Lee County Utilities Water Master Plan Update

Water Master Plan Summary Report

December 20, 2019

Prepared for:

Lee County Utilities

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1.0 INTRODUCTION

1.1 BACKGROUND

Lee County Utilities (LCU) is responsible for providing safe, reliable potable water service throughout several areas in unincorporated Lee County. The principal components of the potable water supply system include raw water supply, five water treatment facilities (with a current operational capacity of approximately 47.8 MGD), onsite storage, remote storage and booster pumping stations, and water transmission and distribution mains. Figure 1-1 provides an overall schematic of the County's potable water service area.

LCU currently provides potable water services to unincorporated areas of Lee County with the exception of Lehigh Acres and Pine Island. Florida Governmental Utility Authority (FGUA) currently provides water to Lehigh Acres area. The Greater Pine Island Water Association (GPIWA) provides water to Pine Island and Matlacha. Additionally, LCU provides bulk water to the Town of Fort Myers Beach. The LCU service area boundary encompasses approximately 209.3 square miles of land area. The LCU service area is bisected by the Caloosahatchee River; the "north" service area is north of the river; the "south" service area is located south of the river.

The Lee County Utilities Integrated Water Resources Master Plan (IWRMP) was completed in December of 2010 and included an evaluation of potable water systems, reclaimed water systems, and wastewater systems. The plan identified capital improvement and recommendation plans based on existing conditions at the time, for both sustainable water supply and sanitary sewer services.

The objectives of the original IWRMP were to identify needs and provide recommended improvements associated with water, wastewater, and reclaimed water systems in order to provide reliable and sustainable water supply and sanitary sewer services through the year 2030. A total of 10 Water Supply projects and 29 Water Main Improvement projects were recommended in the 2010 IWRMP. Table 1-1 and 1-2 provides a summary of the 2010 recommendations and identifies if the recommended improvements have been completed.

In accordance with CN140526 Supplemental Task Authorization No. 2 for the project known as 2018 Water Master Plan Update, Stantec was retained by LCU to update the IWRMP, specifically as it pertains to the water supply system. While the original IWRMP provided recommendations for County-wide utility water resource infrastructure, including water, reclaimed water, and wastewater systems. The 2018 Water Master Plan Update (WMPU) only pertains to the potable water system.

North Lee County WTP
5.0 MG Storage

Olga WTP
5.0 MG Storage
1.08 MGD ASR

North
2.0 MG

3 - City of Cape
Coral Interconnects

Waterway Estates
1.0 MG

College Pkwy
1.5 MG

South
2.0 MG

Miner's Corner
2.0 MG

Green Meadows - AHR
5.0 MG

Green Meadows WTP

Corkscrew - AHR
5.0 MG

Bartow
0.3 MG

Corkscrew WTP
6.0 MG Storage
3.0 MGD ASR

US-41
1.0 MG

Connection to
Fort Myers Beach
& Bonita Springs

Pinewoods WTP
2.0 MG Storage

Legend

- Water Treatment Plant
- Storage Tank
- County Boundary
- Water Service Area

Diameter

- ≤ 6" Diameter
- ≤ 12" Diameter
- ≤ 24" Diameter
- ≤ 48" Diameter

Lee County
Southwest Florida
Stantec

N

Scale: 1 in = 2.40 miles

Figure 1-1: Lee County Utilities Existing Infrastructure

Lee County Utilities Water Master Plan Update TM#4 - July 2019

Table 1-1 Schedule of Recommended Water Treatment Improvements

Implementation Schedule	Service Area	Improvement	Status
2010-2015	North	Current expansion of North Lee County Water Treatment Plant to 10 mgd	Complete
		Decommission Waterway Estates Water Treatment Plant	Complete
		Expand Olga Water Treatment Plant to 10 mgd	Not Complete
		Increase Caloosahatchee River supply with aquifer storage and recovery storage below Underground Source of Drinking Water	Complete
		Construct brackish water well field	Not Complete
	South	Replace existing Green Meadows Water Treatment Plant with a new 14 mgd water treatment plant	Complete
		Increase blend opportunities with fresh groundwater-to groundwater aquifer storage and recovery	Not Complete
		Enhance connectivity with other raw water supplies	Not Complete
2015-2020	North	Expand North Lee County Water Treatment Plant to 15 mgd	Underway
		Increase brackish water supply	Underway
2020-2030		No improvements recommended	-

Table 1-2 Schedule of Recommended Water Main Improvements

Project ID No.	Project Description	Pipe Diameter (inches)	Pipe Length (feet)	Status
2010 - 2015 Water Main Improvements				
1	On Orange Grove Blvd south of Skyline Rd	8	5,500	Complete
2	On Palm Ave from Pondella Rd to Hancock Bridge Parkway	12	2,700	Complete
3	On N. Cleveland Ave	16	5,900	Complete
4	Connecting S. Tamiami Rd to a 30-inch pipe north of Alico	24	23,000	Not Complete
5	Summerlin I on Summerlin Rd from McGregor Blvd to San Carlos Blvd	16	12,000	Not Complete
6	Summerlin IIA on Summerlin Rd from San Carlos Blvd to Pine Ridge Rd	16	2,700	Not Complete
7	Summerlin IIB on Summerlin Rd from Pine Ridge Rd to Gladious Dr	16	17,000	Not Complete
8	Summerlin III on Winkler Rd from Gladious Dr to Cypress Lake Dr	16	6,400	Underway
9	Summerlin Phase IV on Gladious Dr	20	5,000	Complete
10	Summerlin Phase IV on Gladious Dr	24	1,500	Complete
11	On Gladious Dr from Pine Ridge Rd to FPL easement	20	5,500	Complete
12	On A&W Bulb Rd from Gladious Dr to McGregor Blvd	12	5,600	Complete
13	From Alico parallel to Ben Hill Griffin Parkway	24	6,322	Complete
14	On Treeline Ave South	24	9,400	Not Complete
22	On Penzance Blvd connecting to Six Mile Cypress Parkway	10	1,200	Complete
27	On Pittsburgh Blvd (from Lee Road to Oriole Rd)	8	2,600	Complete
19	On Tice St (from I-75 to County Lakes Dr)	12	5,900	Complete
2015 - 2020 Water Main Improvements				
15	On N. Tamiami Trail to Cleveland Ave	24	22,000	Not Complete
16	On Bayshore Rd to North Tamiami Trail	24	13,400	Not Complete
17	On Crystal Dr (from Metro Parkway to S. Cleveland Ave)	16	11,000	Underway
18	On Brantley Rd (from S. Cleveland Ave to Summerlin Rd)	12	5,500	Not Complete
2020 - 2030 Water Main Improvements				
20	From Olga Water Treatment Plant to Airport Haul	30	74,000	Not Complete
21	On Colonial Blvd connecting proposed 30-inch to existing 16-inch on Ortiz Ave	24	33,000	Not Complete
23	Connecting Cypress Lake Dr to Daniels Parkway	16	900	Complete
24	On Winkler Rd (from McGregor Blvd to College Parkway)	12	6,400	Underway
25	On Winkler Rd (from College Parkway to Cypress Lake Dr)	16	4,000	Underway
26	On Sanibel Rd (from S. Tamiami Trail to the railroad)	12	11,000	Complete
28	Connecting pipe (from Lee Rd to Missouri Rd)	8	1,600	Complete
29	Discharge pipe (from Pinewoods Water Treatment Plant to Airport Haul)	24	19,000	Not Complete

1.2 2018 WATER SUPPLY MASTER PLAN UPDATE OBJECTIVE

The County's potable water system can be divided into three distinct components: source, treatment and transmission/distribution. Each of these components is affected by the increase in demand placed on the system by growth and by aging of the system. The purpose of the WMPU is to define these impacts on respective system components and provide recommendations to ensure continued provision of quality potable water to the County's customers.

LCU's main objective is to continue to provide safe reliable potable water service throughout the LCU service area. The purpose of the 2018 update is to provide an updated capital improvement plan through the planning year 2040 with projects and programs identified through the planning period of 2045 that address improvements associated with:

1. Planned and identified growth within the service area;
2. Identification of reliable source water needs;
3. Identification of reliable treatment capacity requirements; and
4. Increased distribution system reliability;

Concurrent to the development of and in support of the WMPU, LCU's consultant developed an existing conditions calibrated potable water extended period simulation hydraulic model. The potable water hydraulic model was upgraded as a part of the 2018 WCMPU and was utilized to perform hydraulic evaluations to support the development of the proposed improvements.

1.3 METHODOLOGY

The methodology used to prepare this update included collecting and reviewing information, the evaluation and analysis of the potable water system operations, and the development of solutions to meet LCUs objectives.

Collect and Review

Data and pertinent information, such as historical water withdrawal, customer usage was collected, reviewed and validated to understand historical potable water system needs. Additionally, a thorough review of planned developments within the potable water service areas was performed to identify when and where new customers would likely require potable water service.

Evaluate and Analyze

The development of the WMPU was performed through the delivery of three technical memoranda as steps to create the final WMPU. Three technical memoranda were independently developed as follows:

- Source Water Resource Characterization Technical Memorandum

  - The purpose of this technical memorandum was to evaluate and identify sustainable quantity, quality, and potential seasonally varying water resources. The resources are surface water, fresh groundwater, brackish groundwater, reclaimed water, potential potable water interconnects and water conservation.

- Population and Demand Projection Technical Memorandum
  - The purpose of this technical memorandum was to establish population projections, a per capita water usage, and water demand projections.
- Capital Improvement Plan Technical Memorandum
  - The purpose of this technical memorandum was to develop improvements and capital planning for the planning periods 2030 and 2040.

Develop Solutions

Solutions to improve potable water supply, treatment, and delivery were developed to meet the needs of future customers as well as to improve overall system performance and reliability through the planning year 2040. Each of the three distinct components (source, treatment and transmission/distribution) was evaluated for the need for increased capacity. The capacity evaluation also addressed improvement projects needed for the system to reliably serve the projected demands. The use of the calibrated hydraulic model serves as a tool to assess the transmission/distribution system for piping improvements and assess the options for potential WTP expansions and the impacts on the hydraulics of the transmission/distribution system.

Gain Consensus

The 2018 WMPU was developed over a series of workshops and meetings as follows:

1. Kick Off Meeting (8/10/18)
2. Existing System Review Meeting (10/17/18)
3. Hydraulic Model Review Meeting (5/23/19)
4. CIP Plan Review Meeting (8/19/19)

Summaries of these meetings are provided in Appendix A.

2.0 DATA REVIEW AND SUMMARY

The available documents and data reviewed and utilized for this WMPU include:

- LCU Water Use Permits
- LCU Planning Department Population Projections
- Public Facilities LOS and Concurrency Report
- Density Reduction/Groundwater Resource (DRGR) Final Report
- Lee County Comprehensive Plan
- Lee County Integrated Water Resources Master Plan and associated Technical Memorandums
- Lower West Coast Water Supply Plan
- 2014-2017 LCU Annual Comprehensive Report
- 2013-2018 LCU Monthly Operating Reports
- 2013-2018 Billed Water Usage by Plant
- Bureau of Economic and Business Research (BEBR) Population Projections
- LCU Capital Improvement Plan Budget and Business Cases
- LCU Potable Water Hydraulic Model (May 7, 2019) and Technical Memorandum 1 Model Update and Calibration Results Summary by Carollo
- LCU Potable Water Geodatabase

3.0 INVENTORY OF EXISTING SYSTEM

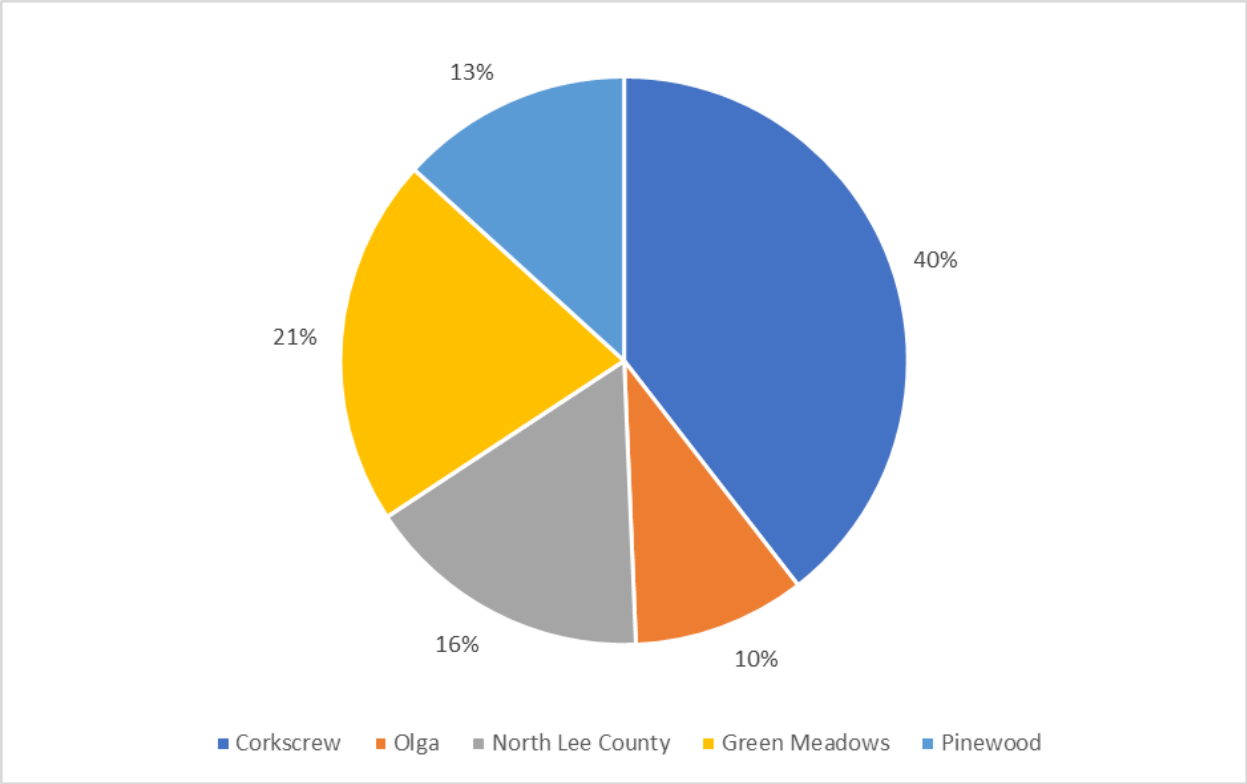
LCU owns and operates five (5) water treatment plants (WTP). These plants are the Corkscrew lime softening plant, the Green Meadows ion exchange/reverse osmosis (RO) plant, the North Lee County RO plant, the Olga surface water treatment plant, and the Nano-Filtration and RO treatment facility. These plants are the listed in Table 3-1, along with permitted and operational capacity in million gallons per day (MGD). Additionally, LCU has a total of ten interconnections with the following surrounding utilities: City of Fort Myers, Cape Coral, and Bonita Springs. These interconnections provide additional reliability in the event of emergencies. The potable water distribution facilities include over 1,434 miles of pipe ranging from 1-inch to 36-inch in diameter, over 85,264 water meters, 27,665 valves, 9,239 fire hydrants, and a total of 35 million gallons (MG) of water storage in fifteen active water storage tanks.

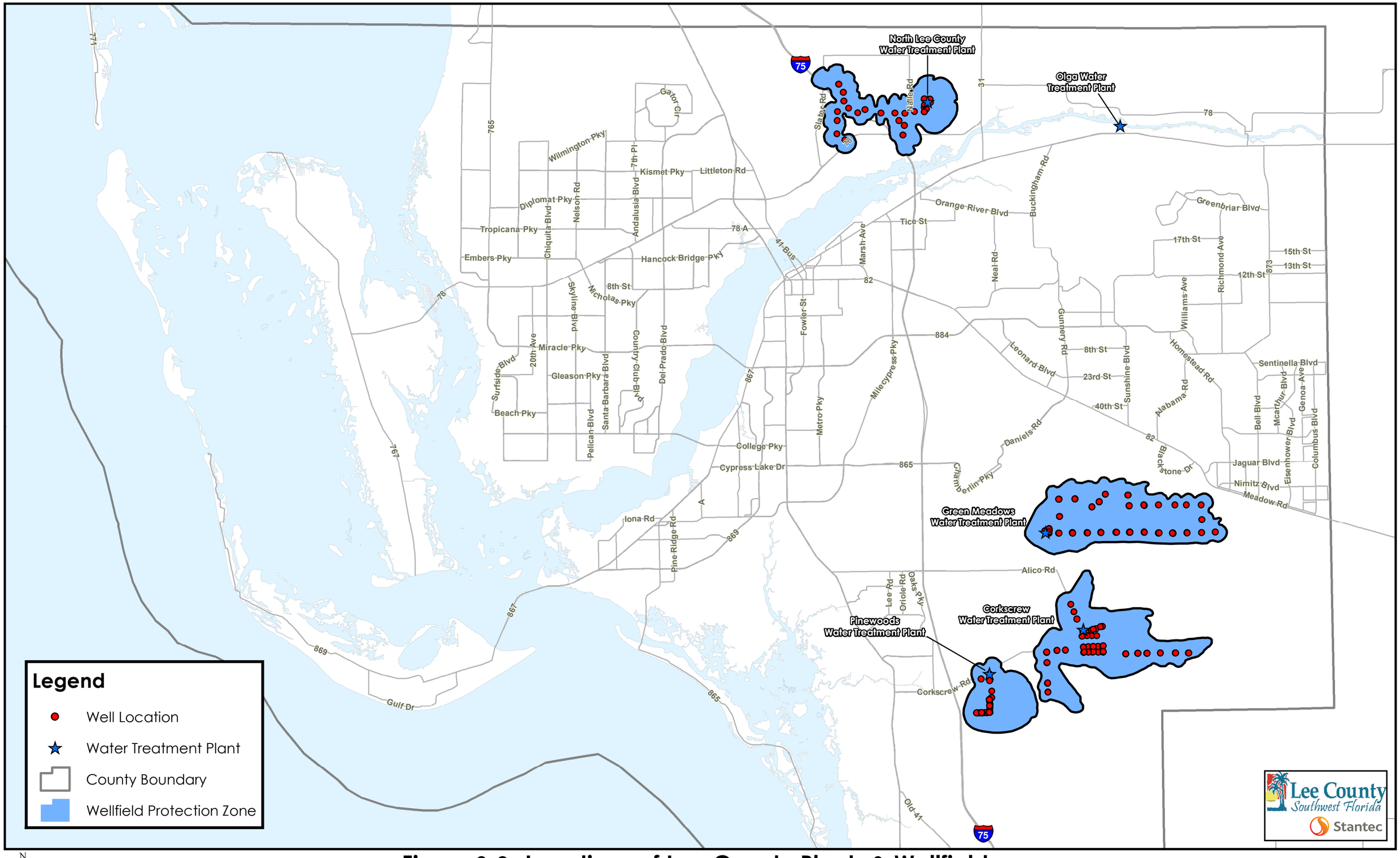
Table 3-1 Current Treatment Plant Permitted and Operating Capacities

Facility	Type	Permitted Capacity (MGD)	Operational Capacity (MGD)
Corkscrew	Lime Softening	15	15
Green Meadows	Ion Exchange/RO	16	14
Pinewoods	NF/RO	5.3	5.3
South Area Total		**36.3**	**34.3**
North Lee County	RO	11.6	8.5
Olga	Surface Water	5	5.0
North Area Total		**16.6**	**13.5**
Total County		**52.9**	**47.8**

Each WTP has an associated wellfield with the exception of the Olga WTP. The wellfields serve the Corkscrew, Green Meadows, Pinewoods, and North Lee County WTPs. The Olga WTP is served by a surface water intake from the Caloosahatchee River. Figure 3-1 illustrates the percent of the LCU potable water demand supplied by each WTP based on average daily flow based for Year 2017. The current raw water supply sources for LCU include four wellfields located throughout the County and one surface water intake located at the Olga WTP as shown in Figure 3-2.

