figure 2-7: Wastewater Total vs. Served Population	2-17
Figure 2-8: IQ Water System Total vs. Served Population	2-19
Figure 3-1: Brackish Water Wellfield Locations	3-2
Figure 3-2: 5-Year Raw Water Supply	3-3
Figure 3-3: Plot Showing Composite Chloride Concentrations & Total Daily Pumpage in the Southwest Wellfield ...	3-8
Figure 3-4: Map Showing Chloride Concentrations in Individual Supply Wells as of 2019	3-9
Figure 3-5: Map Showing the Chloride Concentration Increase per 100 MG Withdrawal in Individual Wells (2011-2020).....	3-10
Figure 3-6: Map Showing Decline in Well Specific Capacities (2011-2020)	3-11
Figure 3-7: Plot Showing Composite Chloride Concentrations & Total Daily Pumpage from the North Wellfield....	3-15
Figure 3-8: North RO WTP Process Flow Diagram.....	3-18
Figure 3-9: North RO WTP Site Plan	3-19
Figure 3-10: Southwest RO WTP Process Flow Diagram	3-22
Figure 3-11: Southwest RO WTP Site Plan	3-23
Figure 3-12: Potable Water Demand Projections.....	3-38
Figure 3-13: Potable Water System Treatment Gap Analysis.....	3-42
Figure 3-14: North and Southwest WTP Treatment Capacities and Raw Water Demand.....	3-44
Figure 3-15: Southwest RO WTP Treatment Capacity and Raw Water Demand	3-45
Figure 3-16: North RO WTP Treatment Capacity and Raw Water Demand	3-46
Figure 3-17: Raw Water Demand and Number of Wells Needed.....	3-48
Figure 3-18: Prospective Locations for Additional Brackish Wells	3-50
Figure 3-19: Prospective Locations for Mid-Hawthorn Aquifer Blend Wells.....	3-51
Figure 3-20: Wastewater and RO Concentrate Flows and Existing Injection Well Capacity at the Southwest RO WTP/WRF	3-53
Figure 3-21: Wastewater and RO Concentrate Flows and Existing Injection Well Capacity at the North RO WTP/WRF	3-55
Figure 3-22: 2020 Water Transmission and Distribution System	3-56
Figure 3-23: North 1 Buildout MDD Available Fire Flow	3-59
Figure 3-24: Proposed North 1 Water Main Improvements Key Map.....	3-62
Figure 3-25: Proposed North 1 Water Main Improvements (A).....	3-63
Figure 3-26: Proposed North 1 Water Main Improvements (B).....	3-64

