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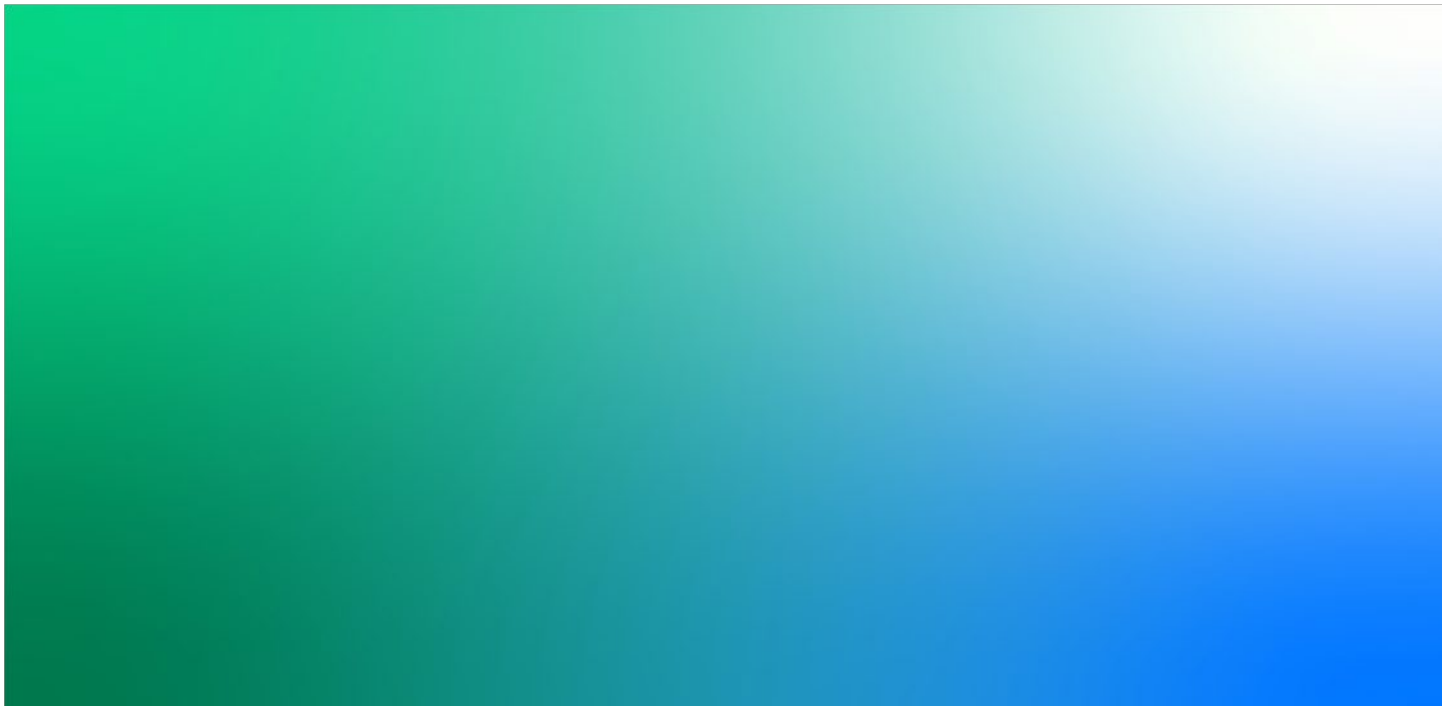
2020 Service Delivery Plan Update
Infrastructure Element
Capital Improvement Element

August 2020

Athens-Clarke County Public Utilities Department



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Acronyms and Abbreviations

7Q10	the lowest average discharge during 7 consecutive days, occurring once every 10 years on average as determined by USGS
AADD	average annual daily demand
ACC	Athens-Clarke County
ACCGov	Unified Government of Athens-Clarke County
BOD_5	5-day biological oxygen demand
cfs	cubic feet per second
CC	Cedar Creek
CH2M	CH2M HILL Engineers, Inc.
DEP	district energy plants
DIP	ductile iron pipe
d/D	ratio of peak flow depth during design storm event divided by diameter of the pipe
DWF	dry-weather flow
EBPR	enhanced biological phosphorus removal
GAEPD	Georgia Department of Natural Resources, Environmental Protection Division
GDOT	Georgia Department of Transportation
GIS	geographic information system
gpd	gallons per day
GWI	groundwater infiltration
Jacobs	Jacobs Engineering Group Inc.
KPI	key performance indicator
LF	linear feet
LMO	Lower Middle Oconee
M&C	Mayor and Commission
MDD	maximum day demand
mg/L	milligrams per liter
MG	million gallons
MGD	million gallons per day
MMAD	maximum month average day
MN	McNutt
MO	Middle Oconee
MOU	Memorandum of Understanding
N/A	not applicable

NO	North Oconee
NPDES	National Pollutant Discharge Elimination System
NPR	non-potable reuse
O&M	operations and maintenance
PFAS	per- and polyfluoroalkyl substances
PUD	Public Utilities Department
RDII	rainfall-derived inflow and infiltration
SDP	Service Delivery Plan
SPLOST	special-purpose local-option sales tax
SSES	sanitary sewer evaluation survey
TCE	Trail Creek East
TCW	Trail Creek West
TP	total phosphorus
UGA	University of Georgia
UNO	Upper North Oconee
UV	ultraviolet
VFD	variable frequency drive
WRF	water reclamation facility
WTP	water treatment plant
WWF	wet-weather flow

Definitions

Collection system – A collection system is composed of gravity pipes, force mains, and lift stations that convey wastewater from residential and non-residential customers and convey the flow to the different water reclamation facilities.