Figure 3-1 Potable Water Demand Supplied by Each Plant





Legend

- Well Location
- Water Treatment Plant
- County Boundary
- Wellfield Protection Zone

N

Figure 3-2: Locations of Lee County Plants & Wellfields

Lee County Utilities Water Master Plan Update TM#3 - August 2019

Scale: 1 in = 3.00 miles

LCU owns 20 potable water storage tanks (surface storage). These tanks are listed in Table 3-2. LCU has 38 MG of storage, with 35 MG active at the time of this report.

Table 3-2 LCU's Existing Potable Water Storage

Tank Name	Capacity (MG)	Status	Type
J Colin English Elevated Tank	0.2	Out of Service	Elevated steel tank
North Reservoir	2.0	Active	Prestressed concrete GST
South Reservoir	2.0	Active	Prestressed concrete GST
Tice Tower	0.3	Out of Service	Elevated steel tank
Miners Corner Reservoir	2.0	Active	Prestressed concrete GST
Airport Haul Reservoir – 1	5.0	Active	Prestressed concrete GST
Airport Haul Reservoir – 2	5.0	Active	Prestressed concrete GST
US 41 Reservoir	1.0	Active	Prestressed concrete GST
Alico Reservoir	1.0	Out of Service	Prestressed concrete GST
College Parkway Reservoir – 1	1.0	Out of Service	Prestressed concrete GST
College Parkway Reservoir – 2	0.5	Out of Service	Prestressed concrete GST
Corkscrew WTP – 1	2.0	Active	Prestressed concrete GST
Corkscrew WTP – 2	4.0	Active	Prestressed concrete GST
Olga WTP – 1	2.0	Active	Prestressed concrete GST
Olga WTP – 2	2.0	Active	Prestressed concrete GST
North Lee County WTP – 1	2.5	Active	Prestressed concrete GST
North Lee County WTP – 2	2.5	Active	Prestressed concrete GST
Pinewoods WTP – 1	1.0	Active	Prestressed concrete GST
Pinewoods WTP – 2	1.0	Active	Prestressed concrete GST
Waterway Estates	1.0	Active	Prestressed concrete GST
Total Storage	**38.0**	**--**	**--**

LCU owns and operates two ASR facilities. These are listed in Table 3-3.

Table 3-3 LCU's Existing ASR System

ASR Wellfield	Estimated Recovery (MG)	Number of Wells	Capacity Each
Corkscrew WTP	249[1]	5	0.648 MGD
Olga WTP[2]	150+[3]	2	1.000 MGD
Total	**400+**	**7**	**5.240**

Notes:
[1] Recovery during Cycle 16 only
[2] The Olga WTP ASRs are currently in a no flow status.
[3] Total recovery since installation

4.0 POPULATION AND DEMAND PROJECTIONS

4.1 POPULATION PROJECTIONS

In developing the population projections for the LCU water service areas, two main sources were considered. The BEBR-based population projections and the Lee County Planning Department Population Projections. The Lee County-provided population compares well (within 1%) to the BEBR projection for the County's total service area, therefore the County-provided population were used as a base for the future projections. The resulting service area populations are provided in Table 4-1.

Table 4-1 LCU Current Service Area Population Projections

Year	2016	2020	2025	2030	2035	2040
North SA	70,692	76,160	83,593	91,751	100,706	110,534
South SA	162,045	171,263	183,526	196,667	210,749	225,840
Total	**232,737**	**247,423**	**267,119**	**288,418**	**311,455**	**336,374**

As LCU may serve Lehigh Acres in the future, two sets of served permanent population projections for the water service area were determined. The first set is just for the LCU water service area without Lehigh Acres, and the second is for the addition of Lehigh Acres to the LCU water service area. These two sets of served permanent population projections are shown in Table 4-2.

Table 4-2 LCU Plus Potential Future Service Area Permanent Population Projections

Year	2016	2020	2025	2030	2035	2040
LCU Water Service Area Served Permanent Population Estimates	232,737	247,423	267,119	288,418	311,455	336,374
Combined LCU & Lehigh Acres Water Service Area Served Permanent Population Estimates	316,257	345,790	387,811	436,503	493,148	559,304

4.2 PER CAPITA WATER DEMAND

The per capita water demand is used to project the system-wide water demand based on the permanent population projections. The seasonal populations will be accounted for in the development of peak factors. To establish a per capita water demand for LCU, the AADD for the year 2016 (23.74MGD) was divided by the 2016 permanent population (232,737). This results in a per capita demand of 102 gallons capita per day (gcpd). The per capita demand calculated above reflects a mix of residential and commercial users within the current facilities boundary. The per capita demands previously used and calculated are listed below in Table 4-3.

Table 4-3 Previous Per Capita Water Demand

Source	GCPD	Notes
Calculated Water Demand	102	Calculated in Table 4-4
Previous Master Plan	118	Previously determined by Lee County
Previous Master Plan Tech Memo Calculated	104	Based on 2008 Pop and Annual Average Day Demand
2016 Population and Flow Data	89	Permanent Population and Max Month water sold (3/2016)
Lee County Utilities Website	111*	FY 16-17 Customers Served and Water Consumed *method of pop calc changed
	89	FY 15-16 Customers Served and Water Consumed
	90	FY 14-15 Customers Served and Water Consumed
	90	FY 13-14 Customers Served and Water Consumed
	91	FY 12-13 Customers Served and Water Consumed
Lee County Water Supply Facilities Work Plan	100	2015 Update, 250 gpd/ERC 2.5 persons/ERC

For the purposes of the projection in this plan. LCU provided direction to use 102 gpcd. This value reflects the water usage trends by LCU customers and the implementation of water conservation fixtures in new construction and existing home renovations.

4.3 PEAKING FACTORS

An essential component of the water demand projections involves determining peak flow demands. The water treatment facilities must be able to meet the peak flow demands with the largest unit out of service (reliable capacity). The Annual Average Daily Demand (AADD), Maximum Month Daily Demand (MMDD), and the Maximum Operating Demand (MOD) for the years 2013 through 2017 are listed below in Table 4-4. For determining water treatment and wellfield requirements, the MMDD is used.

Table 4-4 Historical Peaking Factors

Year	AADD (MGD)	MMDD (MGD)	MMDD Peaking Factor	MOD (MGD)	MOD Peaking Factor
2013	22.78	29.02	1.27	35.43	1.56
2014	22.65	26.87	1.19	32.10	1.42
2015	23.30	27.38	1.18	34.06	1.46
2016	23.74	27.79	1.17	35.33	1.49
2017	24.62	28.84	1.17	35.92	1.46
Maximum Value	23.74	29.02	1.27	35.43	1.56

A conservative peak factor of 1.3 will be applied to the AADD to determine the MMDD. For evaluating the water distribution system, the MOD is used. A peak factor of 1.56 will be applied to the AADD projection to determine the MOD.

4.4 POTABLE WATER DEMAND PROJECTIONS

Potable water demand projections for the AADD are made using the 2016 per capita water demand along with the population projections previously presented. Table 4-5 shows the AADD water demand projections for LCU service area and also LCU service area plus the potential addition of Lehigh Acres service area.

Table 4-5 AADD Water Demand Projections

Year	Total Population Estimates		AADD Water Demand (MGD)	
	LCU	LCU and Lehigh Acres	LCU	LCU and Lehigh Acres
2016	232,737	316,257	23.27	31.63
2020	247,423	345,790	25.00	34.58
2025	267,119	387,811	27.16	38.78
2030	288,418	436,503	29.32	43.65
2035	311,455	493,148	31.48	49.31
2040	336,374	559,304	33.64	55.93

The MMDD uses the 2016 per capita demand and the population projections as above but also includes the peak factor of 1.3 applied to the AADD projections to arrive at the MMDD. Table 4-6 presents the MMDD water demand projections for 2016-2040 for both the LCU and LCU and Lehigh Acres options.

Table 4-6 MMDD Water Demand Projections

Year	Total Population Estimates		MMDD Water Demand (MGD)	
	LCU	LCU and Lehigh Acres	LCU	LCU and Lehigh Acres
2016	232,737	316,257	30.26	41.11
2020	247,423	345,790	32.16	44.95
2025	267,119	387,811	34.73	50.42
2030	288,418	436,503	37.49	56.75
2035	311,455	493,148	40.49	64.11
2040	336,374	559,304	43.73	72.71

The MOD uses the 2016 per capita demand and the population projections as above but also includes the peak factor from Table 4-6 of 1.56 applied to the AADD projections to arrive at the MOD. Table 4-7 presents the MOD water demand projections for year 2016 through 2040 for both the LCU and LCU and Lehigh Acres options.

Table 4-7 MOD Water Demand Projections

Year	Total Population Estimates		MOD Water Demand (MGD)	
	LCU	LCU and Lehigh Acres	LCU	LCU and Lehigh Acres
2016	232,737	316,257	36.31	49.34
2020	247,423	345,790	38.60	53.94
2025	267,119	387,811	41.67	60.50
2030	288,418	436,503	44.99	68.09
2035	311,455	493,148	48.59	76.93
2040	336,374	559,304	52.47	87.25

Table 4-8 lists a summary of the AADD, MMDD, and MOD projections for 2030 and 2040. The demand projections were distributed throughout the system based on existing demand locations, planned development, and an infill rate for the entire system over the planning periods. The proposed demands were calculated based on equivalent dwelling units and gallons per capita per day (gpdpc), which is an AADD basis.

Table 4-8 Summary of Projected Water Demands

Year	AADD (MGD)	MMDD (MGD)	MDD (MGD)
2016	23.27	30.26	36.31
2030	29.32	37.49	44.99
2040	33.64	43.73	52.47

The existing model currently contains system wide demands that reflect the existing conditions. The model was updated for 2030 as well as 2040 to include incremental increase in demands. The AADD difference between 2040 (33.64 MGD) and the existing AADD (23.27 MGD) is 10.37 MGD. Therefore, a total of 10.37 MGD additional demand must be distributed within the model.

The additional demand will be allocated to:

1. Planned developments
2. Infill within the existing service area

An evaluation of planned developments and infill was performed to determine where growth and additional system demands will be located within the system in 2030 and 2040. A review of over 51 planned developments was performed to determine where future growth will occur. Planned developments that are being considered as part of this exercise were selected based on Lee County Land Development Orders (LDO) and input from County staff. A summary of the future planned developments that are being considered as part of this exercise are presented in Figure 4-1 and are listed in Table 4-9 for the corresponding names and LDO numbers.

Table 4-9 Planned Developments and LDO Number

Figure ID	Development Name	LDO Number
1	Chapel Creek	DCI2006-00018
2	North Point	DCI2003-00037
3	Southland Village MPD	DCI2009-00010
4	37 Acre Planned Development	DCI2010-00029
5	Gulf Coast Health Park CPD	DCI2011-00002
6	Corkscrew Crossing RPD (FKA Monte Cristo)	DCI2005-00071
7	Airport Interstate Commerce Park	DCI2004-00010
8	North River Plaza CPD	DCI2009-00016
9	Emerald Lakes RPD	DCI2007-00034
10	17650 East Str IPD	DCI2010-00031
11	Center of Hope	DCI2011-00020
12	Cypress Hammock	DCI2009-00019
15	Heron's Glen	DRI960629
16	Olga Square	DCI2012-00059
17	Coastline Tree Service	DCI2013-00022
18	Estero Grande	DCI2014-00004
19	Sloane's Gate	DCI2005-00047
20	Sabal Springs Golf & Raquet (fka Forest Creek MHPD/RPD)/Crane Landing	DCI2003-00023
21	Genova	DCI2015-00009
22	Volunteers of America	DCI2015-00013
23	Oak View RPD	DCI2016-00010
24	Blasingim Road RPD	DCI2016-00011
25	Three Oaks 106	DCI2015-00024
26	Canterfield Village	DCI2013-00011
27	Gator-Domestic Industrial Center	DCI2013-00004
28	Habitat Harlem Heights	DCI2016-00016
29	Verdana	DCI2016-00018
30	The Place / Corkscrew Farms	DCI2015-00004
31	Pepperland Ranch	DCI2016-00003
32	Centerplace	DCI2016-00017
33	Bayshore 57 MPD	DCI2007-00045
34	Oak Creek	DCI2003-00083
35	Nuttal Partners	DCI2014-00018
36	Timber Creek	DCI2016-00015
37	Verandah	DCI2000-00069
38	Caloosa Palms	DCI2008-00038

Figure ID	Development Name	LDO Number
39	Stonehill Manor	DCI2005-00089
40	FGCU Innovation Hub	DCI2003-00033
41	Wildblue	DCI2014-00009
42	Alico Road 254 Parcels	DCI2017-00001
44	Orange River Estates RPD	DCI890151
45	Buckingham 320 RPD	DCI964568
54	East Corkscrew LLC/The Retreat PRFPD	DCI2000-00048
55	Brightwater/Northbrook	DCI2001-00038
56	Corkscrew Shores/ Corkscrew Woods	DCI2011-00033
57	River Hall	DCI962447
58	The Fountains	DCI2006-00029
13/14	Estates at Entrada	DCI2004-00080
43/50/51/52	Southwest Florida International Airport (RSW)	DRI900136
46/47/48	Breckenridge Phase VIII	950501802Z
49/53	Gateway PUD	DRI951352

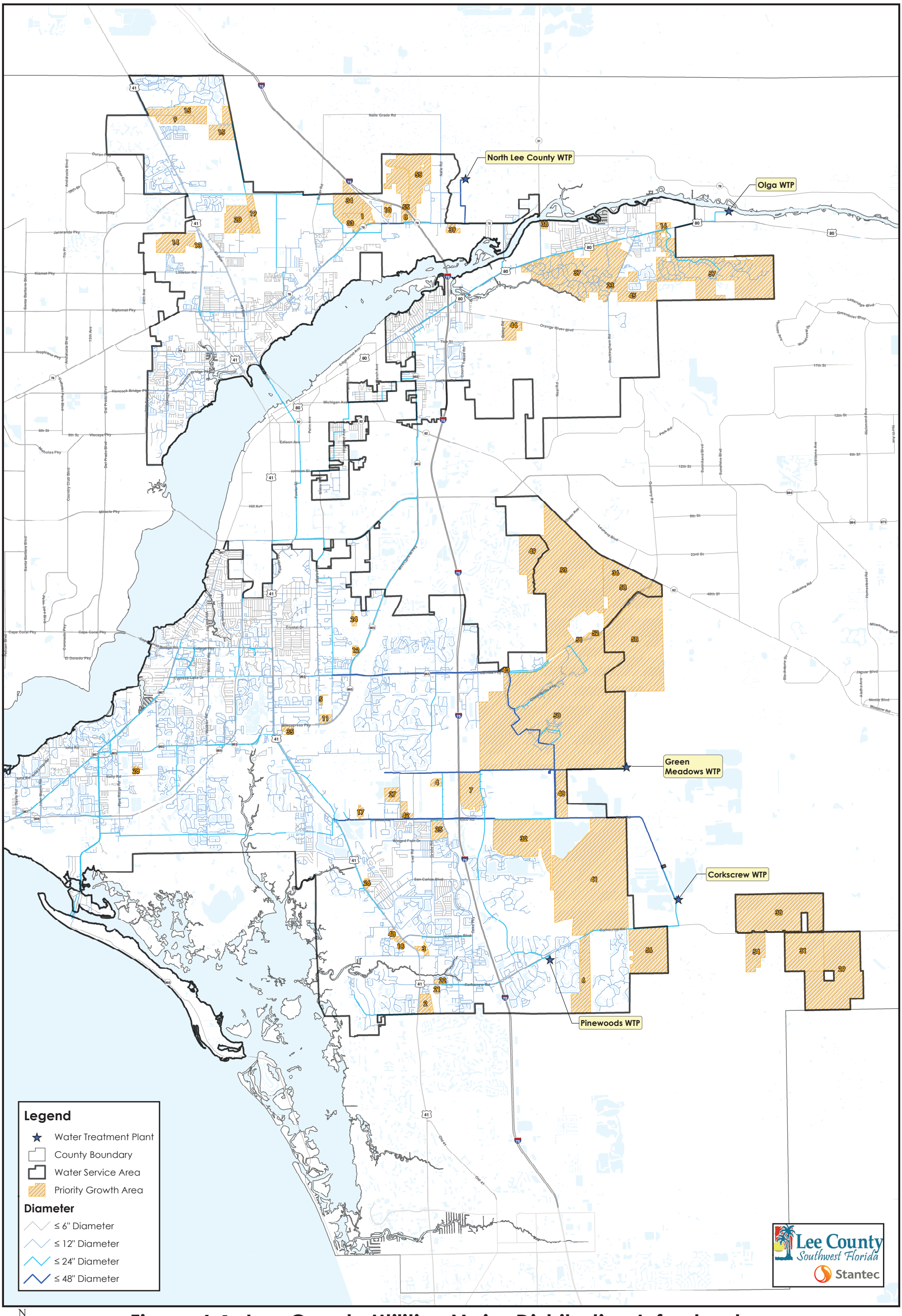


Figure 4-1: Lee County Utilities Major Distribution Infrastructure

Lee County Utilities Water Master Plan Update - August 2019

As reflected in Table 4-8, the County can anticipate an increase in demand from 23.27 AADF as estimated in 2016 to 33.64 AADF in 2040. This represents an increase in demand of 10.37 MGD AADF. The demand projections indicate planned developments account for an additional proposed 9.28 MGD AADD. As such, an additional 1.09 MGD AADD is considered to be associated with infill within the system (10.37 MGD – 9.28 MGD). Infill was distributed to areas where there were vacant parcels and calculated based on future land use. All vacant parcel flow was assigned to the model in the Year 2030 and carried forward to year 2040. Table 4-10 lists the distribution of the development demand of 9.28 MGD among the planning years based on percent developed for each planning period and the total additional demand which includes the infill demand of 1.09 MGD in 2030. Also, listed is the corresponding MOD using the MOD peak factor of 1.56.

Table 4-10 Additional Demand by Planning Period

Planning Period	Development Demand		Total Additional Demand (Development + Infill)	
	AADD (MGD)	MOD (MGD)	AADD (MGD)	MOD (MGD)
2030	5.07	7.91	6.16	9.61
2040	4.21	6.57	4.21	6.57
Total	9.28	14.48	10.37	16.18

5.0 ASSESSMENT OF SOURCE, TREATMENT, AND STORAGE SYSTEMS

5.1 SOURCE WATER ASSESSEMENT SUMMARY

5.1.1 Source Water Characterization

The purposes of the source water characterization is to evaluate and identify sustainable quantity, quality, and potential seasonally varying water resources. The resources are surface water, fresh groundwater, brackish groundwater, reclaimed water, potential potable water interconnects and water conservation.

The total potable water demand in year 2040 is estimated to be 33.6 MGD. This demand does not include any potential reduction due to additional and continued water conservation measures. The current permitted source water capacity annual allocation is 60.6 MGD, or 52.2 MGD when the post treatment source water is taken into consideration. This includes use of the Olga WTP C-43 allocation of 4.43 MGD, which is highly susceptible to surface water quality issues. Removing the Olga WTP from consideration, the current permitted capacity would be 47.7 MGD. The 2040 demand is 74% of the capacity in year 2040.

A review of the groundwater sources developed in Lee County to date, coupled with the potential for growth and costs to treat, indicates that further development beyond projects already slated for completion (such as the North Lee County wellfield expansion) in brackish groundwater sources should be delayed. Development of additional groundwater sources in the southeast portion of the County have a greater potential of delivering fresh, or minimally brackish groundwater for transmission and distribution to the overall service area. The efficiencies of routing these sources to areas of need (upgrading the transmission and distribution system) would be a more cost-effective means of “developing” water sources.

The County has a robust water conservation program that is yielding beneficial results, such as the reduction in the per capita usage. While these efforts should continue, it is difficult to quantify the benefits when sizing proposed improvements. The water conservation programs should continue, with the net effect of pushing the need for new and additional water sources out further into the future.

Similarly, the County is utilizing reclaimed water as prescribed by ordinance to ensure beneficial use to all existing customers without creating a “shortage” during period of low wastewater treatment plant flow and high reclaimed water demand periods. Barring the installation of large storage facilities to “flatten” the demand versus availability curves, the County should continue its reclaimed water program and consider a means to drive the 65% to 75% utilization upward. This would be considered as part of a reclaimed water plan and not further considered herein.