Figure 3-27: Proposed North 1 Water Main Improvements (C).....	3-65
Figure 3-28: Proposed North 1 Water Main Improvements (D).....	3-66
Figure 3-29: Updated Annual Average Daily Demand and Maximum Day Demand Diurnal Patterns.....	3-68
Figure 3-30: 2020 Conditions MDD - Available Fire Flow.....	3-70
Figure 3-31: Delineated Areas with Water Mains Less than 6-Inches.....	3-71
Figure 3-32: Planning Year 2025 – Existing and Proposed Service Areas.....	3-73
Figure 3-33: Planning Year 2025 - North 1 UEP Improvements	3-74
Figure 3-34: Planning Year 2025 - North 3 UEP Improvements	3-75
Figure 3-35: Pine Island Corridor Water Main Improvements.....	3-76
Figure 3-36: Planning Year 2025 - Small Diameter Replacement Program.....	3-77
Figure 3-37: Planning Year 2025 – Burnt Store Road Corridor, Hudson Creek PUD Water Main Improvements....	3-78
Figure 3-38: Planning Year 2025 MDD – Available Fire Flow.....	3-80
Figure 3-39: 2025 Small Diameter Replacement Area – Available Fire Flow	3-81
Figure 3-40: Planning Year 2030 - Existing and Proposed Services Areas.....	3-83
Figure 3-41: Planning Year 2030 - North 4 UEP Improvements	3-84
Figure 3-42: Planning Year 2030 - North 5 UEP Improvements	3-85
Figure 3-43: Planning Year 2030 - Small Diameter Replacement Program.....	3-86
Figure 3-44: Planning Year 2030 MDD – Available Fire Flow.....	3-88
Figure 3-45: 2030 Small Diameter Replacement Area – Available Fire Flow	3-89
Figure 3-46: Planning Year 2035 - Existing and Proposed Services Areas.....	3-91
Figure 3-47: Planning Year 2035 - North 6 UEP Improvements	3-92
Figure 3-48: Planning Year 2035 - North 7 UEP Improvements	3-93
Figure 3-49: Planning Year 2035 - Small Diameter Replacement Program.....	3-94
Figure 3-50: Planning Year 2035 MDD - Available Fire Flow	3-96
Figure 3-51: 2035 Small Diameter Replacement Area – Available Fire Flow	3-97
Figure 3-52: Planning Year 2040 - Existing and Proposed Services Areas.....	3-99
Figure 3-53: Planning Year 2040 - North 8 UEP Improvements	3-100
Figure 3-54: Planning Year 2040 - North 9 UEP Improvements	3-101
Figure 3-55: Planning Year 2040 - Small Diameter Replacement Program.....	3-102
Figure 3-56: Planning Year 2040 MDD - Available Fire Flow	3-104
Figure 3-57: 2040 Small Diameter Replacement Area – Available Fire Flow	3-105
Figure 3-58: Buildout Planning Year - Existing and Proposed Services Areas	3-107
Figure 3-59: Buildout Planning Year - North 10 UEP Improvements.....	3-108
Figure 3-60: Buildout Planning Year - North 11 UEP Improvements.....	3-109
Figure 3-61: Buildout Planning Year - North 12 UEP Improvements.....	3-110
Figure 3-62: Buildout Planning Year – Small Diameter Replacement Program	3-111
Figure 4-1: 2020 Existing Wastewater System	4-2
Figure 4-2: Everest WRF Site Plan	4-4
Figure 4-3: Everest WRF Process Flow Diagram	4-5
Figure 4-4: Southwest WRF Site Plan.....	4-10
Figure 4-5: Southwest WRF Process Flow Diagram	4-12
Figure 4-6: Historical Wastewater Flows Everest WRF	4-19

Figure 4-7: Historical Wastewater Flows SW WRF	4-19
Figure 4-8: Historical per Capita Wastewater Flows	4-20
Figure 4-9: Historical MDF PF Per Facility	4-22
Figure 4-10: Historical M3DF PF Per Facility.....	4-24
Figure 4-11: Historical MMDF PF Per Facility.....	4-25
Figure 4-12: 2020 Existing Wastewater System Areas	4-29
Figure 4-13: Distribution of UEP Wastewater Flows by WRF	4-30
Figure 4-14: Areas Served by WRF at Buildout.....	4-31
Figure 4-15: Everest WRF Gap Analysis.....	4-36
Figure 4-16: SW WRF Gap Analysis.....	4-37
Figure 4-17: North WRF Treatment Capacity Analysis (Alternative A Capacities)	4-39
Figure 4-18: North WRF Treatment Capacity Analysis (Alternative B Capacities)	4-39
Figure 4-19: Wastewater Flow and Existing Injection Well Capacity at the Everest WRF	4-41
Figure 4-20: Additional Developments Considered in the North 1 Analysis.....	4-43
Figure 4-21: 2025 Hydraulic Modeling Analysis.....	4-48
Figure 4-22: 2030 Hydraulic Modeling Analysis.....	4-50
Figure 4-23: 2040 Hydraulic Modeling Analysis.....	4-52
Figure 4-24: Buildout Hydraulic Modeling Analysis	4-54
Figure 4-25: Routing Alternative 1 for North 1	4-59
Figure 4-26: Routing Alternative 2 for North 1	4-60
Figure 4-27: Routing Alternative 3 for North 1	4-61
Figure 4-28: North 1 Split Flows Results from Extended Period Simulation	4-62
Figure 4-29: Summary of UEP Wastewater Linear Improvements.....	4-64
Figure 5-1: Wet Season Available IQ Water Supply.....	5-4
Figure 5-2: Dry Season Available IQ Water Supply	5-4
Figure 5-3: 10-Year Average Historical IQ Water Demands - Average and Maximum Monthly Demands during Dry Season.....	5-10
Figure 5-4: 10-Year Average Historical IQ Water Demands - Average and Maximum Monthly Demands during Wet Season.....	5-10
Figure 5-5: IQ Water Demand Projections.....	5-13
Figure 5-6: Recommended IQ Water Source Management Plan.....	5-20
Figure 5-7: Minimum Pressures for the 2020 MDD Scenario	5-24
Figure 5-8: Minimum Pressures for the 2025 MDD Scenario	5-26
Figure 5-9: Minimum Pressures for the 2030 MDD Scenario	5-28
Figure 5-10: Minimum Pressures for the 2035 MDD Scenario.....	5-30
Figure 5-11: Minimum Pressures for the 2040 MDD Scenario.....	5-32
Figure 5-12: Minimum Pressures for the Buildout MDD Scenario.....	5-34
Figure 5-13: Minimum Pressures for Scenario 7.....	5-36
Figure 5-14: Minimum Pressures for Scenario 8.....	5-37
Figure 5-15: Minimum Pressures for Scenario 9.....	5-38
Figure 5-16: Minimum Pressures for Scenario 10.....	5-39
Figure 6-1: Generalized Stratigraphic Column.....	6-4