Collector lines – Collector lines are a network of pipelines that are typically 6 to 8 inches in diameter that convey wastewater to and from trunk and interceptor lines. They typically connect the service lines into the wastewater collection system.

Distribution and transmission pipelines – Distribution and transmission pipelines convey drinking water to commercial, industrial and residential customers.

Effluent – Effluent refers to the treated wastewater that is discharged from the water reclamation facilities.

Force mains – Force mains are pipelines that convey wastewater under pressure and require pumping.

Gravity pipes – Gravity pipes are pipelines that convey wastewater via gravity and do not require pumping.

Potable water – Potable water is treated water for drinking purposes.

Pump stations - A pump station is designed to receive, store and pump the wastewater to its next destination.

Septic systems – Septic systems are privately owned and operated wastewater systems in the form of septic tanks by individual customers.

Service lines – Service lines in drinking water are pipelines that are part of the water distribution system that convey water from the distribution and transmission mains to the individual customers and fire protection systems. Service lines in wastewater collect wastewater from customers and convey them to collector lines. Service lines establish customer connections and are funded by the customers themselves.

Sub-basin – Basins and sub-basins are defined by the natural drainage of the land. This natural drainage divides ACC into 15 basins and 73 sub-basins.

Trunks and interceptors – Trunks and interceptors are gravity pipelines that collect wastewater from collector lines. Interceptors are typically 8 to 18 inches and are found along streams. Trunks range from 12 to 54 inches and are found along the rivers (Middle Oconee, North Oconee and Oconee).

Water distribution system or distribution system - A network of pipes such as distribution and transmission mains, and service lines to convey potable water from drinking water treatment plants to individual customers and fire protection systems.

Section 1
Infrastructure Element

1. Introduction

The Unification Charter of the Unified Government of Athens-Clarke County (ACCGov) required a plan for providing water and wastewater services to all residents be developed and adopted by January 1995. In accordance with this requirement, the Athens-Clarke County (ACC) Public Utilities Department (PUD) developed a Service Delivery Plan (SDP) that consisted of three major elements:

- Infrastructure Element, which evaluates the water and wastewater system needs over a 20-year planning period and identifies improvements to address these needs,
- Capital Improvements Element, which prioritizes the recommended improvements, and
- Financial Element, which outlines a schedule and financial plan for implementing the identified improvements.

PUD's goal is to update the SDP on a 5-year cycle, or in response to regulatory drivers or the adoption of updated Future Development Maps by ACC Mayor and Commission (M&C). The 2020 SDP Infrastructure Element was developed using the following phased approach:

1) Review ACC PUD goals and objectives for water and wastewater service, as well as strategies to accomplish these goals (described in Section 1).
2) Assess existing water and wastewater system (described in Section 2).
3) Identify future water and wastewater system needs (described in Section 3) based on:
    - Official Future Development Map of ACC (latest adopted by M&C in July 2018) and associated population projections developed by the ACC Planning Department
    - 2018 Comprehensive Plan (ACCGov, 2018), Envision Athens Action Agenda (ACCGov, 2017), and associated population projections as developed by ACCGov Planning Department
    - Evaluation of existing infrastructure's capability to meet existing and projected future needs
4) Identify system alternatives and improvements to address existing and future needs (described in Section 4).

1.1 Service Delivery Plan Goals and Objectives

The goals of the SDP, as defined by PUD, are to:

- Comply with the Unification Charter that requires ACCGov to adopt a plan to provide water and wastewater services to all residents as defined herein.
- Develop a plan that supports water and wastewater needs, as determined by the ACC Comprehensive Plan (ACCGov, 2018) adopted by M&C and associated fire protection services.
- Provide water and wastewater services to the ACC population using an infrastructure design that will protect or improve water quality, protect public investments including conservation and recreational green spaces, and avoid impacts to environmentally sensitive areas such as wetlands, buffers, and floodplains.
- Plan expansions and extensions of service according to the ACC's Future Development Map, recognizing that infrastructure influences long-term development patterns.
- Support existing Watershed Protection Programs with the intent to maintain or improve water quality standards.

- Align with the Fiscal Year 2021 Mayor and Commission Strategic Commitments and Goals including "improving water supply resiliency and reliability," "aim for 100% clean and renewable energy," and "managing environmentally damaging septic tanks." (ACCGov, 2020)

1.2 Water and Wastewater Service – Definition and Goals

The 1995 Service Delivery Plan included specific definitions of water and wastewater services. These definitions, listed below, have been reviewed and approved by the M&C. This update also defines recycled water service which has not previously been defined.

Water Service is defined as the provision of treated (potable) water supply through ACC-owned, operated, and maintained transmission and distribution lines located outside of developments, along identified major roadways. Additional ACC-owned, operated, and maintained smaller pipelines will be required to connect to service lines to establish customer connections. Service lines are typically funded by the property owner/developer and are not included in the SDP.