5.1.2 Summary of Permitted Source Water Allocation

An evaluation was performed to determine if additional source water is required to support growth that is anticipated to occur through 2040. LCU’s source water needs were evaluated with the Olga WTP online, as well as without the Olga WTP online since this facility is impacted seasonally and not considered reliable

for year-round operation. Available treated source water was compared to the flow projections, and is shown in Tables 5-1, 5-2, and 5-3.

This analysis indicates that the total projected demand will be:

- 66% of available treated water in 2040 on an AADD basis;
- 67% on a MMDD basis with Olga WTP, and;
- 72% on a MMDD basis without Olga WTP.

These projections indicate that the demand on a systemwide basis does not exceed the permitted source capacity and does not need to be expanded through 2040. However, as previously discussed, the system is split into a North and South Service Area and should be examined in relation to those service areas to consider scenarios that the WTPs in those service areas exclusively supply those service areas.

The same evaluation done on a Service Area basis indicates the North Service area projected demands will range from 68% to 86%, depending on the if the Olga WTP is considered. Since the North Service area demand projections exceeds 75% of the available treated source water, without considering Olga as part of the system, it is suggested that LCU consider additional water allocations within the North Service area. Water source supply is permitted under a Water Use Permit which typically has a permit duration of 20 years. Any recommended WTP expansions through 2040 would be permitting source capacities for demands outside the 2040 planning period and consequently permitted for greater demand than projected herein. LCU is currently planning for the expansion of the NLC WTP. It is recommended that any expansion of the NLC WTP consider the expansion of the permitted source capacity. In the South Service Area, it is projected that 66% of the permitted source capacity will be met by the 2040 MMDD, therefore expansion of the permitted source capacity in the south is not required based on this evaluation.

The permitted source water is the maximum allowable water that LCU can pump from a source. While LCU has these permitted limits, they do not necessarily have the physical infrastructure to pump the permitted maximum. In the North Service Area, it has been determined that additional source capacity will need to be permitted and in turn additional wells installed to pump the source water to the WTP. In the South Service Area, there is sufficient permitted source water and there may need to be additional wells constructed to pump the amount of source water needed to meet future demands.

5.2 WATER TREATMENT ASSESSMENT SUMMARY

5.2.1 Water Treatment Capacity Gap Analysis

A Gap Analysis was performed to identify future treatment plant capacity needs. The evaluation considers the future MOD demands and current treatment plant permitted and operational capacity. Two evaluations were performed, one considers the permitted and operational capacity of the Olga WTP. However, due to the seasonal performance limitations of the surface water facility, a second analysis was performed to consider additional treatment capacity requirements needed without the Olga WTP. A summary of the surplus/deficit operational capacity for LCU's potable water system without the Olga WTP and considering

that LCU is currently expanding the operational capacity at the NLC WTP to 15.0 MGD is provided in Tables 5-1 and 5-2.

Table 5-1 LCU System WTP Capacity Gap Analysis with NLC WTP Expansion and without Olga WTP (MGD)

Year	2020	2025	2030	2035	2040
Total MDF	38.6	41.7	45.0	48.6	52.5
Total Operational Capacity	49.3	49.3	49.3	49.3	49.3
Difference Surplus/(Deficit)	**10.7**	**7.6**	**4.3**	**0.7**	**-3.2**
Demand to Operational Capacity (%)	**78%**	**85%**	**91%**	**99%**	**106%**

Table 5-2 LCU System WTP Capacity Gap Analysis with NLC WTP Expansion and with Olga WTP (MGD)

Year	2020	2025	2030	2035	2040
Total MDF	38.6	41.7	45.0	48.6	52.5
Total Operational Capacity	54.3	54.3	54.3	54.3	54.3
Difference Surplus/(Deficit)	**15.7**	**12.6**	**9.3**	**5.7**	**1.8**
Demand to Operational Capacity (%)	**71%**	**77%**	**83%**	**90%**	**97%**

The results of this Gap Analysis indicate that with the North Lee County WTP expansion and considering the Olga WTP capacity as a source, LCU will have adequate capacity to meet the MOD. However, the analysis indicates that without the Olga WTP capacity, LCU will only have adequate operational capacity through the year 2035.

The FAC 62-555.348 (3) states that when a system's demands reach 75% of the permitted capacity, the utility should begin the process of identifying expansion efforts. As such, LCU's projected MOD will exceed 75% of the County's operational capacity with the planned North Lee County WTP expansion in 2020. Therefore, it is recommended that LCU consider identifying future treatment facility expansion(s) capacities as part of this WMPU. The following Section of this report provides a detailed discussion of the planning for water treatment expansion.

5.2.2 Planning for Water Treatment Expansion

While the countywide evaluation of source and treatment capacity did not require expansion in the South Service Area, evaluation of the delivery system included additional modeling of the 2040 system to determine if the hydraulics of the system favored the expansion of one WTP over another, specifically NLC WTP versus a WTP in the south service area. This expansion is in addition to the NLC WTP expansion to 15.0 MGD. The model results indicated that Green Meadows was the more hydraulically favorable WTP to

expand. The model results suggest that more of LCU's system is capable of meeting minimum pressures with an expanded Green Meadows WTP versus the NLC WTP being expanded beyond 15.0 MGD.

5.3 SYSTEM STORAGE ASSESSMENT SUMMARY

An evaluation of LCU's existing system storage was performed to determine if additional storage is required through the period 2040.

A typical factor for determining adequate surface storage facilities for a system is to identify the amount of flow needed to meet the demands of the maximum day within the system. For fire flow, the largest hydrant capacity and a fire duration is added. From this data, the following capacity is determined:

25% of Maximum Daily Demand (MDD) for Equalization
+ 15% of Maximum Daily Demand for Emergency Storage
+ Largest Hydrant Flow x Hours of Fire
Surface Storage Facilities Required

Given the above requirement, the total surface storage required was calculated for the LCU system and is provided in Table 5-3.

Table 5-3 Total System Required Surface Storage Facilities

Year	2020	2025	2030	2035	2040
MDD (MGD)	39.37	42.50	45.89	49.56	53.52
25% of MDD (MGD)	6.31	6.81	7.35	7.94	8.58
15% of MDD (MGD)	5.91	6.38	6.88	7.43	8.03
Subtotal (MG)[1]	12.21	13.19	14.24	15.38	16.61
Fire Flow (MG)[2]	0.72	0.72	0.72	0.72	0.72
Total Storage Required (MG)	12.93	13.91	14.96	16.10	17.33

[1] Assume 1 day of flow

[2] Largest hydrant is one to be used for commercial fires, assumed at 3,000 gpm. Fire duration of 4 hours. Total fire flow needed = 0.72 MG

Currently, LCU has 35 MG of active surface storage available. In year 2040, the calculated need is 17.33 MG. Therefore, LCU has twice the amount of surface storage system wide for fire flow use.

The same analysis was completed for the North and South Service Area and determined the minimum storage requirements are also met for the North and South service areas, independently. Therefore, the County's existing storage capacity exceeds the minimum requirements Countywide as well as within each service area, no additional surface storage is needed at this time.

6.0 ASSESMENT OF DISTRIBUTION SYSTEM

A hydraulic analysis was performed utilizing the updated model. The hydraulic model was run under MOD over a 72-hour (3 day) period to understand the impact the increased demand had on the cycling of storage tanks and pressure swings due to demand fluctuation during a 24-hour period and filling of the system storage tanks.

The hydraulic model results were used to determine areas of the distribution system and the transmission system associated with those areas that were experiencing conditions that do not meet the following evaluation criteria:

- Maintain 40 minimum psi operating pressure
- Maximum pressure of 100 psi.
- Fireflow scenarios – residential 750 gpm and 3,000 gpm non-residential
    - Maximum velocity 10 fps
    - Minimum pressure 20 psi

The base model results or no improvement results for each of the planning periods was examined and CIP projects were developed based on modeling results for proposed infrastructure improvements to remedy the violations of the evaluation criteria. Once the projects were developed based on model results, the projects were put into three categories based on priority. The breakdown of the two priorities is as follows:

Priority 1 are projects that are required to meet system demands as projected for 2030 and 2040 and maintain the minimum pressure in the system, therefore this are the most critical projects.

Priority 2 are projects that provide resiliency and redundancy to the LCU water system. There projects are crucial if a large transmission main or WTP were to fail.

6.1 HYDRAULIC MODEL RESULTS

The 2030 hydraulic model results indicate that the system with only the NLC WTP expansion meets the evaluation criteria for minimum pressure. While the results do not indicate that there are issues providing the minimum pressure (Priority 1 projects), there are projects that will improve system resiliency and redundancy (Priority 2 projects). These projects were modeled to determine if they were feasible to improve system redundancy but were not included in the model runs that evaluated system pressure. If the model results indicated that these projects were critical for system pressures than they would be considered Priority 1 projects. Modeling was done to confirm that other recommended projects were still valid even with these improvements to the system.

The 2040 hydraulic model includes the existing LCU water system with the NLC WTP capacity at 15.0 MGD and Green Meadows WTP capacity expanded to 19.0 MGD (from 14.0 MGD) to meet the 2040 MOD. The

results indicate that the pressures within the system fall below the minimum pressure requirement in the northwest of the system; the remainder of the system met the evaluation criteria. In order to improve the pressures in this area, a Priority 1 project for an increase in transmission capacity from the North Reservoir storage tank to the northwest of the system. An additional Priority 1 project was identified to improve pressures in the Airport Haul Road fill lines. Priority 2 projects were identified to provide system redundancy and resilience.

The identified Priority 1 and Priority 2 improvements are listed in Table 6-1 and 6-2 and illustrated in Figure 6-1.

Fireflow was evaluated using the Fireflow Tool in the InfoWater software. The Tool runs a simulation of the system with MOD and a pressure setting to maintain a minimum pressure of 20 psi within the system. The results for the Existing System identify areas that do not meet the minimum residential fireflow criterion of 750 gpm. These areas do not meet this criterion in the 2040 System as well. Further investigation into these areas show that the majority of the areas are older neighborhoods with pipe sizes less than or equal to 6-inches. Due to the small diameter pipe, the minimum required fireflow can't be met at the fire hydrants located on these pipelines.

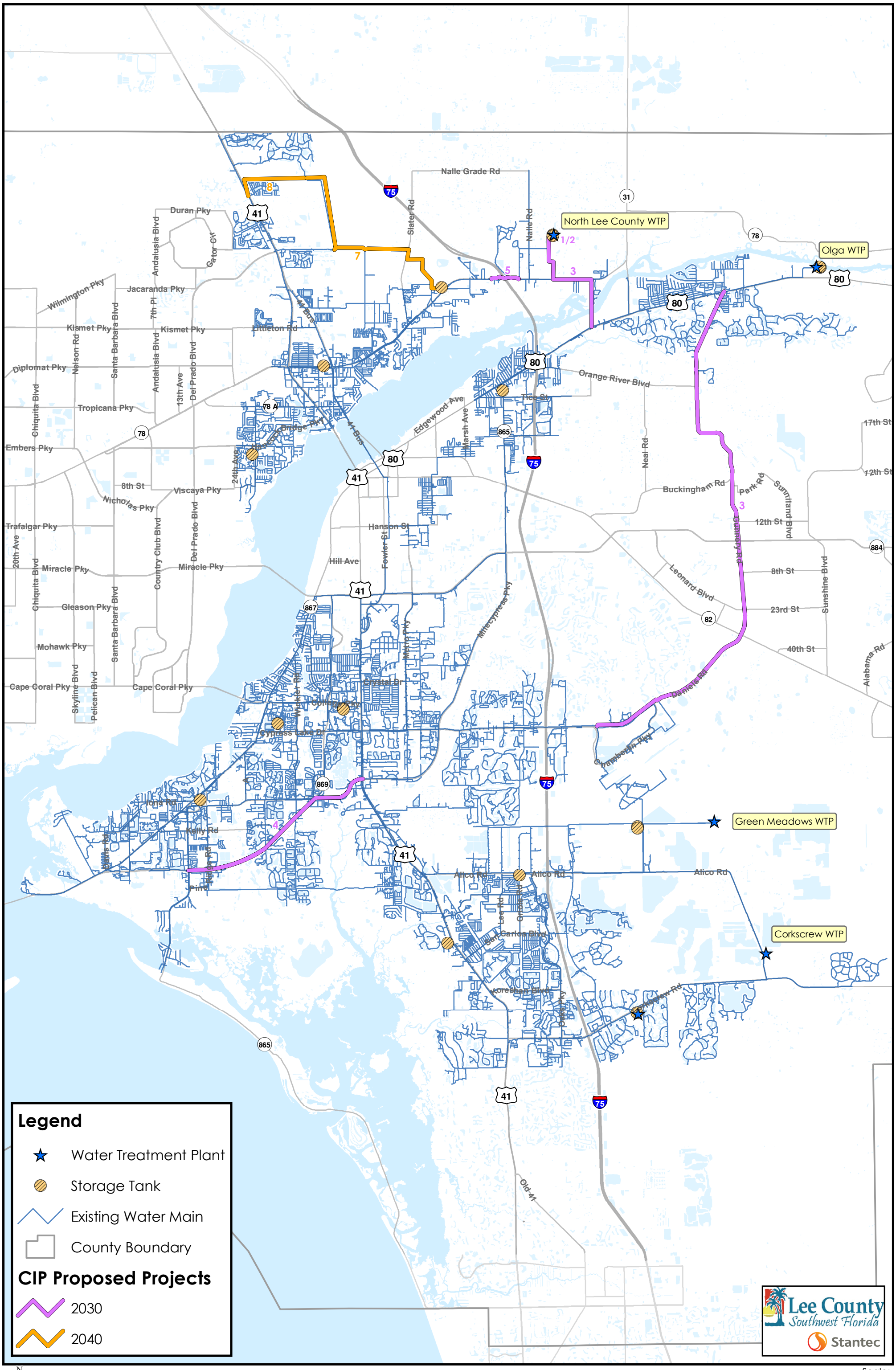
It is recommended that LCU implement a program that plans, designs, and constructs pipe replacement for these areas. The program is recommended to have a yearly budget that addresses portions or all of certain areas identified until all of these areas are replaced. These areas are generally in older parts of the system, with 32% of the pipe to be upsized installed in the 1970s and 67% installed in the 1980s. LCU may elect to replace the water mains in the some or all of the neighborhood, depending on age and condition of the pipes.

Table 6-1 2020-2030 Recommended CIP Project Schedule

Map ID	Priority	Project Description	Project Purpose
1	1	NLC Wellfield Expansion to 15.0 MGD.	Meet future demands.
2	1	NLC WTP Expansion to 15.0 MGD.	Meet future demands.
-	1	Neighborhood Fireflow Improvement Program - identified areas where pipes sizes should be increased so fire hydrants will meet the minimum flow criteria of 750 gpm. These areas are in neighborhoods with pipe sizes ranging from 2-inch to 6-inch. Each neighborhood project will be evaluated by LCU to determine if expanded neighborhood water main improvements will be included as part of the project.	Upsize piping in neighborhoods where the minimum 750 gpm fireflow is not met.
3	2	North/South Interconnect: 24-inch and 16-inch water main extensions as described in Phase1/2. The project can be split into two phases. Phase 1/2 - 24-inch water main extension from existing system at Daniels Pkwy north along Gunnery Rd north to existing 24-inch at SR 80. Phase 1/2 (to achieve full system redundancy) - 16-inch water main extension from existing 24-inch at SR 80 north across the Caloosahatchee River and west to NLC WTP storage tanks.	Transmission main for the north/south interconnect for reliability.
4	2	East/West Connector - Install a 24-inch water main from designed 24-inch water main that terminates at US-41 and Gladiolus Dr, west to Summerlin along Gladiolus Dr, southwest along Summerlin to connect to existing system at San Carlos Blvd. This alignment can potentially be relocated in the southwest of the system. Project includes evaluation of the existing route and whether the pipe should parallel or upsize existing.	Transmission main for the north/south interconnect for reliability.
5	2	Parallel existing 20-inch along Bayshore Rd, from Wells Rd to west of Park 78 Dr, crossing I-75. Project includes evaluation of the existing route.	Improve pressures in the Southwest of the system.

Table 6-2 2030-2040 Recommended CIP Project Summaries

Map ID	Priority	Project Description	Project Purpose
7	1	Green Meadows WTP Expansion to 19 MGD	Expand the WTP to serve increased demand.
8	1	Parallel or upsize existing 16-inch from North Reservoir Tank west along Samville Rd, north along Williams Rd, west along Bright Rd, north along Slater Rd, west along Mellow Dr, and north along Yellow Trail. Project includes evaluation of the existing route and whether the pipe should parallel or upsize existing.	Improve pressures in the Northwest of the system.
9	1	New 16-inch transmission main from existing 16-inch transmission main at Magnolia Landing to existing water main at US-41.	Improve pressures in the Northwest of the system.



Legend

- Water Treatment Plant
- Storage Tank
- Existing Water Main
- County Boundary

CIP Proposed Projects

- 2030
- 2040

N

Figure 6-1: Identified Projects through 2040

Lee County Utilities Water Master Plan Update - October 2019

Scale:
1 in = 2.20 miles

6.2 ADDITIONAL DISTRIBUTION SYSTEM EVALUATIONS

6.2.1 Pipe Age

The data related to water mains as provided in the LCU potable water 2018 geodatabase was reviewed by pipe age and pipe material. The pipes in the LCU water system are generally not older than 60 years, as they were installed after 1960. There is less than 1% of the pipes in the water system that do not have an age identified in the geodatabase. The majority of the water system pipe is PVC and is less than 12-inches. As a pro-active measure, LCU should consider further evaluating pipes installed prior to 1980 to confirm material and assess criticality and replacement and renewal strategy. Neighborhood improvements for fireflow represent approximately 104,000 linear feet of pipe which is an estimated 1.3% of LCU pipes. It is recommended that LCU begin a replacement and renewal strategy with the Neighborhood Fireflow Improvement Program and continue to develop replacement and renewal strategies for aged infrastructure.

6.2.2 Water Age

The water age for the system was modeled using the average day demands for the Existing System. The hydraulic model has a water age calculation tool which provides water age as a function of time. The simulation was run in the model over a 30-day period in order to capture the largest water age in the system.

These results indicate that the majority of the system has water age in the range of 6-10 days. Areas of water age greater than 10 days include isolated (not looped back to the rest of the system) areas and areas that are currently under development, so they do not have a great amount of demand from those pipes allowing water to sit in the pipes. Additionally, the preliminary modeling results of water age do not take into account the County's auto flushing operations which is the primary measure LCU is taking to ensure water quality.

LCU has made operational changes to the WTPs and the system to ensure that the water age does not impact the quality of water provided to the customers. LCU monitors the water chemistry of the water sent to the system in order to limit the growth of nitrifying bacteria which can greatly reduce the effectiveness and longevity of chlorine in the system. The system also has 87 auto-flushing hydrants and a team that has a scheduled route to flush and maintain water quality within the system.

LCU should consider improving the water age analysis to incorporate auto flushing practices into the evaluation to determine the impact that flushing has on the overall water age and potentially to identify target areas where additional flushing measures are recommended.

7.0 CAPITAL IMPROVEMENT PLAN

The proposed CIP projects and their respective estimated cost and total for planning period 2030 and 2040 are listed in Table 7-1 and Table 7-2 and shown in Figure 6-1. The following are the cost components when totaled equal the Total Project Estimated Cost:

Capital Cost – includes the cost of the project materials (pipe, equipment, appurtenances, etc.) and the cost to install/construct the project plus 25% contingency.

Supplemental Costs – includes any or all of the following; easement acquisition, land costs, administration by the utility, engineering, survey, construction administration and construction observation. This is calculated as 30% of the Capital Cost.

The contingency of the Total Project Estimated Cost can be expected to be anywhere from 30% low to 50% high. This range was selected from the AACE accuracy ranges, considering that the WMPU is Class 5 or an evaluation used for concept screening. All costs included in these Tables is reflective of 2019 value and are rounded to the nearest $1,000. A detailed breakdown of the cost is provided in Appendix B.