Figure 6-2: Map Showing Potential Developable Areas of the Surficial Aquifer	6-5
Figure 6-3: Map Showing Locations of USGS Middle Hawthorn Aquifer Wells and Water Levels (as of 2019)	6-8
Figure 6-4: Map Showing Potential Developable Areas of the Mid Hawthorn Aquifer	6-9
Figure 6-5: Map Showing Reported Chloride Concentration in the Lower Hawthorn Aquifer (Dec. 2007-2019)	6-11
Figure 6-6: Map Showing Potential Developable Areas of the Lower Hawthorn Aquifer	6-12
Figure 6-7: Plot Showing Caloosahatchee River Flow at S-79 and Salinity One Mile West of S-79.....	6-18
Figure 6-8: Recorded Flows in Horseshoe Canal, Weir 14.....	6-20
Figure 6-9: Map Showing Locations of 2020 Canal Pump Stations, Weirs, Basins, and Interconnects.....	6-21
Figure 6-10:Plot Showing Various Water Supply Components Used to Meet Irrigation Demands.....	6-23
Figure 6-11: Map Showing the Location of the Southwest Aggregates Mine Reservoir with Respect to the Cape Coral Canal System.....	6-26
Figure 6-12: Historical Monthly Average Reclaimed Water Supply from the City's WRFs.....	6-28
Figure 6-13: Plot Showing Historical Irrigation Water Usage & Number of Irrigation Accounts.....	6-29
Figure 6-14: Map Showing ASR and Injection Well Locations	6-32
Figure 7-1: UCD Admin Building and Warehouse at the North WTP/WRF Site.....	7-9