PUD's goal is to provide water service to all residents by expanding service in existing areas and new growth areas.

Wastewater Service is defined as the provision of wastewater collection and treatment through sewage treatment facilities, trunk and interceptor lines, and major pump stations and force mains in identified major drainage basins and specified sub-basins. Additional collector and service lines to establish individual customer connections are not included in the SDP. Privately owned individual treatment systems (septic tanks) that meet the ACC Health Department requirements may satisfy the provision for wastewater service planned for low-density development of two units per acre or less.

PUD's initial goal was to provide wastewater service to all residents; however, M&C determined that privately owned individual treatment systems (that is, septic tanks) that meet the ACC Health Department requirements may better serve areas of low-density development. Therefore, PUD's goal for wastewater service is to provide public wastewater collection and treatment to the greatest practicable extent, based on population densities and cost-effectiveness.

Recycled Water Service is defined as the provision of recycled water, treated to an extent appropriate for irrigation, industrial cooling, and other non-drinking purposes, through ACC-owned, operated, and maintained transmission and distribution lines located outside of developments. along major roadways to recycled water customers for beneficial use. Recycled water service provides additional drought resiliency and water supply reliability by reducing potable water demand.

1.3 Strategies to Accomplish Service Goals

To accomplish its **water service goals**, PUD will use the SDP to outline its approach to:

- Install Transmission and Distribution Lines along major roadways, especially in areas not currently served by the distribution system but are planned for growth in the Future Development Map.
- Evaluate the water system based on PUD minimum pressure and velocity operating criteria.
- Evaluate elevated water storage to support future needs, enhance water system operations, and sustain fire protection.
- Provide water service through smaller pipe lines connected to the transmission and distribution lines and eliminate dead-end pipe lines.

- Ensure long-term water quality by meeting future regulatory requirements.
- Improve water supply resiliency and reliability.

To accomplish its **wastewater service goals**, PUD will use the SDP to define a plan to:

- Install trunks, interceptors, and major pump stations/force mains within the M&C approved public service area.
- Provide wastewater service through Collector Lines to approximately 90 percent of ACC residents (approximately 10 percent of residents, located in rural land use areas, may be better served by onsite systems based on population density and cost effectiveness).
- Improve the existing system by expanding pipes, if predicted flows are greater than 75 percent of the pipe's capacity.
- Provide service to the upper 200 acres of each sub-basin.
- Identify and correct areas of high infiltration and inflow (groundwater and stormwater into the system).
- Maintain the integrity of water reclamation facility (WRF) equipment reliability and redundancy.
- Ensure WRF treatment technology produces effluent meeting or exceeding regulatory requirements.

To accomplish its **recycled water service goals**, PUD will use the SDP to define a plan to:

- Install recycled water Transmission and Distribution Lines along major roadways, especially in areas identified as potential future recycled water customers in the *Reuse System Master Plan*. (CH2M, 2018b)
- Evaluate recycled water system based on PUD minimum pressure and velocity operating criteria.
- Evaluate elevated recycled water storage to support future needs and enhance recycled water system operations.
- Ensure long-term recycled water quality by meeting future regulatory requirements.
- Improve water supply resiliency and reliability by reducing potable water demand.

1.4 Implementation Guidelines

ACC PUD plans, designs, and constructs water and wastewater infrastructure with the goal of being dependable, safe, operationally efficient, and easily maintained. Throughout this process, multiple approvals are required by M&C, including project concept and design development, engineering consultant selection, preliminary construction plans, easement acquisitions, and construction bid award. As such, PUD has developed engineering guidelines/recommended practices for various phases of project implementation. These guidelines, summarized below, build upon experience from past projects and from PUD's commitment to avoiding, minimizing, and mitigating environmental impacts.

1.4.1 Conceptual Planning

PUD utilizes the following guidelines during conceptual planning for water and wastewater improvements:

- The SDP provides for flexibility to deliver wastewater service. Gravity sewers are preferred as the long-term, most cost-effective design option for wastewater systems. Alternative designs (including pump stations and force mains) may be considered to avoid environmentally sensitive areas or other constraints on a project-by-project basis.
- Design options for water and wastewater service will be evaluated during the preliminary engineering design phase. The results of this evaluation will be subsequently presented to M&C for approval.

- Pump stations, cluster septic systems, or other decentralized wastewater treatment systems may be considered as a service solution in areas where public wastewater is not available and existing developments are currently experiencing or are expected to experience septic system failures. For communities with failing septic systems, ACC PUD will develop a specific method of providing wastewater service to the subject area, though property owners are responsible for funding their connection to the wastewater system, through collector or service lines.

1.4.2 Preliminary Engineering Design

PUD utilizes the following guidelines during the preliminary engineering design phase for water, wastewater, and recycled water improvements:

- Design infrastructure improvements in such a way as to avoid or minimize impacts to environmentally sensitive areas, public investments such as land conservation or recreational green spaces, and to protect the overall water quality. Proposed routes will be surveyed under the guidance of an ecologist or other environmental professional to identify these sensitive areas.
- Review pump station and force main design options that may apply to the project.
- Review alternative construction strategies and technologies to minimize areas of impact.
- Obtain necessary temporary construction and permanent easements for the project.
- Conduct a Public Outreach Program to solicit input from impacted property owners and the community.
- Conduct coordination meetings with ACCGov departments, the University of Georgia (UGA), and other appropriate agencies.
- Develop an estimated project cost for the project.