Table 7-1 2020-2030 Proposed CIP Project Estimated Costs

No.	Map ID	Project Description	Capital Cost	Supplemental Cost	Total Project Estimated Cost
30-1	1	NLC Wellfield Expansion to 15.0 MGD.	$ 35,938,000	$ 13,477,000	$ 58,400,000
30-2	2	NLC WTP Expansion to 15.0 MGD.	$ 30,395,000	$ 9,119,000	$ 39,514,000
30-3	-	Neighborhood Fireflow Improvement Program - identified areas where pipes sizes should be increased so fire hydrants will meet the minimum flow criteria of 750 gpm. These areas are in neighborhoods with pipe sizes ranging from 2-inch to 6-inch. Each neighborhood project will be evaluated by LCU to determine if expanded neighborhood water main improvements will be included as part of the project.	$ 10,530,000	$ 3,159,000	$ 13,689,000
30-4	3	North/South Interconnect: 24-inch and 16-inch water main extensions as described in Phase1/2. The project can be split into two phases. Phase 1/2 - 24-inch water main extension from existing system at Daniels Pkwy north along Gunnery Rd north to existing 24-inch at SR 80. Phase 1/2 (to achieve full system redundancy) - 16-inch water main extension from existing 24-inch at SR 80 north across the Caloosahatchee River and west to NLC WTP storage tanks.	$ 30,888,000	$ 9,267,000	$ 40,155,000
30-5	4	East/West Connector - Install a 24-inch water main from designed 24-inch water main that terminates at US-41 and Gladiolus Dr, west to Summerlin along Gladiolus Dr, southwest along Summerlin to connect to existing system at San Carlos Blvd. This alignment can potentially be relocated in the southwest of the system. Project includes evaluation of the existing route and whether the pipe should parallel or upsize existing.	$ 8,773,000	$ 2,632,000	$ 11,405,000
30-6	5	Parallel existing 20-inch along Bayshore Rd, from Wells Rd to west of Park 78 Dr, crossing I-75. Project includes evaluation of the existing route.	$ 1,272,000	$ 382,000	$ 1,654,000
Total Estimated Cost for Planning Period			$ 126,133,000	$ 38,036,000	$ 164,817,000

Table 7-2 2030-2040 Recommended CIP Project Estimated Cost

No.	Map ID	Project Description	Capital Cost	Supplemental Cost	Total Project Estimated Cost
40-1	7	Green Meadows WTP Expansion to 19 MGD.	$ 34,281,000	$ 10,285,000	$ 44,566,000
40-2	8	Parallel or upsize existing 16-inch from Bayshore Storage Tank west along Samville Rd, north along Williams Rd, west along Bright Rd, north along Slater Rd, west along Mellow Dr, and north along Yellow Trail. Project includes evaluation of the existing route and whether the pipe should parallel or upsize existing. The project includes approximately 32,200 LF of 16-inch pipe.	$ 6,783,000	$ 2,035,000	$ 8,818,000
40-3	9	New pipeline from existing pipe on Yellow Trail to US 41. The project includes approximately 10,900 LF of 16-inch pipe.	$ 2,296,000	$ 689,000	$ 2,985,000
Total Estimated Cost for Planning Period			$ 43,360,000	$ 13,009,000	$ 56,369,000

7.1 CIP PROJECT PLANNING SCHEDULE AND ESTIMATED COST

A spend plan for the proposed CIP projects and their associated costs, listed in Table 7-1 and 7-2, was developed for the next 5 fiscal years on a yearly basis. The following 6 years (2025-2030) were grouped into one cost per project with an inflation rate of 2.5%/year applied to the project cost. For the projects scheduled for the following 10 years (2031-2040), the project cost was grouped into one cost per project with an inflation rate of 2.5%/year applied to the project cost. Table 7-3 lists the projects and the spend plan through 2040.

Table 7-3 Estimated Major Projects Spend Plan through 2040

Project ID	Description	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	2025-2030	2031-2040	Start Year
30-1	North Lee County Water Treatment Plant 15.0 MGD Wellfield Expansion	$ 6,827,448	$ 49,462,054	$ -					FY19/20
30-2	North Lee County Water Treatment Plant Expansion to 15.0 MGD	$ 1,428,035	$ 4,619,685	$ 33,466,279					FY19/20
30-3	Neighborhood Fireflow Improvement Program	$ 144,524	$ 500,965	$ 1,079,588	$ 1,368,900	$ 1,368,900	$ 9,834,000		FY19/20
30-4a/4b	Potable Water Service Areas North/South Interconnect - Phase 1 and 2				$ 852,272	$ 3,266,222	$ 38,296,000		FY22/23
30-5	East/West Connector - 24-inch Water Main Extension						$ 11,891,000		2025
30-6	Northwest Service Area Redundant Water Transmission Main Crossing I-75						$ 1,699,000		2025
40-1	Green Meadows WTP Expansion to 19 MGD							$ 54,465,000	2031
40-2	Northeast Service Area 16-inch Water Transmission Main							$ 10,699,000	2031
40-3	Northwest 16-inch Water Transmission Main Extension							$ 3,975,000	2036
	Total	$ 8,400,008	$ 54,582,704	$ 34,545,867	$ 2,221,172	$ 4,635,122	$ 61,720,000	$ 69,139,000	

[1]Inflation of 2.5% applied to years 2025-2040.

Appendix A MEETING NOTES

Stantec

Meeting Notes

LCU 2018 Water Master Plan Kick-off Meeting

1500 Monroe Street, Ft Myers, FL
Conference Room
August 10, 2018

Safety Moment:

1. Project Administration

   - **NTP Issued**: July 16, 2018
   - **NTP Complete**: July 15, 2019
   - **Contract#** C-7119
   - **Supplemental Task Auth.:** #2
   - **Contract Amount:** $196,076.00
   - **Billed to Date:** $0

2. Project Team/Communication

   County Team:

   Project Manager: Nathan Beals – Primary Point of Contact

   Stantec Team:

   Project Manager: Greg Isaacs – Primary Point of Contact

   941-365-5500

   greg.isaacs@stantec.com

   Project Engineer: Sam Nehme

   Sr. Engineer: Kelly Blake Smith

   QA/QC: Joe Greeley

3. Review Scope of Services

   Meeting and Coordination (Budget: $13,168)

   - Project Kick-Off Meeting (August 10, 2018)
   - Source Water Characterization-Findings and Preliminary Conclusions
   - Population and Demand Projections - Findings and Preliminary Conclusions
   - Improved Storage - Findings and Preliminary Conclusions
   - Water Resource Integration - Findings and Preliminary Conclusions
   - Preliminary Cost Estimates
   - Infrastructure Improvement- Findings and Preliminary Conclusions
   - Up to two (2) additional meetings.
   - Two-week review period for County

   Data Collection Review (Budget: $6,088)

   - Lee County Department of Community Development, Concurrency Report
   - Lee County Land Development Code and Lee Plan
   - SFWMD, Lower West Coast Water Supply Plan

- Lee County Utilities, Engineer of Record Report
- Lee County Utilities, Master Plan
- City of Fort Myers, Water Master Plan
- Lehigh Acres Water Master Plan
- Basis of design documentation and record information for existing water treatment facilities
- Existing water use permits and operating permits

Source Water Resource Characterization Tech Memo (Budget: $40,060)

- Surface Water Supply
- Fresh Groundwater Supply
- Reclaimed Water
- Potential Potable Water Interconnects
- Water Conservation

Population and Demand Projection Tech Memo (Budget: $24,000)

- Population Projections
- Demand Projections
- 2040 Plan Period – linear growth from 2016 to 2040

Capital Improvements Plan Tech Memo (Budget: $87,900)

- Improved Storage
- Water Resource Integration
- Cost Estimate
- Infrastructure Improvements
- Need tables by end of January 2017

Water Master Plan Update Summary (Budget: $24,860)

4. Anticipated Schedule

- Project Team Kick-Off Meeting – August 10, 2018
- Source Water Resource Characterization Technical Memorandum Final Submittal – November 2018
- Population and Demand Projection Technical Memorandum Final Submittal – December 2018
- Capital Improvements Plan Technical Memorandum Final Submittal – June 2019
- Water Master Plan Final Submittal – July 2019

5. Stantec Questions

- Status of Carollo modeling efforts **– Targeting end of September to be complete.**
- LCU intent for Olga WTP **– For reliability 5M will be assumed not there. Plant will be kept for use as needed. District Engineering is in charge of flow in river.**
- What are the known bottlenecks in the system **– Shell Point has pressure problems; regulated Miners Corner PS**
- Improvement in connecting North and South open parts of system. Needs to be verified. Revisit Lee High main. North to South transmission not completed.

- What are the known maintenance issues with the system - **North of 41 & Old 41, old pipe connecting to 16-inch.**

What improvements do your feel should be made to the system **- McGregor Blvd there is a problem with A/C pipe. Pressure issues South with vertical builds**

6. Owner Comments

Water Budget

- **$600,000 CIP Maintain**
- **$400,000 CIP Maintenance**

Interconnect Cape Coral, Fort Myers, and Bonita

Development Corkscrew

Action: Request GIS Linework

Alico and College are two reservoirs

Don't need Alico Booster

Demolition CIP to remove old facilities

Stantec

Contact List and Sign-in Sheet

2018 Water Master Plan

Name	Affiliation	Office Phone #	Mobile Phone #	Email Address	Initial
Greg Isaacs	Stantec	941-365-5500		Greg.Isaacs@stantec.com	GTI
Kelly Smith	Stantec	941-544-2569		Kelly.Smith@stantec.com	KS
Nathan Beals	Lee County	239-533-8157		nbeals@leegov.com	NB
Rebecca Rodriguez	Lee County				
Henry Barroso	Lee County	239-826-5619		hbarroso@leegov.com	HB
Dewayne Tagg	Lee County	239-357-1079		dtagg@leegov.com	DT
DAVID REYCRAFT	LCU	239-533-8150		dreycraft@leegov.com	DVR

Stantec

Meeting Notes

Water Master Plan – System Discussion

Lee County Water Master Plan Update / 177310992

Date/Time:	October 17, 2018 / 1:30
Place:	Lee County Utilities
Next Meeting:	TBD
Attendees:	Nathan Beals (Lee County), DeWayne Tagg (Lee County), Greg Isaacs (Stantec), Samantha Nehme (Stantec)
Distribution:	Attendees

Item: **Action:**

1. Discussed existing infrastructure and reviewed maps and noted the following (details on attached maps):
    a. Areas of pressure and water quality issues
    b. Infrastructure that is no longer in service.
    c. Interconnects – 3 City of Cape Coral and 1 Bonita Springs
    d. Proposed pipe that is now in service
2. Discussion of system improvements:
    a. The County is interested in ways to move water from south to north.
    b. The most recent EOR report will have recommendations for recent (1-3 year) CIP projects
3. Reviewed gpdpc calculations and discussed lowering the rate from the previous master plan to between 100 and 110 gpdpc. Nathan to discuss with colleagues and respond with County selected rate.
4. Reviewed and discussed the demand projections with the different gpdpc rates. Acquisition of Lehigh Acres should be considered in the demand projections.

Stantec Consulting Services Inc.

Samantha Nehme

Samantha Nehme PE
Civil Engineer

Phone: (941) 365-5500
Samantha.Nehme@stantec.com

Attachment: Maps

Stantec

Meeting Notes

Water Master Plan – System Discussion

Lee County Water Master Plan Update / 177310992

Date/Time:	May 23, 2019 / 11:00 AM
Place:	Lee County Utilities
Next Meeting:	TBD
Attendees:	Nathan Beals (Lee County), Greg Isaacs (Stantec), Samantha Nehme (Stantec)
Distribution:	Attendees

Item:

1. Hydraulic Modeling Scope
    - Reviewed Scope items 5.2 and 5.4.
2. Future Demand Development
    - Include Gateway, Corkscrew Shores, Brightwater, and 320 units between service area and Development ID 33 and 34 (see attached map).
    - Do not include developments outside service area and within another franchise area.
    - See attached map for additional notes.
3. Allocation of Future Demand
    - The method of identifying development for 74% of the projected demand is approved. The remaining 26% should be allocated to the additional developments listed above and then allocated to the existing system as infill.
    - Infill will consider the percent occupancy of developed areas will allocating future demands.
    - Growth for bulk users will potentially be treated the same as infill by an increase to the overall demand at nodes within the model.
4. Hydraulic Model Scenarios
    - See attached powerpoint slides.
    - Analysis will include a review of the previous master plan's CIP recommendations.
5. TM 3 Status
    - Draft to be submitted by June 1.
6. Schedule
    - On target to meet schedule in the attached powerpoint slides.
7. Discussion

- Reviewed a few comments that Nathan had for the Interim Memo. Nathan to provide full review later via email.
- Nathan to provide updated water main shapefiles and CIP shapefiles.

Agenda

1. Hydraulic Modeling Scope
2. Future Demand Development
3. Allocation of Future Demand
4. Hydraulic Model Scenarios
5. TM 3 Status
6. Schedule
7. Discussion

Accompanying Printouts:

- Full size map of selected planned developments with IDs
- Table of planned developments/IDs and associated demands

Hydraulic Modeling Scope – Task 5.0

- Subtask 5.2 – Water Resource Integration:
  - Stantec will provide water resource integration strategies which will be modeled by Stantec to verify hydraulic requirements of the proposed improvements as well as to confirm water quality requirements can be achieved.
  - The model will verify sizes under steady state conditions using max day demands for two identified planning periods (ie. 2030 and 2040).
  - Modeling efforts will be limited to two strategies to meet the long term demands of the system.
  - Hydraulic models will be used to develop preliminary conveyance and transmission plans to integrate new service area demands into existing distribution systems. The hydraulic model will be used to confirm proposed pipeline diameters and if additional pumping and storage facilities are required.

- Subtask 5.4 – Infrastructure Improvement:
  - Water Quality in the context of water age will be modeled on the existing system at average day demand. This model will be evaluated on an extended period simulation.
  - Stantec will evaluate improvements to the existing system to improve water quality within the system.
  - Stantec will review, evaluate and compare the outstanding recommended improvements from the existing Master Plan and the new recommendations as proposed in this document.

Future Demand Development

Development data:

- Lee County Planned Developments
- Lee County Development Order

Development Selection Criteria:

- Planning Input
- Active Development Order for Large DO
- Exclude DOs within other franchise areas
- Obtain DO planned unit counts for residential and commercial

Clarifications:

- Previous Master Plan Recommended Improvements

Allocation of Future Demand

New Development

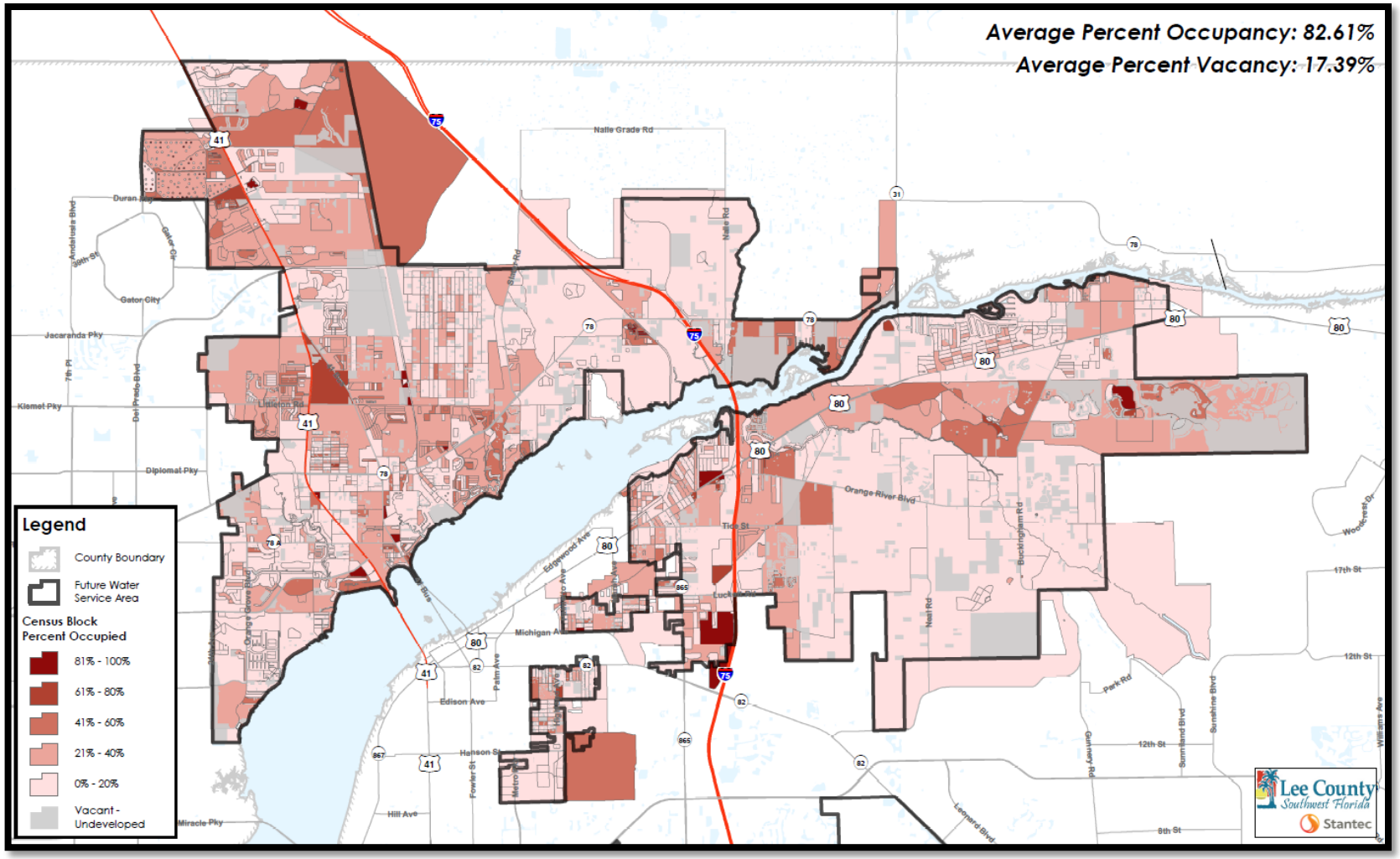
- Percent developed over planning periods (2030 and 2040) – approximately 76% of future demand
  - Assume 50% Residential Developed by 2030 and 100% by 2040
  - Assume 60% Commercial Developed by 2030 and 100% by 2040
  - See table for list of developments and demand calculation

Suggestions for remaining 24% of future demand

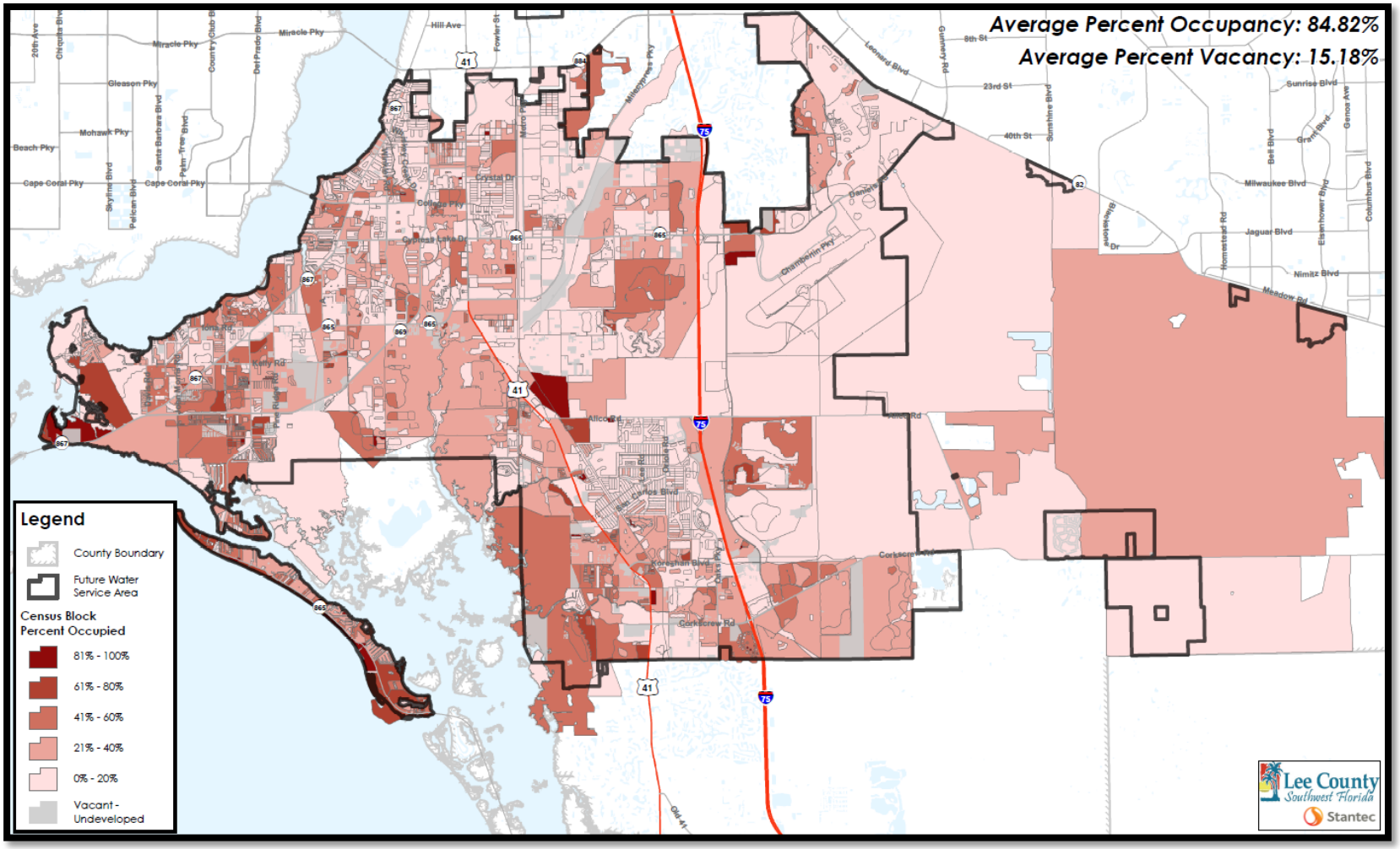
- Development east and not in Future Service Area
- Infill - Percent occupancy from Census Block Data

LCU
Water Master
Plan Update

Census Block Data – North Service Area



Census Block Data – South Service Area



Hydraulic Model Scenarios

Planning Period Scenarios

- 2030 – allocate demands, size new and upgrade existing infrastructure
- 2040 – allocate demands, size new infrastructure and upgrade existing

Water Age Scenario

- Existing system (as received from Carollo) – determine pipe upsize and looping to improve water quality
  - Existing model set up for MDF.