TABLES

Table 2-1: City of Cape Coral Total Population Projections.....	2-6
Table 2-2: UEP Subarea Prioritization Matrix	2-10
Table 2-3: UEP Subarea Prioritization Matrix	2-12
Table 2-4: Served Potable Water and Wastewater Population Projections	2-15
Table 2-5: Summary of UEP Populations.....	2-16
Table 2-6: Served IQ Water Population Projections.....	2-18
Table 3-1: Well Depths & Flow Rates of Raw Water Supply Wells at the South Wellfield.....	3-5
Table 3-2: Summary of Specific Capacity Change in the Southwest Wellfield.....	3-7
Table 3-3: Well Depths & Flow Rates of Raw Water Supply Wells at the North Wellfield.....	3-12
Table 3-4 Summary of Specific Capacity Change in the North Wellfield	3-14
Table 3-5: Storage and Pumping Facilities.....	3-25
Table 3-6: Summary of USEPA Health Advisories as Revised in June 2022	3-29
Table 3-7: Preliminary FDEP Potable Reuse Disinfection Requirements.....	3-31
Table 3-8: 10-Year Historical Potable Water Production	3-33
Table 3-9: Nonrevenue Potable Water Summary	3-34
Table 3-10: Historical Per Capita Water Usage	3-34
Table 3-11: Historical Supplemental Irrigation Water Demand	3-35
Table 3-12: Maximum Daily Demand Peaking Factors	3-36
Table 3-13: Maximum 3-Day Daily Demand Peaking Factors	3-37
Table 3-14: Maximum Month Daily Demand Peaking Factors	3-37
Table 3-15: Potable Water Demand Projections.....	3-38
Table 3-16: Potable Water Level of Service/Design Criteria for Cape Coral.....	3-40
Table 3-17: WTP Treatment Capacity Timeline	3-43
Table 3-18 Recommended Timeline for the Construction of Wells*	3-47
Table 3-19: Summary of the Recommended UEP Improvement Projects for Planning Year 2025	3-82
Table 3-20: Summary of the UEP Improvement Projects for Planning Year 2030	3-90
Table 3-21: Summary of the Recommended UEP Improvement Projects for Planning Year 2035	3-98
Table 3-22: Summary of the Recommended UEP Improvement Projects for Planning Year 2040	3-106
Table 3-23: Summary of the Recommended UEP Improvement Projects for Buildout Planning Year	3-112
Table 4-1: Water Reclamation Facilities FDEP Permit Summary	4-3
Table 4-2: Everest WRF Effluent Permit Limits for Surface Water Discharge.....	4-7
Table 4-3: Everest WRF Effluent Permit Limits for Underground Injection	4-8
Table 4-4: Everest WRF Effluent Permit Limits for Reuse and Land Application	4-9
Table 4-5: Southwest WRF Permit Effluent Limits for Underground Injection	4-13
Table 4-6: Southwest WRF Permit Effluent Limits for Reuse and Land Application.....	4-14
Table 4-7: Key Updates to Chapter 62-600, FAC Domestic Wastewater Facilities	4-16
Table 4-8: Historical Wastewater Flows	4-18
Table 4-9: Historical Per Capita Wastewater Flow.....	4-20
Table 4-10: Everest WRF Historical Maximum Day Flow	4-21

Table 4-11: SW WRF Historical Maximum Day Flow	4-22
Table 4-12: Everest WRF Historical Maximum Consecutive 3-Day Flow	4-23
Table 4-13: SW WRF Historical Maximum Consecutive 3-Day Flow	4-23
Table 4-14: Everest WRF Maximum Month Daily Flow and Peaking Factor.....	4-24
Table 4-15: SW WRF Maximum Month Daily Flow and Peaking Factor.....	4-25
Table 4-16: Water Reclamation Recommended Design Per Capita Flows.....	4-26
Table 4-17: Recommended Wastewater Level of Service Standards/Performance Criteria.....	4-27
Table 4-18: Everest WRF Wastewater Flow Projections (MGD).....	4-32
Table 4-19: SW WRF Wastewater Flow Projections (MGD).....	4-33
Table 4-20: Flex Station Wastewater Flow Projections (MGD)	4-34
Table 4-21: North WRF Wastewater Flow Projections (MGD)	4-35
Table 4-22: Everest WRF Gap Analysis (MGD).....	4-36
Table 4-23: Southwest WRF Gap Analysis (MGD)	4-37
Table 4-24: North WRF Treatment Capacity Analysis (MGD).....	4-38
Table 4-25: North 1 UEP Service Area Population Estimates.....	4-44
Table 4-26: Additional Flow to North 1 UEP	4-44
Table 4-27: North 1 Area Estimated Flows.....	4-44
Table 4-28: Flow from Developments Outside the North 1 UEP Area.....	4-44
Table 4-29: Buildout Population and Flows of Future UEP Areas.....	4-45
Table 4-30: Results for Additional Scenarios.....	4-56
Table 4-31: Results for Alternative 1	4-57
Table 4-32: Results for Alternative 2	4-58
Table 4-33: Results for Alternative 3	4-58
Table 4-34: Summary of Recommended UEP Wastewater Improvements	4-63
Table 5-1: Summary of Irrigation Quality Water Sources	5-3
Table 5-2: Historical IQ Water Demands.....	5-7
Table 5-3: Historical IQ Water Demands – Monthly Demands during Dry Season (MGD)	5-9
Table 5-4: Historical IQ Water Demands – Monthly Demands during Wet Season (MGD)	5-9
Table 5-5: Historical IQ Seasonal Demand Multipliers and Monthly Seasonal Demands.....	5-11
Table 5-6: Historical Wastewater Min Month Flows and PFs.....	5-12
Table 5-7: IQ Water Demand Projections.....	5-12
Table 5-8: Historical Per Capita Irrigation Demand References	5-14
Table 5-9: Recommended IQ Water LOS and Performance/Design Criteria.....	5-15
Table 5-10: IQ Water Supply Gap Analysis: Seasonal Monthly Average Daily Demand Basis.....	5-18
Table 5-11: IQ Water Supply Gap Analysis: Seasonal Monthly Max Daily Demand Basis.....	5-19
Table 5-12: Summary of Simulated Scenarios.....	5-21
Table 5-13: Summary of Modeling Scenarios.....	5-22
Table 5-14: Summary of Additional Modeling Scenarios.....	5-23
Table 5-15: Pipeline Improvements Summary for 2025 Scenario	5-25
Table 5-16: Pipeline Improvements Summary for 2030 Scenario	5-27
Table 5-17: Pipe Improvements Summary for Scenario 2035	5-29
Table 5-18: Pipe Improvements Summary for Scenario 2040	5-31