1.4.3 Final Engineering Design

PUD utilizes the following guidelines during the final engineering design phase for water, wastewater, and recycled water improvements:

- Continue the coordination of design activities with ACCGov departments, UGA, and other appropriate agencies.
- Stream crossing design goals are to:
  - Evaluate the potential to relocate aerial crossing to below the streambed.
  - Minimize impact area by using appropriate construction strategies and technologies.
  - Restore streambanks to a condition that is equal or superior to the previous conditions prior to construction.
  - Purchase any required mitigation credits.
- Wetland encroachment goals are to:
  - Minimize the impact area through the evaluation and implementation of appropriate construction strategies and technologies.
  - Purchase any required mitigation credits.
- Land disturbance goals are to:
  - Minimize impact area by limiting the constructed width and length of open trenches and other excavations.

- Comply with permits for erosion, sedimentation, and pollution control in compliance with permit requirements.

1.4.4 Design Resources

PUD has adopted the following documents for reference during the design of water, wastewater, and recycled water improvements:

- *Standard Specifications for Wastewater and Water System Construction* (ACC PUD, 2008). Standard specifications and detail drawings have been prepared by PUD to provide qualitative requirements for products, materials, and workmanship for construction of additions to and replacements of the sewer system and water distribution system under the jurisdiction of ACCGov. The latest edition of this document is available from the PUD website.
- *Sanitary Sewer Renewal Design Guidelines* (ACC PUD, 2018). Design Guidelines serve as the guiding principles for the design of sanitary sewer renewal projects associated with the wastewater collection system owned and operated by PUD. This document is intended to serve as a tool for Design Engineers and supplement to the Standard Specifications for Wastewater System Construction (ACC PUD, 2008). The guidelines outline the various methods, technologies, and materials of rehabilitation and replacement approved by PUD for renewal projects.
- *Standard Specifications for Recycled Water System Construction* (ACC PUD, 2019). Standard specifications and detail drawings have been prepared by PUD to provide qualitative requirements for products, materials, and workmanship for construction of additions to and replacements of the recycled water system under the jurisdiction of ACCGov. The latest edition of this document is available from the PUD website.

1.4.5 Construction

During the construction phase, PUD not only meets permit requirements, but also places more stringent limitations on the contractor (for example, restrictions of no more than 1,000 feet of simultaneous construction disturbance and a construction width of no more than 50 feet). Project construction is coordinated with other government agencies to minimize the impact of construction. PUD complies with the ACC Community Tree Management Ordinance (ACCGov Code Title 8, Chapter 8-7) and completes additional riparian restoration efforts, including grassing and tree planting where temporary construction easement encroaches on protected buffers.

2. Assessment of the Existing Water and Wastewater System

The first step in evaluating whether infrastructure is sufficient to meet current and future needs is to assess the existing system. This section outlines the existing PUD water and wastewater system. This information will form the basis for identifying future water and wastewater needs (described in Section 3) and recommended improvements to meet those needs (described in Section 4).

2.1 History of the Water System

From the founding of the City of Athens in 1800 until the year 1880, water supply for domestic use and fire protection was available from wells and a limited number of cisterns in the downtown area. A private water company constructed the first water works in the city in 1880. By the early 1890s, the City of Athens terminated the private company's franchise and constructed a municipal water works. This municipal system was a filter plant with an initial capacity of 1 million gallons per day (MGD), a 175,000-gallon treated water storage tank, and 16 miles of water lines.

During the mid-1930s, the original filter plant was abandoned, and a new water treatment facility was constructed at the site of the current J.G. Beacham Water Treatment Plant (WTP). The new facility had a capacity of 3 MGD and included settling basins, sand filters, and mechanical equipment for chemical dosing. The City of Athens also constructed a raw water pumping station on the North Oconee River, additional distribution lines, and an elevated storage tank. From 1950 through the 1980s, water system projects included a series of expansions and improvements to the WTP, construction of additional raw water intakes and pump stations on the North Oconee and Middle Oconee Rivers, and a continuous installation of water mains and elevated storage tanks throughout ACC. During this time, water service was extended to the cities of Winterville and Bogart, and to Oconee, Jackson, Madison, and Oglethorpe counties.

Prior to this 2020 SDP Update, major improvements to the water system were completed, including construction of new water mains throughout ACC, a new rapid mix basin, new finished water pumping, raw water pumping improvements, backup diesel generators, improved treatment process facilities, chemical storage and feed facilities, two elevated finished water storage tanks, improvements to the lagoon drain structure and embankments, and operations building remodeling. Additionally, significant improvements to the water distribution system have been made, using funds from special-purpose local-option sales tax (SPLOST). PUD has recently replaced all the water distribution lines in downtown Athens, because of their age and/or condition, to improve water quality and increase fire protection. To date, water distribution lines have been constructed on every public roadway with a structure in ACC.