TM 3 Status

- Surface Water

- 75% of WWTP effluent used by reclaimed system.

Schedule

TASK NO.	TASK	DATE
1	Meetings & Coordination	Ongoing
2	Data Collection Review	Complete
3	Source Water Resource Characterization TM (draft)	6/1/19
4	Population Projection and Demand TM	4/1/19
5	Capital Improvements Plan TM	8/19/19
6	Water Master Plan Update Summary	11/18/19

Stantec

Meeting Notes

Water Master Plan – System Discussion

Lee County Water Master Plan Update / 177310992

Date/Time:	August 19, 2019 / 10:30 AM
Place:	Lee County Utilities
Next Meeting:	TBD
Attendees:	Nathan Beals (Lee County), Dewayne Tagg (Lee County), Hank Barosso (Lee County), Kelly Smith (Stantec), Samantha Nehme (Stantec), Fletcher McKenzie (Stantec)
Distribution:	Attendees

Item: See attached powerpoint slides that were presented during meeting.

1. Surface Storage Analysis
    - There is sufficient storage to meet minimum storage requirements up to 2040. This does not include if there are additional storage needs due to hydraulic requirements.
2. Water Treatment Plant Capacity Analysis
    - Consider permitted capacities for each plant and calculate percent utilized by demand projections with Olga's capacity included and with it excluded.
    - The previous master plan considered demand reaching 85% of WTP capacity as the threshold for requiring an expansion.
3. Source Water Analysis
4. Demand Allocation
5. Hydraulic Model Set Up
    - Model controls were modified to allow the system to supply the increased flow. These changes include the controls of the storage tank. They were updated to fill from 10pm -5am and a pressure sustaining valve on the fill line to maintain a pressure upstream of 50 psi.
        - The County operates the storage tanks similar using a modulating valve maintaining a pressure no lower than 50 psi during peak demand periods. The valve is set to maintain a pressure of between 55 and 65 psi depending on demands in the system.
6. Hydraulic Model Evaluation
    - Two tier system as described in powerpoint slides. Tier 1 is critical; Tier 2 is system optimization.
    - The target for system pressures in the model is to be no lower than 55 psi.
7. Hydraulic Model Preliminary Findings

- Preliminary model findings are showing that there is no clear hydraulic advantage to expanding a certain WTP within the County's system. When NLC, Green Meadows, and Corkscrew were run with no limit on the capacity to supply flow to the system they all supplied with 2,000 gpm of each other.
- The NLC WTP and Green Meadows will both be evaluated for expansion to meet 2040 max day demands.
- Fireflow analysis highlights neighborhoods that need larger water mains to deliver the minimum fireflow to hydrants. The master plan update will recommend a line item for an annual program to replace the water mains in these areas.

Schedule

- On target to meet schedule in the attached powerpoint slides.

8. Discussion

- Expanding Corkscrew would require conventional and RO treatment, while Green Meadows would only require RO. Therefore, Green Meadows is the WTP that would be more likely to expand.
- There is no remote chlorine dosing in the system once water leaves the WTP. The County currently has a flushing program of 70 autoflushers and 2 field staff conducting manual flushing.

Agenda

1. Surface Storage Analysis
2. Source Water Analysis
3. Demand Allocation
4. Hydraulic Model Set Up
5. Hydraulic Model Evaluation
6. Hydraulic Model Preliminary Findings
7. Schedule

Surface Storage Analysis

Required surface storage facilities determined by:

25% of Maximum Daily Demand for Equalization

+ 15% of Maximum Daily Demand for Emergency Storage

+ Largest Hydrant Flow x Hours of Fire

Surface Storage Facilities Required

Year	2020	2025	2030	2035	2040
MDF (MGD)	38.6	41.7	45.0	48.6	52.5
25% of MDF (MGD)	9.7	10.4	11.3	12.2	13.1
15% of MDF (MGD)	5.8	6.3	6.8	7.3	7.9
Subtotal (MG)[1]	15.4	16.7	18.0	19.4	21.0
Fire Flow (MG)[2]	0.72	0.72	0.72	0.72	0.72
Countywide Total Storage Required (MG)	**16.2**	**17.4**	**18.7**	**20.2**	**21.7**

[1] Assume 1 day of flow

[2] Largest hydrant is one to be used for commercial fires, assumed at 3,000 gpm. Fire duration of 4 hours. Total fire flow needed = 0.72 MG

In year 2040, the calculated need is 21.7 MG, total existing LCU storage is 35 MG.

No additional surface storage is recommended during planning period.

Surface Storage Analysis by Service Area

North Service Area

Year	2020	2025	2030	2035	2040
MDF (MGD)	11.9	13.0	14.3	15.7	17.2
25% of MDF (MGD)	3.0	3.3	3.6	3.9	4.3
15% of MDF (MGD)	1.8	2.0	2.1	2.4	2.6
Subtotal (MG)[1]	4.8	5.2	5.7	6.3	6.9
Fire Flow (MG)[2]	0.72	0.72	0.72	0.72	0.72
North Total Storage Required (MG)	**5.5**	**5.9**	**6.4**	**7.0**	**7.6**
Existing Storage (MG)	12	12	12	12	12
Excess Storage (MG)	6.5	6.1	5.6	5.0	4.4

[1] Assume 1 day of flow

[2] Largest hydrant is one to be used for commercial fires, assumed at 3,000 gpm. Fire duration of 4 hours. Total fire flow needed = 0.72 MG

South Service Area

Year	2020	2025	2030	2035	2040
MDF (MGD)	26.7	28.6	30.7	32.9	35.2
25% of MDF (MGD)	6.7	7.2	7.7	8.2	8.8
15% of MDF (MGD)	4.0	4.3	4.6	4.9	5.3
Subtotal (MG)[1]	10.7	11.5	12.3	13.2	14.1
Fire Flow (MG)[2]	0.72	0.72	0.72	0.72	0.72
South Total Storage Required (MG)	**11.4**	**12.2**	**13.0**	**13.9**	**14.8**
Existing Storage (MG)	23	23	23	23	23
Excess Storage (MG)	11.6	10.8	10.0	9.1	8.2

[1] Assume 1 day of flow

[2] Largest hydrant is one to be used for commercial fires, assumed at 3,000 gpm. Fire duration of 4 hours. Total fire flow needed = 0.72 MG

WTP Capacity Analysis - ADF

LCU System WTP Capacity Gap Analysis with Current Improvements (MGD)					
Year	2020	2025	2030	2035	2040
Total ADF	25.3	27.2	29.5	31.7	34.3
Total Operational Capacity	49.3	49.3	49.3	49.3	49.3
Difference Surplus/(Deficit)	**24.0**	**22.1**	**19.8**	**17.6**	**15.0**

North SA WTP Capacity Gap (MGD)					
Year	2020	2025	2030	2035	2040
North SA ADF	7.8	8.5	9.4	10.3	11.3
Current North SA Operational Capacity	8.5	15.0	15.0	15.0	15.0
Difference Surplus/(Deficit)	**7.2**	**6.5**	**5.6**	**4.7**	**3.7**

South SA WTP Capacity Gap (MGD)					
Year	2020	2025	2030	2035	2040
South SA ADF	17.5	18.7	20.1	21.5	23.0
Current South SA Operational Capacity	34.3	34.3	34.3	34.3	34.3
Difference Surplus/(Deficit)	**16.8**	**15.6**	**14.2**	**12.8**	**11.3**

LCU Water Master Plan Update

WTP Capacity Analysis - MDF

LCU System WTP Capacity Gap Analysis with Current Improvements (MGD)					
Year	2020	2025	2030	2035	2040
Total MDF	38.6	41.7	45.0	48.6	52.5
Total Operational Capacity	49.3	49.3	49.3	49.3	49.3
Difference Surplus/(Deficit)	**10.7**	**7.6**	**4.3**	**0.7**	**-3.2**

75% Op Capacity

37.0 MGD

North SA WTP Capacity Gap (MGD)					
Year	2020	2025	2030	2035	2040
North SA MDF	11.9	13.0	14.3	15.7	17.2
Current North SA Operational Capacity	15	15	15	15	15
Difference Surplus/(Deficit)	**3.1**	**2.0**	**0.7**	**-0.7**	**-2.2**

11.3 MGD

South SA WTP Capacity Gap (MGD)					
Year	2020	2025	2030	2035	2040
South SA MDF	26.7	28.6	30.7	32.9	35.2
Current South SA Operational Capacity	34.3	34.3	34.3	34.3	34.3
Difference Surplus/(Deficit)	**7.6**	**5.7**	**3.6**	**1.4**	**-0.9**

25.7 MGD

WTP Capacity Analysis - Regs

62-555.348 Planning for Expansion of Public Water System Source, Treatment, or Storage Facilities.

- (3) When the total maximum-day quantity of finished water produced by all treatment plants connected to a water system, including water produced to meet any fire-flow demand but excluding water produced to meet any demand that the supplier of water documents to be highly unusual and nonrecurring, exceeds 75 percent of the total permitted maximum-day operating capacity of the plants, the supplier of water shall submit source/treatment/storage capacity analysis reports to the Department

- (a) 1. If the initial report or the latest updated report indicates that maximum-day water demand (including fire-flow demand if fire protection is being provided) at build-out will not exceed the total permitted maximum-day operating capacity of the treatment plant(s) and that finished-water storage need (including fire storage if fire protection is being provided) at build-out will not exceed the existing total useful finished-water storage capacity, no additional report is required.

Existing Capacity = 47.8 mgd
75% Capacity = 35.9 mgd

Recent MDF (MGD)		
2016	2017	2018
35.3	35.9	34.0

WTP Analysis Continued

Impact of LCU's additional storage on meeting MDF Demands:

Total SA

Year	2020	2025	2030	2035	2040
Total Storage Required (MG)	12.93	13.91	14.96	16.1	17.33
Excess storage to meet Demand (MG)	22.07	21.09	20.04	18.9	17.67
WTP Capacity (MGD)	42.8	49.3	49.3	49.3	49.3
MDF (MGD)	38.6	41.7	45.0	48.6	52.5
75% MDF (MGD)	32.1	37.0	37.0	37.0	37.0
Deficit to 75%	-6.5	-4.7	-8.0	-11.6	-15.5
Available Storage to MDF Storage Needs	3.4	2.2	1.6	1.2	0.9

North SA

Year	2020	2025	2030	2035	2040
Total Storage Required (MG)	5.5	5.9	6.4	7.0	7.6
Excess storage to meet Demand (MG)	6.5	6.1	5.6	5.0	4.4
WTP Capacity (MGD)	8.5	15	15	15	15
MDF (MGD)	11.9	13.0	14.3	15.7	17.2
75% MDF (MGD)	6.4	11.3	11.3	11.3	11.3
Deficit to 75%	-5.5	-1.8	-3.1	-4.5	-6.0
Available Storage to MDF Storage Needs	1.2	3.4	1.8	1.1	0.7

South SA

Year	2020	2025	2030	2035	2040
Total Storage Required (MG)	11.4	12.2	13.0	13.9	14.8
Excess storage to meet Demand (MG)	11.6	10.8	10.0	9.1	8.2
WTP Capacity (MGD)	34.3	34.3	34.3	34.3	34.3
MDF (MGD)	26.7	28.6	30.7	32.9	35.2
75% MDF (MGD)	25.7	25.7	25.7	25.7	25.7
Deficit to 75%	-1.0	-2.9	-5.0	-7.2	-9.5
Available Storage to MDF Storage Needs	11.7	3.7	2.0	1.3	0.9

Source Water Analysis

Adjusted source water permitted capacity based on treatment process losses

Plant	Annual Allocation (MG)	Maximum Monthly Allocation (MG)	Return (Loss During Treatment Process)	Adjusted Annual Allocation (MG)	Adjusted Maximum Monthly Allocation (MG)
Corkscrew	4,737.00	513.20	4.3%	4,533.31	491.13
Green Meadows	7,185.00	778.18	17.7%	5,913.26	640.44
Pinewoods	2,685.70	268.40	18.1%	2,199.59	219.82
Subtotal- South Area	14,607.70	1,559.78		12,646.15	1,351.39
South County Equivalent Daily Flow (MGD)	**40.0**	**51.3**		**34.6**	**44.4**
NLC	5,886.0	592.9	14.8%	5,014.87	505.15
Olga	1,616.0	152.0	9.1%	1,468.94	138.17
Subtotal- North Area	7,502	656.0		6,483.82	643.32
North County Equivalent Daily Flow (MGD)	**20.6**	**24.5**		**17.6**	**21.2**
Total County Equivalent Daily Flow (MGD)	**60.6**	**75.8**		**52.2**	**65.6**

LCU Existing Source Water versus Demands (MGD)					
Year	2020	2025	2030	2035	2040
Total ADF	25.3	27.2	29.5	31.7	34.3
Total Source Water Capacity	52.2	52.2	52.2	52.2	52.2
Difference Surplus/(Deficit)	**26.9**	**25.0**	**22.7**	**20.5**	**17.9**

The total demand to total source water capacity in year 2040 is approximately 66% of permitted source water.

Demand Allocation

- Existing model in 2018 MDF. Assign additional 10.37 MGD MDF between 2030 and 2040.
- Assign flows to development in progress and proposed for the planning periods = 9.28 mgd total.

Period	Additional Flow (gpd)
2030 Additional Demand	5,067,551
2040 Additional Demand	4,216,761
Total	9,284,312

- Remaining 1.09 MGD flow was assigned to vacant parcels within service area based on land use. All vacant parcel flow was assigned to the model in the Year 2030 and carried forward to year 2040.

*See Development Figure and Table for detailed list and locations

Hydraulic Model Set Up

Model Scenarios:

- Analysis to determine infrastructure to serve future demand

Year	ADF Water Demand (MGD)	MOD Water Demand (MGD)
2030	29.3	45.0
2040	33.6	52.5

2030 Demands w/no improvements – MDF EPS (72 Hours)
(except to proposed developments in east)

2040 Demands w/no improvements – MDF EPS (72 Hours)
(except to proposed developments in east)

New Supply Alternatives:

1. NLC WTP supplies north service area – Upgrade NLC WTP
2. South service area supplies north service area – Upgrade Green Meadows or Corkscrew WTP

- Existing System Analysis
  - 2018 Water Age – ADF
  - 2018 Fireflow – MDF

Hydraulic Model Evaluation

Tiered criteria to evaluate the model results:

Tier 1 – criteria that indicates critical improvements

- Minimum pressure of 20 psi.
- Maximum pressure of 100 psi.
- Maximum velocity of 5 fps
- Fireflow scenarios – residential 750 gpm and 3,000 gpm non-residential
  - Maximum velocity 10 fps
  - Minimum pressure 20 psi

Tier 2 – criteria that indicates operational improvements

- Head loss less than or equal to 7 ft/1000ft for pipes less than 16-inches diameter
- Head loss less than or equal to 3 ft/1000ft for pipes greater than or equal to 16-inches diameter

Hydraulic Model Preliminary Findings

2030

- There are pipes that exceed the requirements for headloss. These were further evaluated under the 2040 scenarios to determine criticality.