Table 5-19: Pipe Improvements Summary for Scenario 2080	5-33
Table 6-1: Estimated Wet & Dry Season Capacities of Available Irrigation Water Resources for Year 2025	6-27
Table 6-2: ASR Well Construction & Permit Details.....	6-31
Table 6-3: Summary of Current & Potential New Sources for Raw Water Supply.....	6-38
Table 6-4: Summary of Current & Potential New Sources for Irrigation Supply.....	6-38
Table 7-1: Recommended Potable Water Improvement Projects	7-2
Table 7-2: Recommended Wastewater Improvement Projects.....	7-3
Table 7-3: Recommended IQ Improvement Projects	7-4
Table 7-4: AACE Cost Estimate Classification Matrix	7-1
Table 7-5: Summary of UEP Improvements (Assessed vs. Non-Assessed).....	7-4
Table 7-6: Cost Summary of All Recommended Improvements	7-11

LIST OF ACRONYMS

<i>AACE</i>	Association for the Advancement of Cost Engineering
<i>AADD</i>	Annual Average Daily Demand
<i>AADF</i>	Annual Average Daily Flow
<i>AFFF</i>	Aqueous firefighting foams
<i>AL</i>	Action Level
<i>APT</i>	aquifer performance test
<i>ASR</i>	Aquifer Storage and Recovery
<i>Avg</i>	average
<i>bls</i>	below land surface
<i>BMAP</i>	Basin Management Plan Area
<i>BO</i>	Buildout
<i>CECs</i>	constituents of emerging concern
<i>CFEC</i>	Capital Facility Expansion Charge
<i>CPS</i>	canal pumping station
<i>CRA</i>	Community Redevelopment Agency
<i>Cu</i>	Copper
<i>DBP</i>	Disinfection byproducts
<i>DPR</i>	Direct potable reuse
<i>DWWTF</i>	domestic wastewater treatment facility
<i>DZMW</i>	Dual-zone monitoring well
<i>EMA</i>	Environmental Management Area
<i>EP</i>	Equivalent parcel
<i>EPS</i>	Extended period simulation
<i>EPTDS</i>	entry points to distribution system
<i>ERU</i>	Equivalent Residential Unit
<i>FAC</i>	Florida Administrative Code
<i>FDEP</i>	Florida Department of Environmental Protection
<i>FGUA</i>	Florida Governmental Utility Authority
<i>fps</i>	feet per second
<i>FS</i>	Florida Statutes
<i>FWEA</i>	Florida Water Environment Association
<i>FY</i>	Fiscal Year
<i>gpcd</i>	gallons per capita per day