2.2 Existing Water System

The ACC water system today has a design capacity of 36 MGD and a permitted peak day capacity of 34.75 MGD. The system produces high quality drinking water that complies with all current federal and state standards to nearly all of ACC residential, commercial, governmental, and industrial users within its political boundaries. Approximately 2 percent of the population maintains private wells for water supply, and another small portion receives water from 1 of 9 private community water systems in operation, serving a total population of approximately 2,300 individuals (GAEPD, 2019). The existing ACC water system, as well as locations of the private water system, are shown on Figure 2-1. Details of the water system are provided in the following sections.

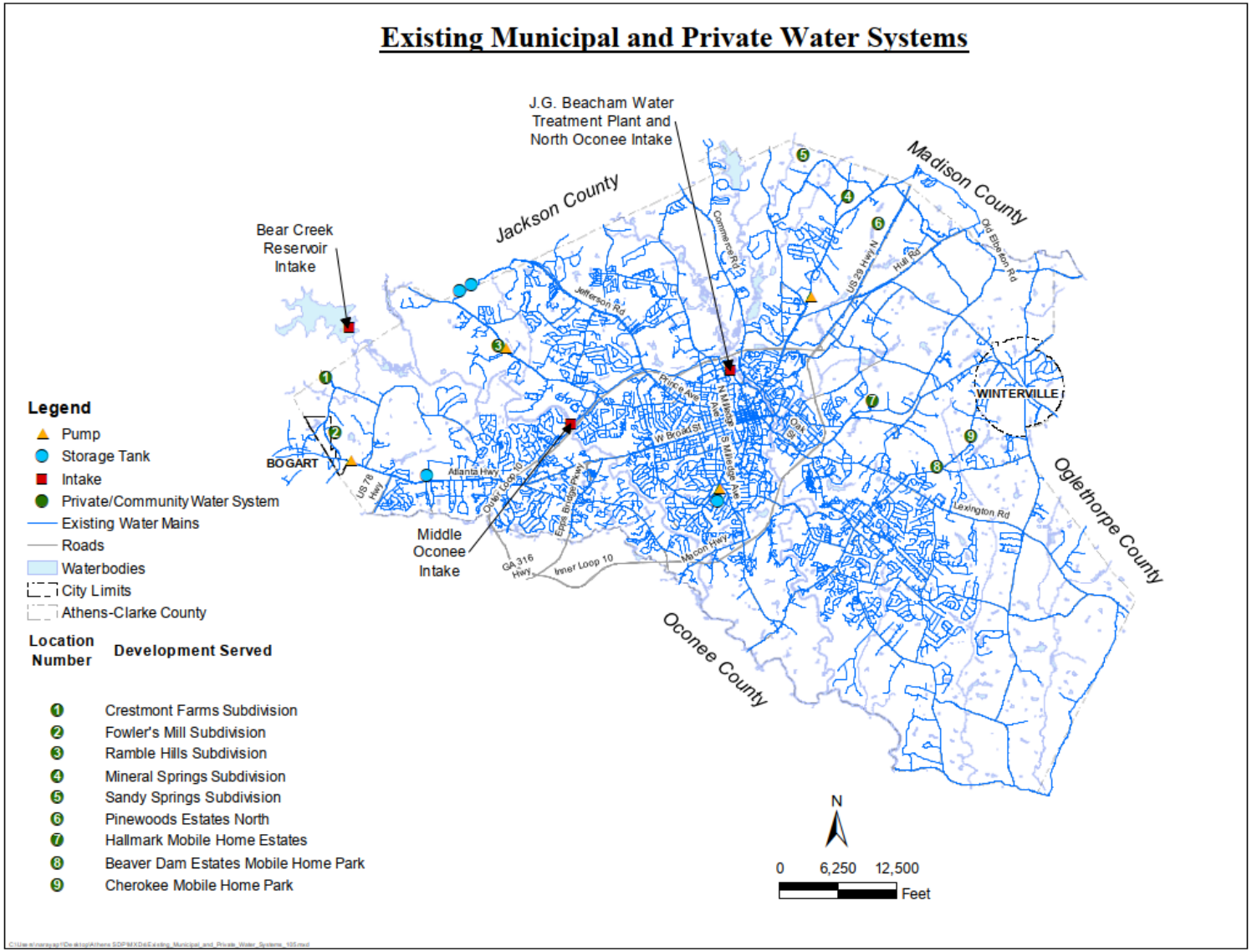

Figure 2-1: Existing Municipal and Private Water Systems
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2.2.1 Water Supply