2040

- Transmission main improvements
- Supply Alternatives
  - NLC WTP Expansion
  - South Service Area WTP (Green Meadows or Corkscrew) Expansion and transmission main

Fireflow

- Fireflow max allowable flow map

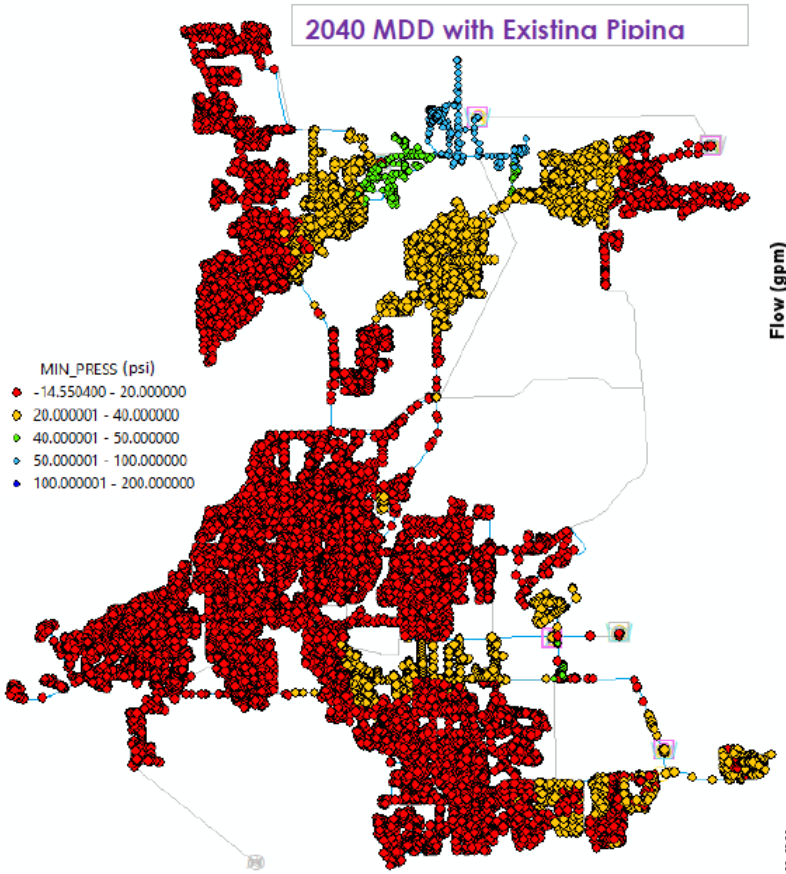
Water Age

- Water Age heat map – under development

***Operational questions

LCU Water Master Plan Update

Hydraulic Model Preliminary Results



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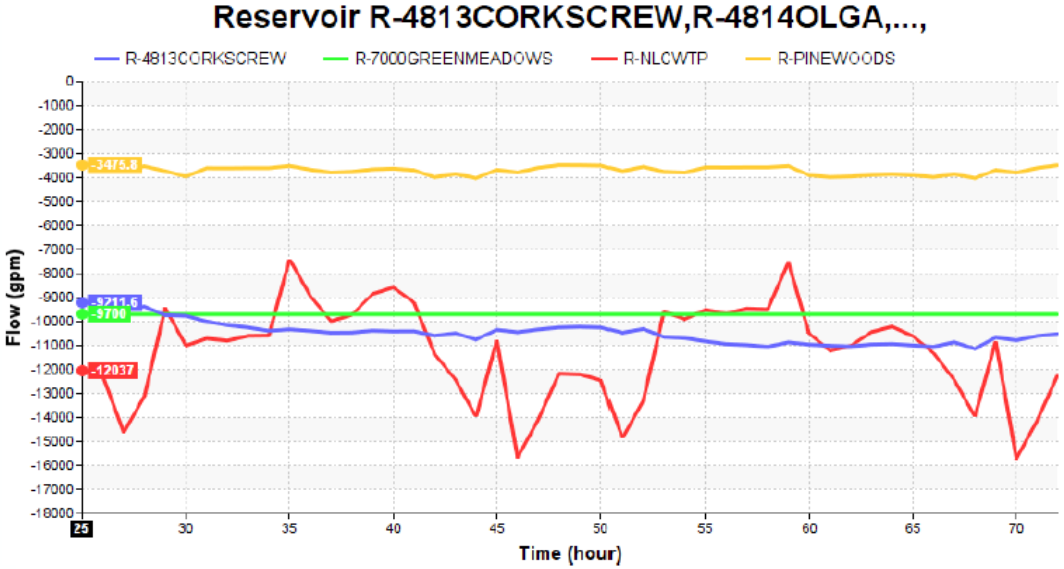
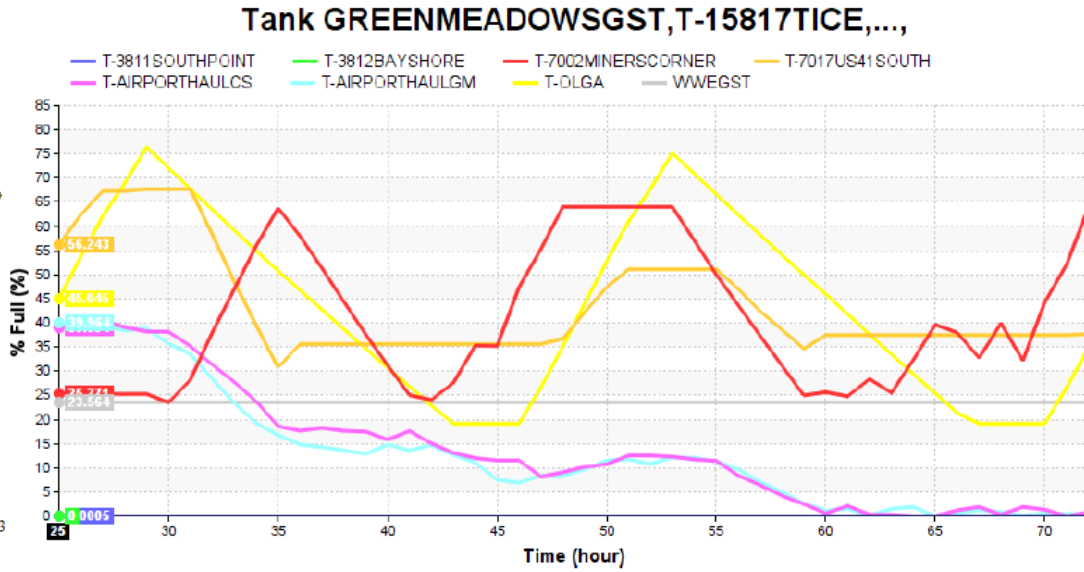
$q_{2040mddgmmeadows2} := 9700gpm = 13.968 \cdot mgd$

$q_{2040mddpinewoods2} := 3707.48804791667gpm = 5.339 \cdot mgd$

$q_{2040mddnlcwtp2} := 11267.37678125gpm = 16.225 \cdot mgd$

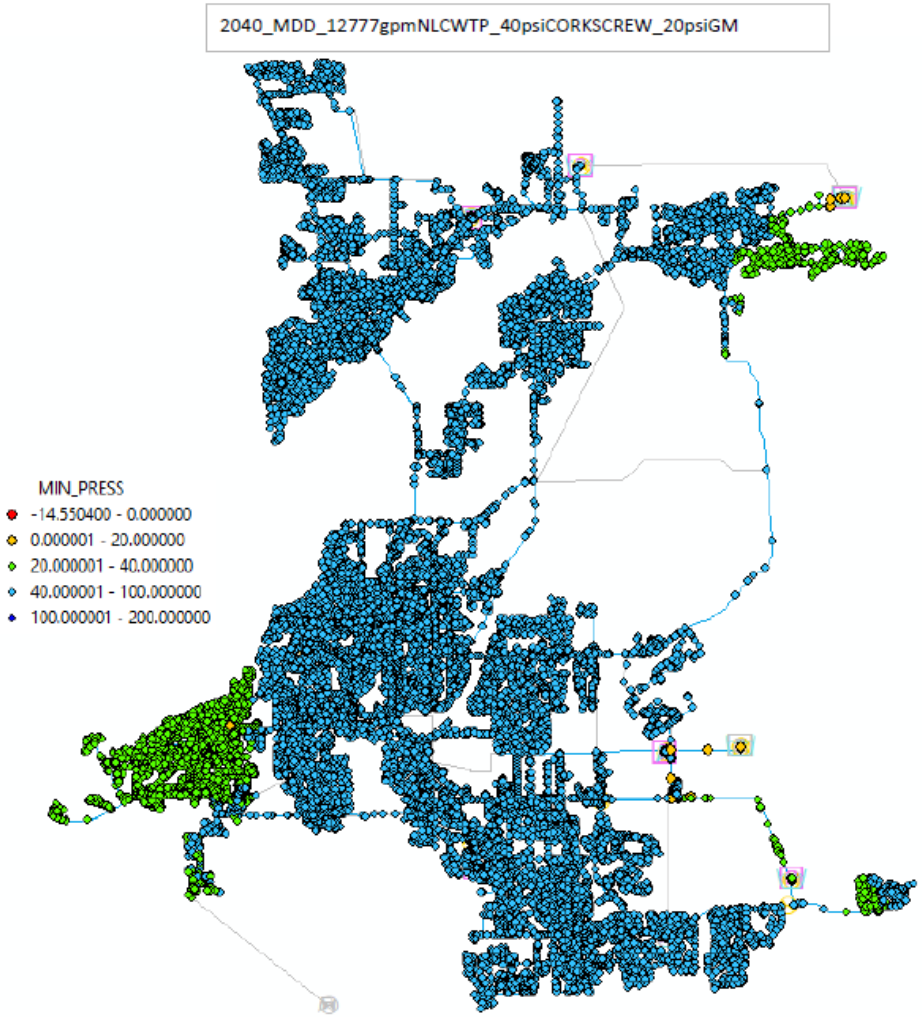
$q_{sup2040chk2} := q_{2040mddcorkscrew2} + q_{2040mddgmmeadows2} + q_{2040mddpinewoods2} + q_{2040mddnlcwtp2} = 50.603$