<i>gpd/ft</i>	gallons per day per foot
<i>gpm</i>	gallons per minute
<i>HAA5</i>	haloacetic acids
<i>HAL</i>	Health Advisory Level
<i>HAV</i>	hepatitis A virus
<i>HDPE</i>	high-density polyethylene
<i>HP</i>	horsepower
<i>I&I</i>	inflow and infiltration
<i>IGM</i>	Interactive Growth Model
<i>in</i>	inch
<i>IPR</i>	Indirect potable reuse
<i>IQ</i>	Irrigation Quality
<i>IW</i>	Injection well
<i>KW</i>	Kilowatt
<i>LCEC</i>	Lee County Eelectric Cooperative
<i>LCR</i>	Lead and Copper Rule
<i>LCRR</i>	Lead and Copper Rule Revision
<i>LF</i>	linear foot
<i>LOS</i>	Level of service
<i>LSL</i>	Lead service line
<i>M3DD</i>	Maximum 3-day demand
<i>M3DF</i>	Maximum 3-day flow
<i>MAR</i>	managed aquifer recharge
<i>MCL</i>	maximum contaminant levels
<i>MDD</i>	Maximum daily demand
<i>MDF</i>	Maximum daily flow
<i>MDF</i>	Maximum day flow
<i>MFM</i>	Metro Forcecasting Models
<i>MG</i>	million gallons
<i>mg/L</i>	milligrams per liter
<i>MGD</i>	Million gallons per day
<i>MGM</i>	million gallons per month
<i>MinMF</i>	Minimum Monthly Flows
<i>MMADF</i>	Maximum month average daily flow
<i>MMDD</i>	Maximum month daily demand

<i>MPS</i>	master pump station
<i>MRL</i>	minimum reporting level
<i>NDMA</i>	N-nitrosodimethylamine
<i>NPDWR</i>	National primary drinking water regulation
<i>NSTS</i>	North-South Transfer Station
<i>O&M</i>	Operation and Maintenance
<i>Pb</i>	Lead
<i>PF</i>	peaking factor
<i>PFAS</i>	poly-and perfluoroalkyl substances
<i>PFBA</i>	perfluorobutanoic acid
<i>PFBS</i>	perfluorobutane sulfonic acid
<i>PFDA</i>	perfluorodecanoic acid
<i>PFHxA</i>	perfluorohexanoic acid
<i>PFHxS</i>	perfluorohexane sulfonate
<i>PFNA</i>	perfluorononanoic acid
<i>PFOA</i>	perfluorooctanoic acid
<i>PFOS</i>	perfluorooctane sulfonate
<i>PHD</i>	peak hour demand
<i>PHF</i>	peak hour flow
<i>PS</i>	Pump station
<i>psi</i>	pound-force per square inch
<i>PUD</i>	Planned unit developments
<i>PVC</i>	polyvinyl chloride
<i>PW</i>	Potable Water
<i>RO</i>	Reverse Osmosis
<i>SA</i>	Service Area
<i>SB 64</i>	Senate Bill 64
<i>SDWA</i>	Safe Drinking Water Act
<i>SEDA</i>	Southeast Desalting Association
<i>SF</i>	Line Extension Assessments
<i>SFWMD</i>	South Florida Water Management District
<i>SIS</i>	Smart Irrigation Systems
<i>SMW</i>	shallow monitoring well
<i>SR</i>	State Road
<i>SRF</i>	State Revolving Funds
<i>SSO</i>	sanitary sewer overflows

<i>SW</i>	Southwest
<i>SWFWMD</i>	Southwest Florida Water Management District
<i>TAZ</i>	Traffic Analysis Zone
<i>TDH</i>	total dynamic head
<i>TDS</i>	total dissolved solids
<i>TL</i>	Trigger Level
<i>TMDL</i>	total maximum daily load
<i>TOC</i>	total organic carbon
<i>TTHM</i>	total trihalomethanes
<i>UCMR3</i>	Unregulated Contaminant Monitoring Rule 3
<i>UCMR5</i>	Unregulated Contaminant Monitoring Rule 5
<i>UCMR6</i>	Unregulated Contaminant Monitoring Rule 6
<i>UEP</i>	Utility Extension Project
<i>UIC</i>	Underground Injection Control
<i>USDW</i>	Underground Source of Drinking Water
<i>USEPA</i>	United States Environmental Protection Agency
<i>W.I.C.C.</i>	Water Independence of Cape Coral
<i>WMA</i>	Wildlife Management Area
<i>WRAP</i>	Water Reuse Action Plan
<i>WRF</i>	Water Reclamation Facility
<i>WTP</i>	Water Treatment Plant
<i>WW</i>	Wastewater