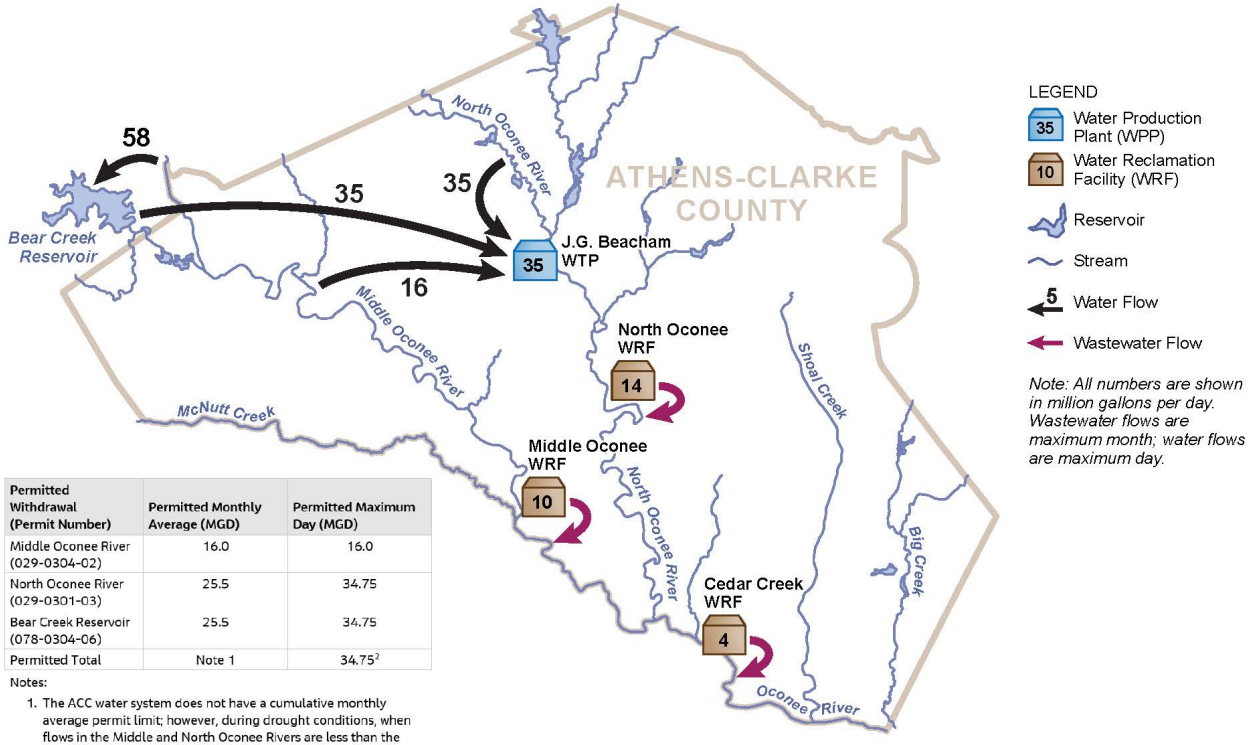
Raw water for the ACC water system is withdrawn from the North Oconee River and Middle Oconee River and from the Bear Creek Reservoir (Figure 2-2). ACC is permitted to withdraw up to a combined total of 34.75 MGD (maximum day) from these sources (Table 2-1).

PUD is permitted to withdraw from the North Oconee River, at the J.G. Beacham WTP, when flow is greater than 7Q10 (the lowest average discharge during 7 consecutive days, occurring once every 10 years on average) of 31.6 cubic feet per second (cfs). PUD's permitted withdrawal from the North Oconee River is 34.75 MGD maximum day, 25.5 MGD monthly average.

PUD is permitted to withdraw from the Middle Oconee River, just upstream of U.S. Highway 29, when flow is greater than 7Q10 (44.4 cfs). Permitted withdrawal from the Middle Oconee River is 16 MGD maximum day, 16 MGD monthly average.

The Bear Creek Reservoir was constructed in June 2002 and provides off-stream storage for ACC, as well as for Barrow, Jackson, and Oconee counties. The Bear Creek Reservoir was designed to provide low flow protection to the Middle and North Oconee Rivers and must be operated to pass flows equal to 4.0 cfs (the 7Q10 downstream of the reservoir) or greater at all times. The permitted yield of the Bear Creek Reservoir for all four counties is a monthly average 58 MGD and a maximum day 79 MGD. The ACC allotment of this yield is 44 percent (monthly average 25.5 MGD and maximum day 34.75 MGD).

Permitted Raw Water Withdrawals and Wastewater Discharges



Permitted Withdrawal (Permit Number)	Permitted Monthly Average (MGD)	Permitted Maximum Day (MGD)
Middle Oconee River (029-0304-02)	16.0	16.0
North Oconee River (029-0301-03)	25.5	34.75
Bear Creek Reservoir (078-0304-06)	25.5	34.75
Permitted Total	Note 1	34.75[2]

Notes:

1. The ACC water system does not have a cumulative monthly average permit limit; however, during drought conditions, when flows in the Middle and North Oconee Rivers are less than the 7Q10, the Bear Creek Reservoir is the only available water source.
2. The ACC water system can withdraw raw water from three sources but cannot exceed a combined maximum of 34.75 MGD

Figure 2-2: Permitted Raw Water Withdrawals and Wastewater Discharges
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Table 2-1: Permitted Raw Water Withdrawal
2020 Service Delivery Plan Update – Infrastructure Element

Permitted Withdrawal (Permit Number)	Permitted Monthly Average (MGD)	Permitted Maximum Day (MGD)
Middle Oconee River (029-0304-02)	16.0	16.0
North Oconee River (029-0301-03)	25.5	34.75
Bear Creek Reservoir (078-0304-06)	25.5	34.75
Permitted Total	Note 1	34.75[2]

Notes:

1. The ACC water system does not have a cumulative monthly average permit limit; however, during drought conditions, when flows in the Middle and North Oconee Rivers are less than the 7Q10, the Bear Creek Reservoir is the only available water source.
2. The ACC water system can withdraw raw water from three sources but cannot exceed a combined maximum of 34.75 MGD (maximum day).