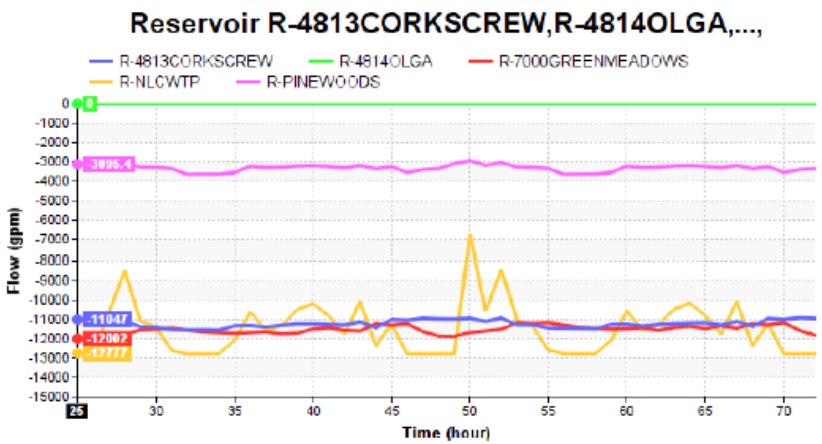


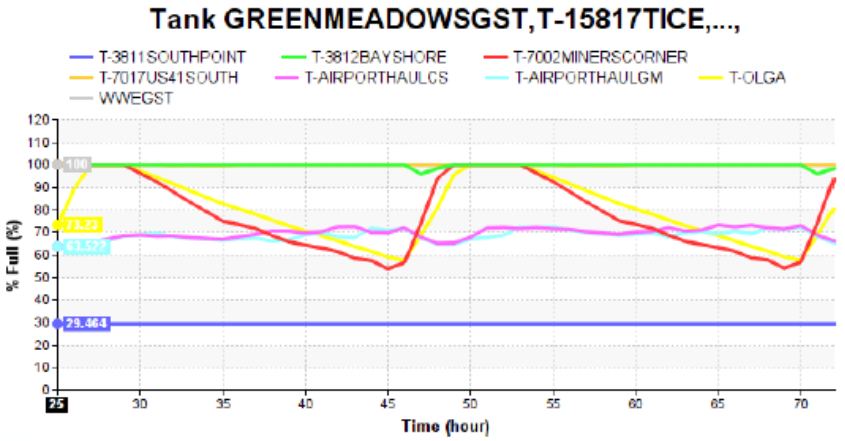


LCU Water Master Plan Update

Hydraulic Model Preliminary Results

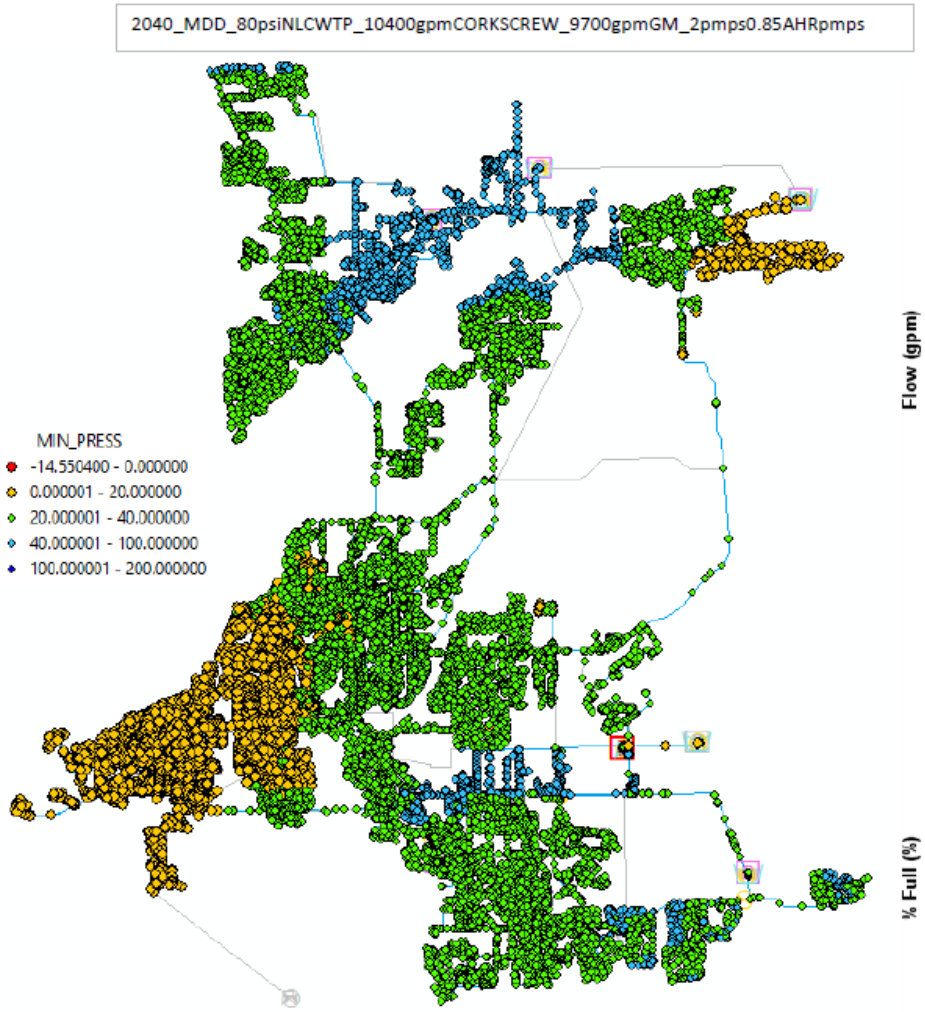


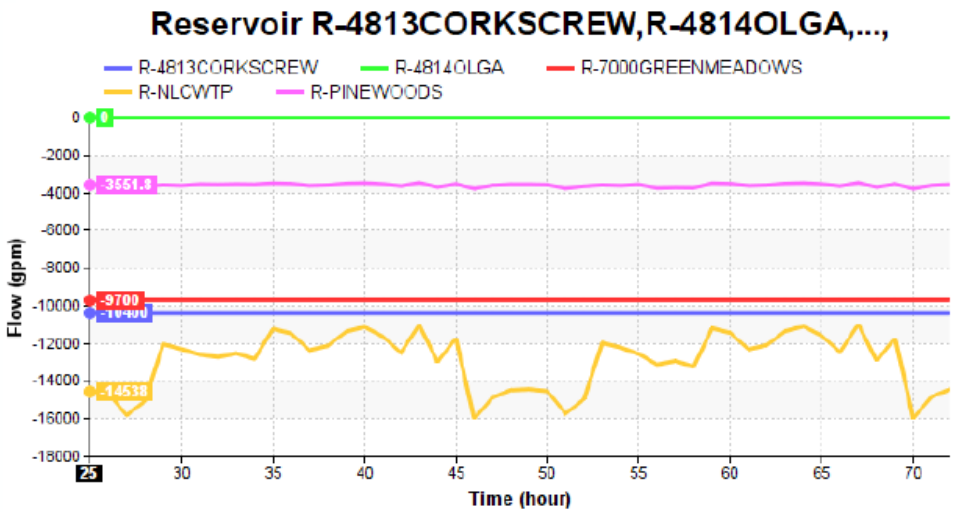


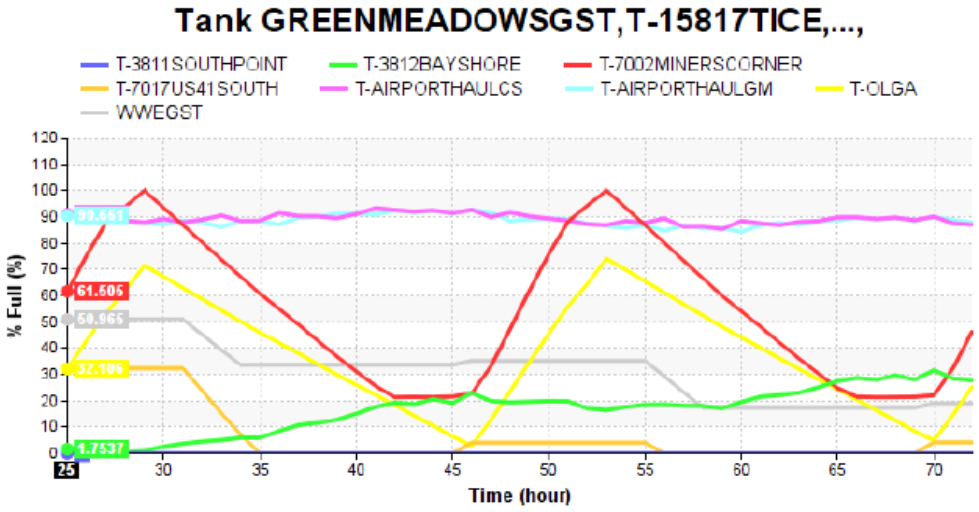


LCU Water Master Plan Update

Hydraulic Model Preliminary Results

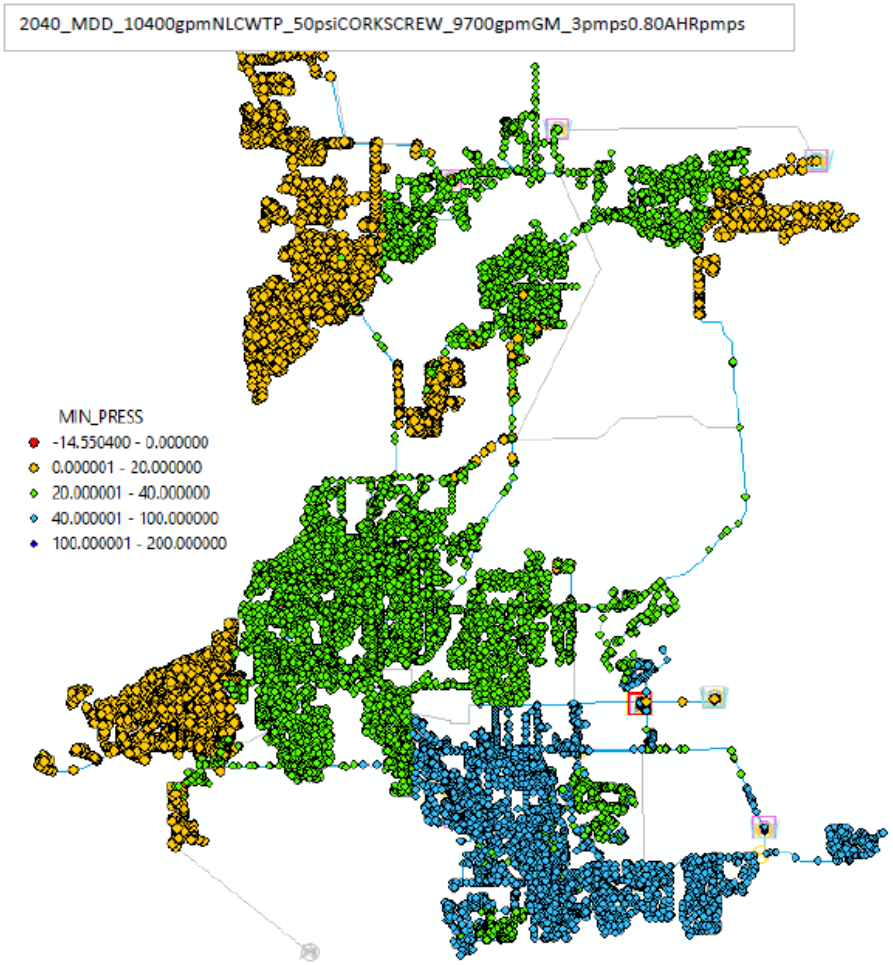


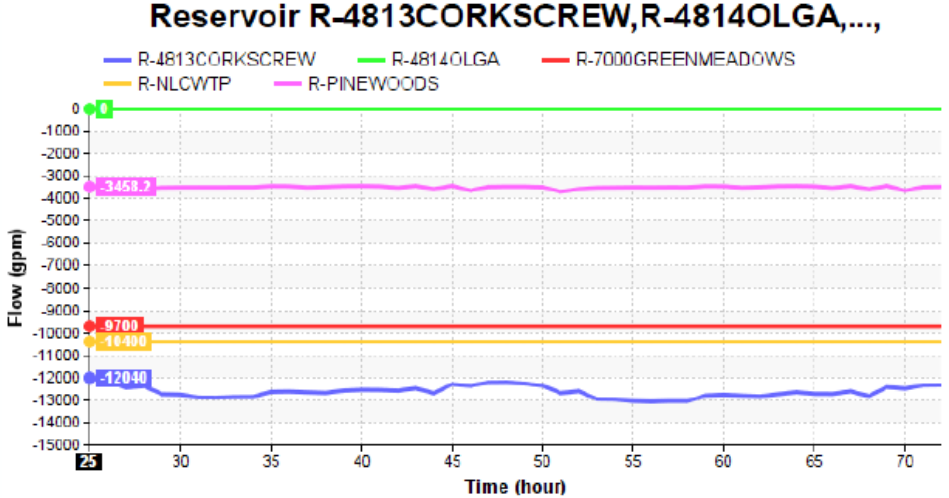


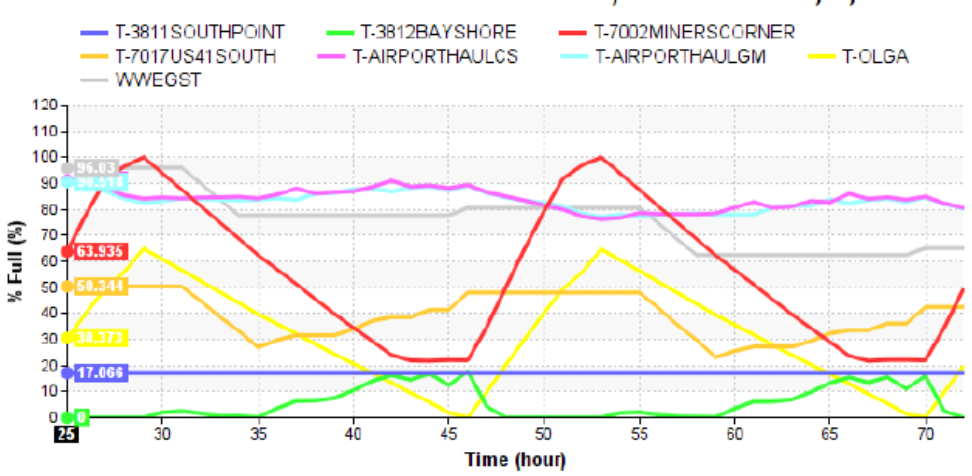


LCU Water Master Plan Update

Hydraulic Model Preliminary Results

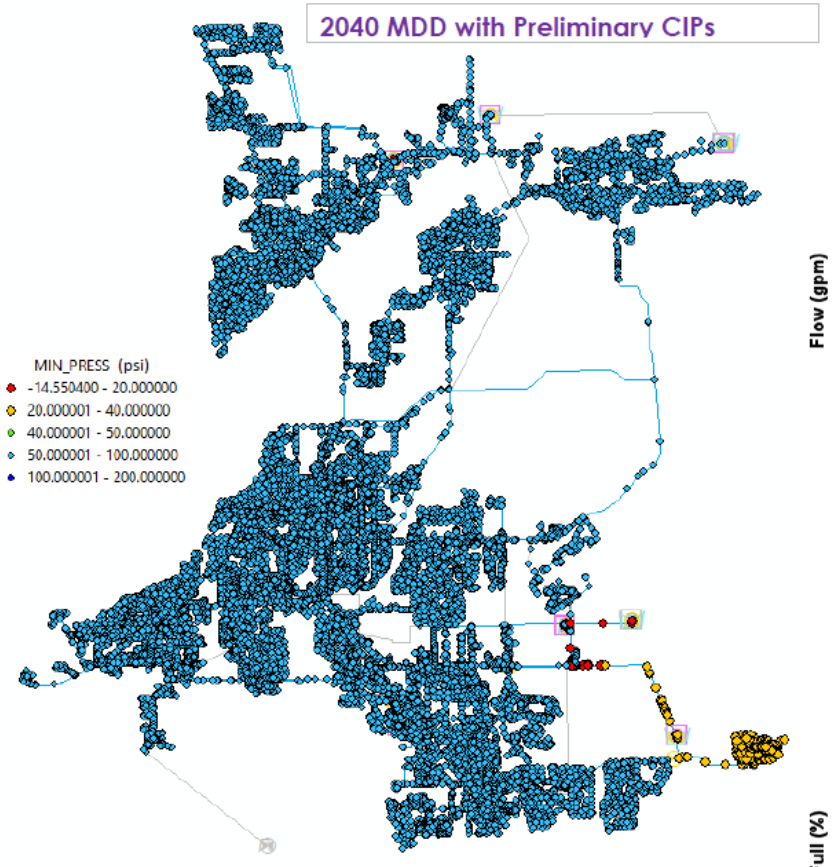






LCU Water Master Plan Update

Hydraulic Model Preliminary Results



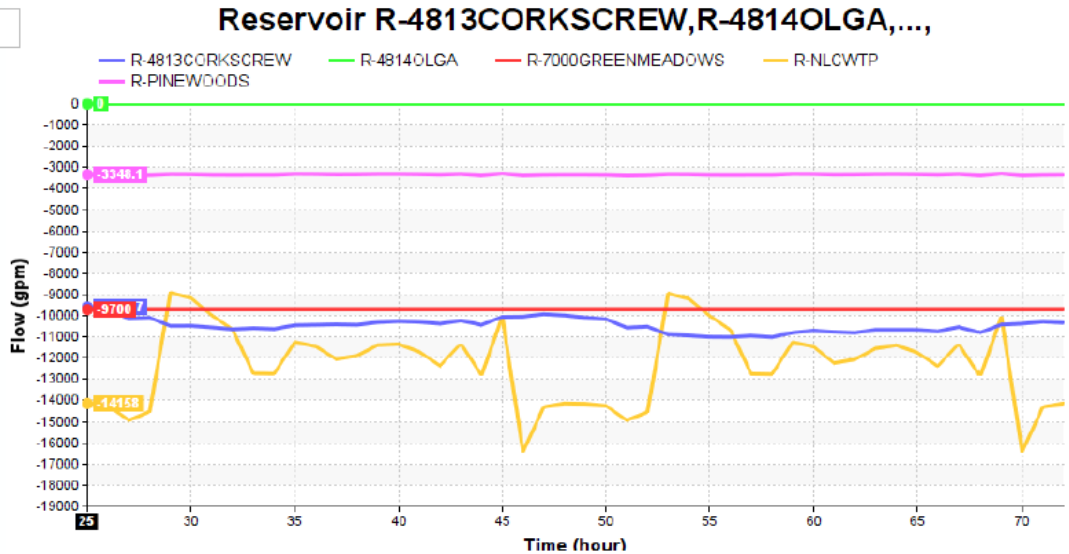
$q_{2040mddcorkscrew2} := 10461.3037643833gpm = 15.065 \cdot mgd$

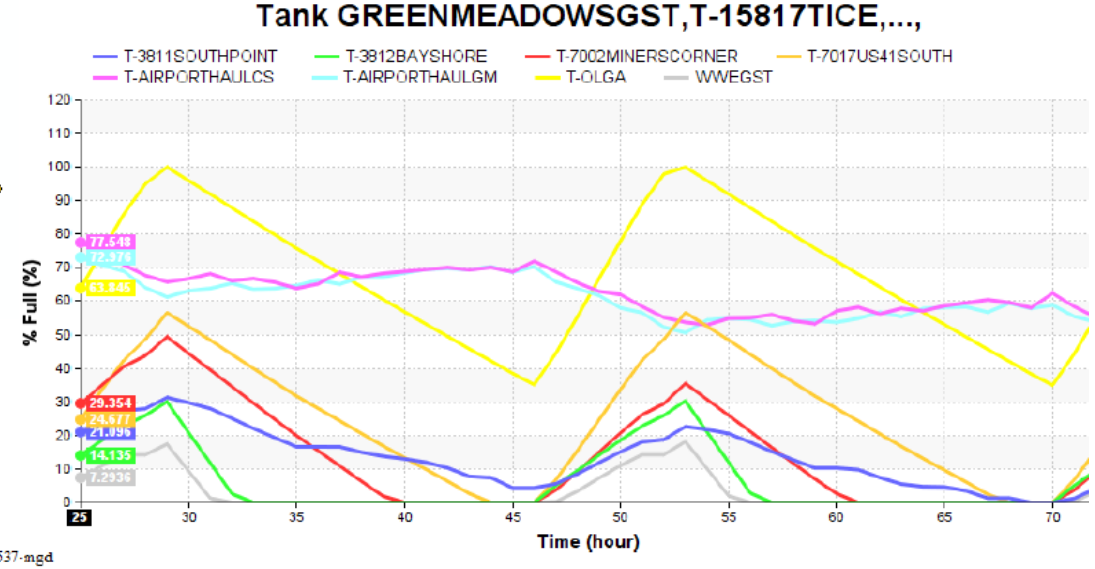
$q_{2040mddgrnmeadows2} := 9700gpm = 13.968 \cdot mgd$

$q_{2040mddpinewoods2} := 3340.8275gpm = 4.811 \cdot mgd$

$q_{2040mddnlcwtp2} := 12287.3928229167gpm = 17.694 \cdot mgd$

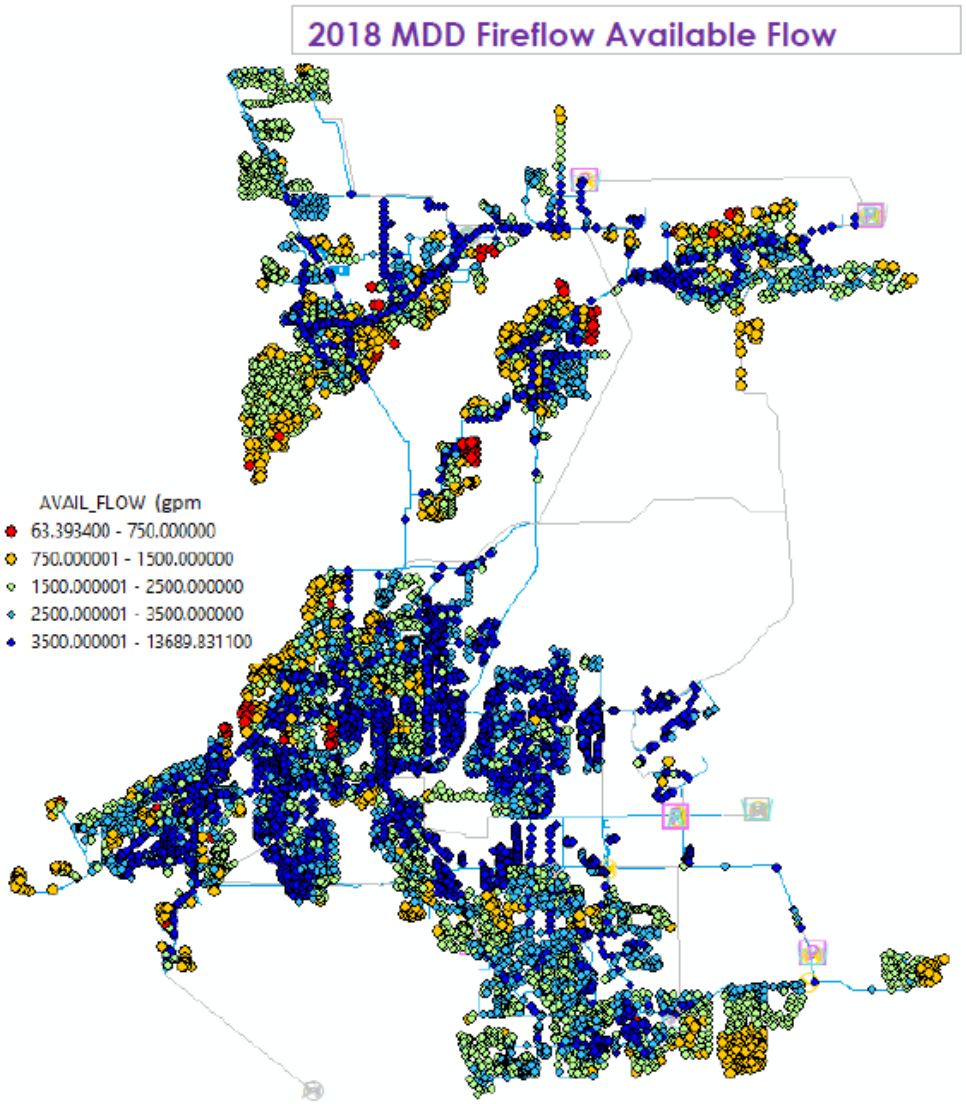
$q_{sup2040chk2} := q_{2040mddcorkscrew2} + q_{2040mddgrnmeadows2} + q_{2040mddpinewoods2} + q_{2040mddnlcwtp2} = 51.537 \cdot mgd$





LCU Water Master Plan Update

Hydraulic Model Preliminary Results



Schedule

Task	Date
Task 5– Capital Improvement Plan	
Interim List of CIPs	8/30/2019
TM # 5 Draft	9/16/2019
Review Meeting	9/23/2019
TM # 5 Final	10/11/2019
Task 6 – Water Master Plan Summary Report	
Draft Report	10/11/2019
Review Meeting	10/18/2019
Final Report	11/1/2019

Appendix B CIP COST BREAKDOWN

CIP Project Summary and Cost Breakdown Table

Project ID	Map ID	Priority	Planning Period	Project Description	Length (LF)	Diameter (in)	Purpose	Capital Unit	Unit of Measurement	Cost Per Unit ($)	Capital Cost[1]	Contingency Cost[3]	Subtotal	Supplemental Costs[3]	Total Project Cost
2020-2030 Planning Period															
30-1	1	1	2020-2030	NLC Wellfield Expansion to 15.0 MGD.	-	-	Meet future demands.	Source Water Expansion	Lump Sum	-	$ 35,938,000	$ 8,985,000	$ 44,923,000	$ 13,477,000	$ 58,400,000
30-2	2	1	2020-2030	NLC WTP Expansion to 15.0 MGD.	-	-	Meet future demands.	Treatment Expansion	Lump Sum	-	$ 24,316,000	$ 6,079,000	$ 30,395,000	$ 9,119,000	$ 39,514,000
30-3	-	1	2020-2030	Neighborhood Fireflow Improvement Program - identified areas where pipes sizes should be increased so fire hydrants will meet the minimum flow criteria of 750 gpm. These areas are in neighborhoods with pipe sizes ranging from 2-inch to 6-inch. Each neighborhood project will be evaluated by LCU to determine if expanded neighborhood water main improvements will be included as part of the project.	104000	8	Upsize piping in neighborhoods where the minimum 750 gpm fireflow is not met.	Pipe	Linear Feet	$81	$ 8,424,000	$ 2,106,000	$ 10,530,000	$ 3,159,000	$ 13,689,000
30-4a	3	2	2020-2030	North/South Interconnect: Phase 1/2 - 24-inch water main extension from existing system at Daniels Pkwy north along Gunnery Rd north to existing 24-inch at SR 80.	76,000	24	Transmission main for the north/south interconnect for reliability.	Pipe	Linear Feet	$242	$ 18,392,000	$ 4,598,000	$ 22,990,000	$ 6,897,000	$ 29,887,000
30-4b	3	2	2020-2030	North/South Interconnect: Phase 1/2 (to achieve full system redundancy) - 16-inch water main extension from existing 24-inch at SR 80 north across the Caloosahatchee River and west to NLC WTP storage tanks.	39,000	16	Transmission main for the north/south interconnect for reliability.	Pipe	Linear Feet	$162	$ 6,318,000	$ 1,580,000	$ 7,898,000	$ 2,370,000	$ 10,268,000
30-4	3	2	2020-2030	North/South Interconnect: 24-inch and 16-inch water main extensions as described in 30-4a and 30-4b. The project can be split into two phases.	115,000						$ 24,710,000	$ 6,178,000	$ 30,888,000	$ 9,267,000	$ 40,155,000
30-5	4	2	2020-2030	East/West Connector - Install a 24-inch water main from designed 24-inch water main that terminates at US-41 and Gladiolus Dr, west to Summerline along Gladiolus Dr, southwest along Summerlin to connect to existing system at San Carlos Blvd. This alignment can potentially be relocated in the southwest of the system. Project includes evaluation of the existing route and whether the pipe should parallel or upsize existing.	29,000	24	Improves velocity and headloss conditions and creates a redundant pipe under I-75, which is a large transmission main from NLC WTP to the northwest of the LCU system.	Pipe	Linear Feet	$242	$ 7,018,000	$ 1,755,000	$ 8,773,000	$ 2,632,000	$ 11,405,000
30-6	5	2	2020-2030	Parallel existing 20-inch along Bayshore Rd, from Wells Rd to west of Park 78 Dr, crossing I-75. Project includes evaluation of the existing route.	4,200	24	Improve pressures in the Southwest of the system.	Pipe	Linear Feet	$242	$ 1,017,000	$ 255,000	$ 1,272,000	$ 382,000	$ 1,654,000
Total Estimated Cost for Planning Period											$ 126,133,000	$ 31,536,000	$ 126,781,000	$ 38,036,000	$ 164,817,000

2030-2040 Planning Period															
Project ID	Map ID	Priority	Planning Period	Project Description	Length (LF)	Diameter (in)	Purpose	Capital Unit	Unit of Measurement	Cost Per Unit ($)	Capital Cost[1]	Contingency Cost	Subtotal	Supplemental Costs[2]	Total Project Cost
40-1	7	1	2030-2040	Green Meadows WTP Expansion to 19 MGD	-	-	Expand the WTP and HSPS to serve the increased demand.	Capacity Expansion	Lump Sum	-	$ 26,370,000	$ 7,911,000	$ 34,281,000	$ 10,285,000	$ 44,566,000
40-2	8	1	2030-2040	Parallel or upsize existing 16-inch from North Reservoir Tank west along Samville Rd, north along Williams Rd, west along Bright Rd, north along Slater Rd, west along Mellow Dr, and north along Yellow Trail. Project includes evaluation of the existing route and whether the pipe should parallel or upsize existing.	32,200	16	Improve pressures in the Northwest of the system.	Pipe	Linear Feet	$162	$ 5,217,000	$ 1,566,000	$ 6,783,000	$ 2,035,000	$ 8,818,000
40-3	9	1	2030-2040	New 16-inch transmission main from existing 16-inch transmission main at Magnolia Landing to exisitng water main at US-41.	10,900	16	Improve pressures in the Northwest of the system.	Pipe	Linear Feet	$162	$ 1,766,000	$ 530,000	$ 2,296,000	$ 689,000	$ 2,985,000
Total Estimated Cost for Planning Period											$ 33,353,000	$ 10,007,000	$ 43,360,000	$ 13,009,000	$ 56,369,000