Raw water flow is pumped from the Bear Creek Reservoir to the J.G. Beacham WTP through two 36-inch ductile iron pipe (DIP) raw water mains that were installed in 2000. The length of pipeline from the Bear Creek Reservoir pump station to the WTP is approximately 12,000 linear feet (LF).

2.2.2 Water Treatment

The J.G. Beacham WTP, located adjacent to the North Oconee River on Barber Street, is the only facility operated by PUD for potable water treatment. The plant was originally constructed in 1935 and has been expanded and upgraded several times. In 2009, major improvements to the WTP were completed, including expansion from 28 MGD to peak day design capacity of 36 MGD. These improvements were designed to meet future demands and to ensure performance reliability and regulatory compliance with current and future drinking water regulations. In 2011, the permitted capacity of J.G. Beacham WTP was increased to 34.75 MGD (Permit CS0590000).

Figure 2-3 provides a site plan of the J.G. Beacham WTP. Note that the site plan includes the proposed location of the recommended future solids handling facility and the future drinking water regulations treatment project, which are discussed in Section 4. Current treatment processes include removal of suspended particles through flocculation, filtration through multimedia filters, ultraviolet (UV) disinfection, and fluoridation. Finished water is stored in two 3.5-million gallon (MG) clear wells before being pumped to the distribution system. The WTP has a pair of 2.0-megawatt backup diesel generators that supply emergency power during outages.

Table 2-2 summarizes J.G. Beacham WTP water production between 2006 and 2019. From 2007 to 2008, water production substantially decreased, and remained fairly stable from 2008 through 2011. Water production decreased again to a new stabilized level from 2012 through 2019. The decrease in water production can be attributed to water conservation efforts taken in response to drought conditions, as well as an economic downturn. These production values were used to develop a water use profile for ACC and associated water demands, which are discussed in Section 3.2.