Project Spend Plan Breakdown

Project ID	Map ID	Priority	Planning Period	Project Description	Length (LF)	Diameter (in)	Capital Cost	Contingency Cost	Subtotal	Supplemental Costs	Total Project Cost	Project Spend Plan				
												Subtask	**Phase**	**Duration(months)**	**% Phase Spend**	**2019 Cost Estimate**
30-1	1	1	2020-2030	NLC Wellfield Expansion to 15.0 MGD.	-	-						Project Administration	Administration	25	5%	$ 2,291,090
												Route Study/Hydraulic Modeling	Planning/Project Development	4	15%	$ 1,010,775
												Easement Acquisition	Design/Permitting/Acquisition	0	0%	
												Design/Permit	Design/Permitting/Acquisition	12	85%	$ 5,727,725
							$ 35,938,000	$ 8,985,000	$ 44,923,000	$ 13,477,000	$ 58,400,000	Construction	Construction	9	100%	$ 49,370,410
															Subtotal	**$ 58,400,000**
												Subtask	**Phase**	**Duration(months)**	**% Phase Spend**	**2019 Cost Estimate**
												Project Administration	Administration	25	5%	$ 1,550,230
												Preliminary Design	Planning/Project Development	4	15%	$ 683,925
												Easement Acquisition	Design/Permitting/Acquisition	0	0%	
												Design/Permit	Design/Permitting/Acquisition	12	85%	$ 3,875,575
30-2	2	1	2020-2030	NLC WTP Expansion to 15.0 MGD.	-	-	$ 24,316,000	$ 6,079,000	$ 30,395,000	$ 9,119,000	$ 39,514,000	Construction	Construction	9	100%	$ 33,404,270
															Subtotal	**$ 39,514,000**
												Subtask	**Phase**	**Duration(months)**	**% Phase Spend**	**2019 Cost Estimate**
				Neighborhood Fireflow Improvement Program - identified areas where pipes sizes should be increased so fire hydrants will meet the minimum flow criteria of 750 gpm. These areas are in neighborhoods with pipe sizes ranging from 2-inch to 6-inch. Each neighborhood project will be evaluated by LCU to determine if expanded neighborhood								Project Administration	Administration	120	5%	$ 537,030
													Route Study/Hydraulic Modeling	Planning/Project Development	6	15%	$ 236,925
													Easement Acquisition	Design/Permitting/Acquisition	0	0%	
													Design/Permit	Design/Permitting/Acquisition	12	85%	$ 1,342,575
30-3	-	1	2020-2030	water main improvements will be included as part of the project.	104,000	8	$ 8,424,000	$ 2,106,000	$ 10,530,000	$ 3,159,000	$ 13,689,000	Construction	Construction	24	100%	$ 11,572,470
															Subtotal	**$ 13,689,000**
												Subtask	**Phase**	**Duration(months)**	**% Phase Spend**	**2019 Cost Estimate**
												Project Administration	Administration	42	5%	$ 1,172,490
												Route Study/Hydraulic Modeling	Planning/Project Development	12	15%	$ 517,275
												Easement Acquisition	Design/Permitting/Acquisition	0	0%	
				North/South Interconnect: Phase 1/2 - 24-inch water main extension from existing								Design/Permit	Design/Permitting/Acquisition	12	85%	$ 2,931,225
30-4a	3	2	2020-2030	system at Daniels Pkwy north along Gunnery Rd north to existing 24-inch at SR 80.	76,000	24	$ 18,392,000	$ 4,598,000	$ 22,990,000	$ 6,897,000	$ 29,887,000	Construction	Construction	18	100%	$ 25,266,010
															Subtotal	**$ 29,887,000**
												Subtask	**Phase**	**Duration(months)**	**% Phase Spend**	**2019 Cost Estimate**
												Project Administration	Administration	33	5%	$ 402,900
												Route Study/Hydraulic Modeling	Planning/Project Development	9	15%	$ 177,750
				North/South Interconnect: Phase 1/2 (to achieve full system redundancy) - 16-inch								Easement Acquisition	Design/Permitting/Acquisition	0	0%	
				water main extension from existing 24-inch at SR 80 north across the Caloosahatchee								Design/Permit	Design/Permitting/Acquisition	12	85%	$ 1,007,250
30-4b	3	2	2020-2030	River and west to NLC WTP storage tanks.	39,000	16	$ 6,318,000	$ 1,580,000	$ 7,898,000	$ 2,370,000	$ 10,268,000	Construction	Construction	12	100%	$ 8,680,100
															Subtotal	**$ 10,268,000**
				North/South Interconnect: 24-inch and 16-inch water main extensions as described in												
30-4	3	2	2020-2030	30-4a and 30-4b. The project can be split into two phases.			**$ 24,710,000**	**$ 6,178,000**	**$ 30,888,000**	**$ 9,267,000**	**$ 40,155,000**				**TOTAL 30-4**	**$ 40,155,000**
												Subtask	**Phase**	**Duration(months)**	**% Phase Spend**	**2019 Cost Estimate**
												Project Administration	Administration	48	5%	$ 447,440
				East/West Connector - Install a 24-inch water main from designed 24-inch water main								Route Study/Hydraulic Modeling	Planning/Project Development	12	15%	$ 263,250
				that terminates at US-41 and Gladiolus Dr, west to Summerline along Gladiolus Dr,								Easement Acquisition	Design/Permitting/Acquisition	0	0%	$ -
				southwest along Summerlin to connect to existing system at San Carlos Blvd. This								Design/Permit	Design/Permitting/Acquisition	12	85%	$ 1,491,750
				alignment can potentially be relocated in the southwest of the system. Project includes												
30-5	4	2	2020-2030	evaluation of the existing route and whether the pipe should parallel or upsize existing.	29,000	24	$ 7,018,000	$ 1,755,000	$ 8,773,000	$ 2,632,000	$ 11,405,000	Construction	Construction	24	100%	$ 8,773,000
															Subtotal	**$ 10,528,000**
												Subtask	**Phase**	**Duration(months)**	**% Phase Spend**	**2019 Cost Estimate**
												Project Administration	Administration	33	5%	$ 64,940
												Route Study/Hydraulic Modeling	Planning/Project Development	9	15%	$ 38,250
												Easement Acquisition	Design/Permitting/Acquisition	0	0%	$ -
				Parallel existing 20-inch along Bayshore Rd, from Wells Rd to west of Park 78 Dr,								Design/Permit	Design/Permitting/Acquisition	12	85%	$ 216,750
30-6	5	2	2020-2030	crossing I-75. Project includes evaluation of the existing route.	4,200	24	$ 1,017,000	$ 255,000	$ 1,272,000	$ 382,000	$ 1,654,000	Construction	Construction	12	100%	$ 1,272,000
															Subtotal	**$ 1,527,000**

Project Spend Plan Breakdown

Project ID	Map ID	Priority	Planning Period	Project Description	Length (LF)	Diameter (in)	Capital Cost	Contingency Cost	Subtotal	Supplemental Costs	Total Project Cost	Project Spend Plan				
												Subtask	**Phase**	**Duration(months)**	**% Phase Spend**	**2019 Cost Estimate**
												Project Administration	Administration	42	5%	$ 1,748,450
												Preliminary Design	Planning/Project Development	12	20%	$ 1,028,500
												Easement Acquisition	Design/Permitting/Acquisition	0	0%	
												Design/Permit	Design/Permitting/Acquisition	12	80%	$ 4,114,000
40-1	7	1	2030-2040	Green Meadows WTP Expansion to 19 MGD	-	-	$ 26,370,000	$ 7,911,000	$ 34,281,000	$ 10,285,000	$ 44,566,000	Construction	Construction	18	100%	$ 37,675,050
															Subtotal	**$ 44,566,000**
												Subtask	**Phase**	**Duration(months)**	**% Phase Spend**	**2019 Cost Estimate**
												Project Administration	Administration	36	5%	$ 345,950
												Route Study/Hydraulic Modeling	Planning/Project Development	12	20%	$ 203,500
												Easement Acquisition	Design/Permitting/Acquisition	0	0%	
				Parallel or upsize existing 16-inch from North Reservoir Tank west along Samville Rd, north along Williams Rd, west along Bright Rd, north along Slater Rd, west along Mellow Dr, and north along Yellow Trail. Project includes evaluation of the existing								Design/Permit	Design/Permitting/Acquisition	12	80%	$ 814,000
40-2	8	1	2030-2040	route and whether the pipe should parallel or upsize existing.	32,200	16	$ 5,217,000	$ 1,566,000	$ 6,783,000	$ 2,035,000	$ 8,818,000	Construction	Construction	12	100%	$ 7,454,550
															Subtotal	**$ 8,818,000**
												Subtask	**Phase**	**Duration(months)**	**% Phase Spend**	**2019 Cost Estimate**
												Project Administration	Administration	33	5%	$ 117,130
												Route Study/Hydraulic Modeling	Planning/Project Development	9	20%	$ 68,900
												Easement Acquisition	Design/Permitting/Acquisition	0	0%	
				New 16-inch transmission main from existing 16-inch transmission main at Magnolia								Design/Permit	Design/Permitting/Acquisition	12	80%	$ 275,600
40-3	9	1	2030-2040	Landing to exisitng water main at US-41.	10,900	16	$ 1,766,000	$ 530,000	$ 2,296,000	$ 689,000	$ 2,985,000	Construction	Construction	12	100%	$ 2,523,370
															Subtotal	**$ 2,985,000**

2020 - 2030 Cost Estimates and Preliminary Spend Plan - 2019 $$

Project ID	Map ID	Priority	Planning Period	Project Name	Project Phase	2019 Cost Estimate	Duration (months)	Duration (Years)	Cost/Project Month	Project Start	Project End	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
30-1	1	1	2020-2030	North Lee County Water Treatment Plant 15.0 MGD Wellfield Expansion	Administration	$ 2,291,090	25	2.08	$ 91,644			$ 1,099,723	$ 1,099,723	$ 91,644							
30-1	1	1	2020-2030	North Lee County Water Treatment Plant 15.0 MGD Wellfield Expansion	Planning/Project Development	$ 1,010,775	4	0.33	$ 252,694			$ 1,010,775									
30-1	1	1	2020-2030	North Lee County Water Treatment Plant 15.0 MGD Wellfield Expansion	Design/Permitting/Acquisition	$ 5,727,725	12	1.00	$ 477,310				$ 5,727,725								
30-1	1	1	2020-2030	North Lee County Water Treatment Plant 15.0 MGD Wellfield Expansion	Construction	$ 49,370,410	9	0.75	$ 5,485,601					$ 49,370,410							
											Year Totals	**$ 2,110,498**	**$ 6,827,448**	**$ 49,462,054**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
30-2	2	1	2020-2030	North Lee County Water Treatment Plant Expansion to 15.0 MGD	Administration	$ 1,550,230	25	2.08	$ 62,009			$ 744,110	$ 744,110	$ 62,009							
30-2	2	1	2020-2030	North Lee County Water Treatment Plant Expansion to 15.0 MGD	Planning/Project Development	$ 683,925	4	0.33	$ 170,981			$ 683,925									
30-2	2	1	2020-2030	North Lee County Water Treatment Plant Expansion to 15.0 MGD	Design/Permitting/Acquisition	$ 3,875,575	12	1.00	$ 322,965				$ 3,875,575								
30-2	2	1	2020-2030	North Lee County Water Treatment Plant Expansion to 15.0 MGD	Construction	$ 33,404,270	9	0.75	$ 3,711,586					$ 33,404,270							
											Year Totals	**$ 1,428,035**	**$ 4,619,685**	**$ 33,466,279**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
30-3	-	1	2020-2030	Neighborhood Fireflow Improvement Program	Administration	$ 537,030	120	10.00	$ 4,475			$ 53,703	$ 53,703	$ 53,703	$ 53,703	$ 53,703	$ 107,406	$ 107,406	$ 53,703		
30-3	-	1	2020-2030	Neighborhood Fireflow Improvement Program	Planning/Project Development	$ 236,925	6	0.50	$ 39,488			$ 23,693	$ 23,693	$ 23,693	$ 23,693	$ 23,693	$ 47,385	$ 47,385	$ 23,693		
30-3	-	1	2020-2030	Neighborhood Fireflow Improvement Program	Design/Permitting/Acquisition	$ 1,342,575	12	1.00	$ 111,881			$ 67,129	$ 134,258	$ 134,258	$ 134,258	$ 134,258	$ 268,515	$ 268,515	$ 201,386		
30-3	-	1	2020-2030	Neighborhood Fireflow Improvement Program	Construction	$ 11,572,470	24	2.00	$ 482,186				$ 289,312	$ 867,935	$ 1,157,247	$ 1,157,247	$ 2,314,494	$ 2,314,494	$ 2,314,494	$ 867,935	$ 289,312
											Year Totals	**$ 144,524**	**$ 500,965**	**$ 1,079,588**	**$ 1,368,900**	**$ 1,368,900**	**$ 2,737,800**	**$ 2,737,800**	**$ 2,593,276**	**$ 867,935**	**$ 289,312**
30-4a	3	2	2020-2030	Potable Water Service Areas North/South Interconnect - Phase 1	Administration	$ 1,172,490	42	3.50	$ 27,916			$ 334,997	$ 334,997	$ 334,997	$ 167,499						
30-4a	3	2	2020-2030	Potable Water Service Areas North/South Interconnect - Phase 1	Planning/Project Development	$ 517,275	12	1.00	$ 43,106			$ 517,275									
30-4a	3	2	2020-2030	Potable Water Service Areas North/South Interconnect - Phase 1	Design/Permitting/Acquisition	$ 2,931,225	12	1.00	$ 244,269				$ 2,931,225								
30-4a	3	2	2020-2030	Potable Water Service Areas North/South Interconnect - Phase 1	Construction	$ 25,266,010	18	1.50	$ 1,403,667					$ 16,844,007	$ 8,422,003						
30-4b	3	2	2020-2031	Potable Water Service Areas North/South Interconnect - Phase 2	Administration	$ 402,900	33	2.75	$ 12,209						$ 146,509	$ 146,509	$ 109,882				
30-4b	3	2	2020-2030	Potable Water Service Areas North/South Interconnect - Phase 3	Planning/Project Development	$ 177,750	9	0.75	$ 19,750						$ 177,750						
30-4b	3	2	2020-2030	Potable Water Service Areas North/South Interconnect - Phase 4	Design/Permitting/Acquisition	$ 1,007,250	12	1.00	$ 83,938						$ 251,813	$ 755,438					
30-4b	3	2	2020-2030	Potable Water Service Areas North/South Interconnect - Phase 5	Construction	$ 8,680,100	12	1.00	$ 723,342							**$ 2,170,025**	$ 6,510,075				
											Year Totals	**$ 852,272**	**$ 3,266,222**	**$ 17,179,004**	**$ 9,165,573**	**$ 3,071,972**	**$ 6,619,957**	**$ -**	**$ -**	**$ -**	**$ -**
30-5	4	2	2020-2030	East/West Connector - 24-inch Water Main Extension	Administration	$ 447,440	48	4.00	$ 9,322			$ 111,860	$ 111,860	$ 111,860	$ 111,860						
30-5	4	2	2020-2030	East/West Connector - 24-inch Water Main Extension	Planning/Project Development	$ 263,250	12	1.00	$ 21,938			$ 263,250									
30-5	4	2	2020-2030	East/West Connector - 24-inch Water Main Extension	Design/Permitting/Acquisition	$ 1,491,750	12	1.00	$ 124,313				$ 1,491,750								
30-5	4	2	2020-2030	East/West Connector - 24-inch Water Main Extension	Construction	$ 8,773,000	24	2.00	$ 365,542					$ 4,386,500	$ 4,386,500						
											Year Totals	**$ 375,110**	**$ 1,603,610**	**$ 4,498,360**	**$ 4,498,360**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
30-6	5	2	2020-2030	Northwest Service Area Redundant Water Transmission Main Crossing I-75	Administration	$ 64,940	33	2.75	$ 1,968			$ 23,615	$ 23,615	$ 17,711							
30-6	5	2	2020-2030	Northwest Service Area Redundant Water Transmission Main Crossing I-75	Planning/Project Development	$ 38,250	9	0.75	$ 4,250			$ 38,250									
30-6	5	2	2020-2030	Northwest Service Area Redundant Water Transmission Main Crossing I-75	Design/Permitting/Acquisition	$ 216,750	12	1.00	$ 18,063			$ 54,188	$ 162,563								
30-6	5	2	2020-2030	Northwest Service Area Redundant Water Transmission Main Crossing I-75	Construction	$ 1,272,000	12	1.00	$ 106,000				$ 318,000	$ 954,000							
											Year Totals	**$ 116,052**	**$ 504,177**	**$ 971,711**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
											Subtotal 2020-2030 Plan	**$ 5,026,492**	**$ 17,322,108**	**$ 106,656,996**	**$ 15,032,833**	**$ 4,440,872**	**$ 9,357,757**	**$ 2,737,800**	**$ 2,593,276**	**$ 867,935**	**$ 289,312**

2030-2040 Cost Estimates and Preliminary Spend Plan - 2019 $$

Project ID	Map ID	Priority	Planning Period	Project Description	Project Phase	2019 Cost Estimate	Project Duration	Duration (Years)	Cost/Project Month	Project Start	Project End	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
40-1	6	1	2030-2040	Green Meadows WTP Expansion to 19 MGD	Administration	$ 1,748,450	42	3.50	$ 41,630			$ 499,557	$ 499,557	$ 499,557	$ 249,779						
40-1	6	1	2030-2040	Green Meadows WTP Expansion to 19 MGD	Planning/Project Development	$ 1,028,500	12	1.00	$ 85,708			$ 1,028,500									
40-1	6	1	2030-2040	Green Meadows WTP Expansion to 19 MGD	Design/Permitting/Acquisition	$ 4,114,000	12	1.00	$ 342,833				$ 4,114,000								
40-1	6	1	2030-2040	Green Meadows WTP Expansion to 19 MGD	Construction	$ 37,675,050	18	1.50	$ 2,093,058					$ 25,116,700	$ 12,558,350						
											Year Totals	**$ 1,528,057**	**$ 4,613,557**	**$ 25,616,257**	**$ 12,808,129**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
40-2	7	1	2030-2040	Northeast Service Area 16-inch Water Transmission Main	Administration	$ 345,950	36	3.00	$ 9,610			$ 115,317	$ 115,317	$ 115,317							
40-2	7	1	2030-2040	Northeast Service Area 16-inch Water Transmission Main	Planning/Project Development	$ 203,500	12	1.00	$ 16,958			$ 203,500									
40-2	7	1	2030-2040	Northeast Service Area 16-inch Water Transmission Main	Design/Permitting/Acquisition	$ 814,000	12	1.00	$ 67,833				$ 814,000								
40-2	7	1	2030-2040	Northeast Service Area 16-inch Water Transmission Main	Construction	$ 7,454,550	12	1.00	$ 621,213					$ 7,454,550							
											Year Totals	**$ 318,817**	**$ 929,317**	**$ 7,569,867**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
40-3	8	1	2030-2040	Northwest 16-inch Water Transmission Main Extension	Administration	$ 117,130	33	2.75	$ 3,549			$ 42,593	$ 42,593	$ 31,945							
40-3	8	1	2030-2040	Northwest 16-inch Water Transmission Main Extension	Planning/Project Development	$ 68,900	9	0.75	$ 7,656			$ 68,900									
40-3	8	1	2030-2041	Northwest 16-inch Water Transmission Main Extension	Design/Permitting/Acquisition	$ 275,600	12	1.00	$ 22,967			$ 68,900	$ 206,700								
40-3	8	1	2030-2042	Northwest 16-inch Water Transmission Main Extension	Construction	$ 2,523,370	12	1.00	$ 210,281				$ 630,843	$ 1,892,528							
											Year Totals	**$ 180,393**	**$ 880,135**	**$ 1,924,472**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**
											Subtotal 2030-2040 Spend Plan	**$ 2,027,267**	**$ 6,423,009**	**$ 35,110,596**	**$ 12,808,129**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**

Estimated Major Projects Spend Plan through 2040									
Project ID	Description	FY 19/20	FY 20/21	FY 21/22	FY 22/23	FY 23/24	2025-2030	2031-2040	Start Year
30-1	North Lee County Water Treatment Plant 15.0 MGD Wellfield Expansion	$ 6,827,448	$ 49,462,054	$ -					FY19/20
30-2	North Lee County Water Treatment Plant Expansion to 15.0 MGD	$ 1,428,035	$ 4,619,685	$ 33,466,279					FY19/20
30-3	Neighborhood Fireflow Improvement Program	$ 144,524	$ 500,965	$ 1,079,588	$ 1,368,900	$ 1,368,900	$ 10,607,800		FY19/20
30-4a/4b	Potable Water Service Areas North/South Interconnect - Phase 1 and 2				$ 852,272	$ 3,266,222	$ 40,085,004		FY22/23
30-5	East/West Connector - 24-inch Water Main Extension						$ 13,381,110		2025
30-6	Northwest Service Area Redundant Water Transmission Main Crossing I-75						$ 1,900,052		2025
40-1	Green Meadows WTP Expansion to 19 MGD							$ 61,621,000	2031
40-2	Northeast Service Area 16-inch Water Transmission Main							$ 12,105,000	2031
40-3	Northwest 16-inch Water Transmission Main Extension							$ 4,498,000	2036
	Total	$ 8,400,008	$ 54,582,704	$ 34,545,867	$ 2,221,172	$ 4,635,122	$ 65,973,966	$ 78,224,000	

[1]Inflation of 2.5% applied to years 2025-2040.