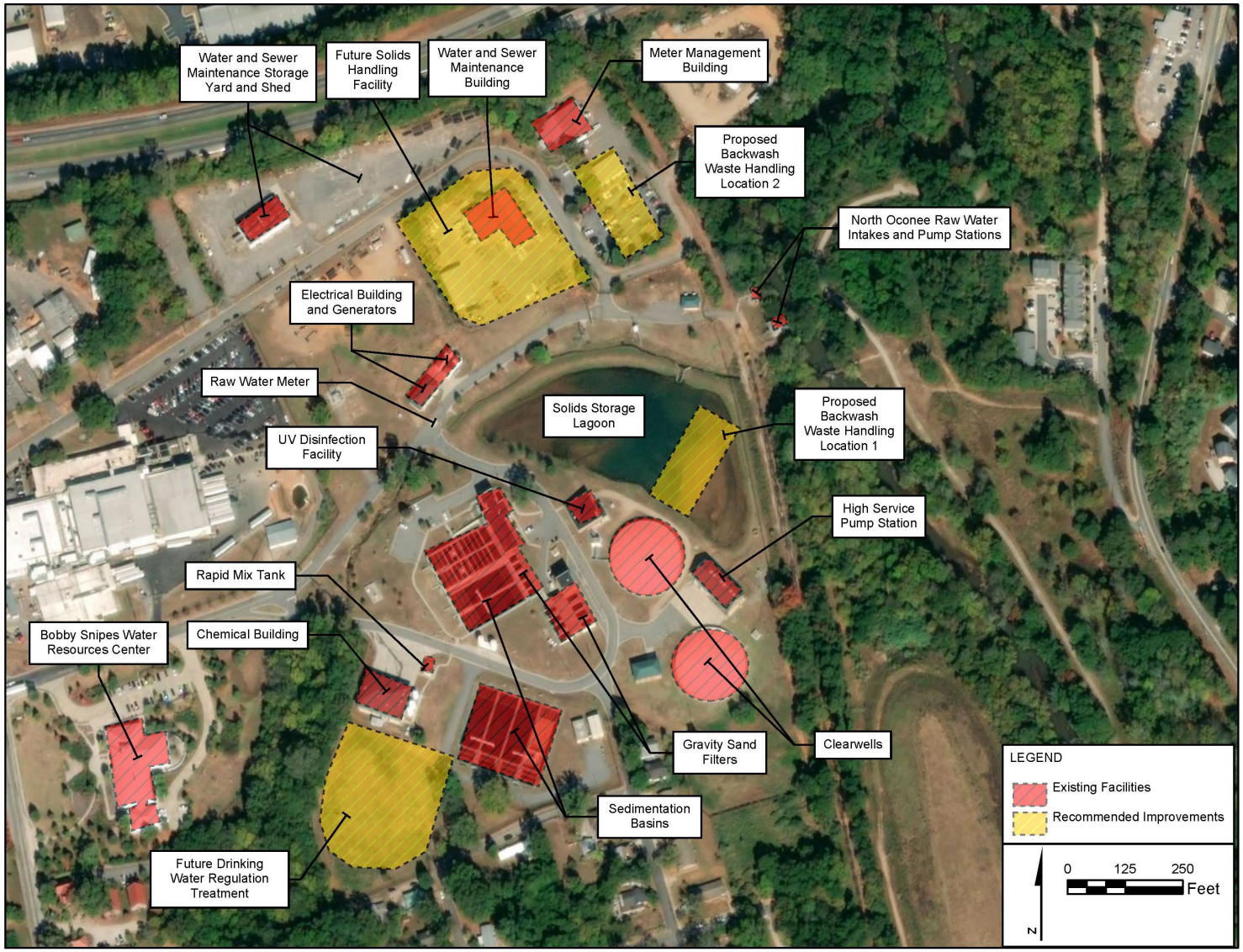

Figure 2-3: J.G. Beacham Water Treatment Plant Site Plan
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Table 2-2: Water System Production
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Year	Annual Average Daily Production (MGD)	Maximum Day Production (MGD)
2006	17.2	25.4
2007	16.2	27.6
2008	13.6	18.0
2009	13.4	17.9
2010	13.1	16.8
2011	13.2	17.4
2012	12.3	15.5
2013	11.3	15.2
2014	12.0	16.2
2015	12.1	16.2
2016	12.6	15.1
2017	12.1	15.0
2018	12.5	15.5
2019	12.7	16.0

2.2.3 Solids Handling

J.G. Beacham WTP solids are treated passively using a 3-acre, onsite lagoon. The WTP processes generate solids from two major sources: chemical precipitates that settle in the sedimentation basins, which are a result of mixing alum, lime, and potassium permanganate with raw water, and solids in the filter backwash. These solids are produced at an approximate rate of 500 pounds per million gallons of water and are discharged into the WTP's lagoon. As settling occurs, clear water is decanted and discharged into the North Oconee River under the National Pollutant Discharge Elimination System (NPDES) permit GAG640000. The lagoon is periodically dredged to remove the accumulation of solids. Currently, there are no facilities at the WTP to mechanically dewater waste solids generated by the treatment process.

2.2.4 Water Distribution

The ACC PUD water distribution system (Figure 2-1) includes approximately 810 miles of water lines and supplies service to approximately 41,300 customer accounts. The system consists of water distribution and transmission mains with associated smaller pipelines connecting to the service lines of individual customers. The pipes range in size from 2 to 48 inches in diameter. PUD owns, maintains, and operates all of these water lines. However, service lines are typically funded by property owners or developers; therefore, recommendations for new or improved service lines are not included in the SDP.

The water distribution system consists of four high service pumps at the J.G. Beacham WTP, one repump station, and three booster pump stations. One repump station (Five Points Pump Station) is located at the ground storage tank, two pump stations (Northeast and Northwest Pump Stations) deliver water to the elevated tanks located in the northeastern and northwestern portions of the service area, and one station (Bogart Pump Station) serves the Bogart area. There are four tank sites in the water distribution system with a cumulative storage volume of 4.35 MG (Northwest, Northeast, Atlanta Highway, and Five Points). Ownership of the decommissioned Hull Road tank was conveyed to Athens Technical College. The Hull Road tank is no longer connected to PUD's water distribution system.

The ACC water distribution system was initially evaluated using a hydraulic model developed in 1984. The hydraulic model was updated in 2010, and in 2018 to 2019, it was recalibrated to include new pipes, hydrants, fittings, and valves. The detailed hydraulic analysis of the distribution system that was completed for the 2019 Water Model Update described in *Water Distribution System Calibration and Deficiency Analysis* technical memorandum (Jacobs/CH2M, 2019b) indicated that the existing distribution system could satisfy current residential, commercial, and industrial demands.

2.3 History of the Wastewater System

Wastewater collection sewer pipes were first installed in the City of Athens and Clarke County in the late 1880s, around the same time that the water system was being established. The first sewer pipes were installed in the downtown area of the City of Athens and were primarily constructed of vitrified clay, in 2- to 3-foot segments. Early, small-scale wastewater treatment systems included private septic tanks, oxidation ponds, and package plants. These systems were often independent from one another and scattered throughout ACC until the early 1980s.

In 1962, the City of Athens constructed a Water Reclamation Facility (WRF) on the North Oconee River to serve its central business district and industrial areas northeast of the city. In 1964, the City constructed a second WRF on the Middle Oconee River. In 1979, the Cedar Creek WRF was constructed, primarily to treat wastewater from the southeastern portion of Clarke County. Since construction of the WRFs, several improvements have been made to wastewater infrastructure in ACC. During the 1970s, the City of Athens extended sewer interceptors to 27 oxidation ponds and package plants, some of which were not treating wastewater to current standards. Additionally, each of the three WRF facilities have been expanded or replaced. Replacement of the North Oconee WRF was completed in March 2012, and replacement of the Cedar Creek WRF was completed in July 2011. Upgrades and expansions of the Middle Oconee WRF were completed in August 2012. ACC WRF improvements included the influent pump stations, headworks facilities, advanced secondary activated sludge systems, secondary clarifiers, UV disinfection, post-aeration, aerated sludge holding, centrifuge dewatering systems, and odor control systems for each WRF.

Each of the three WRFs were initially operated to provide secondary treatment with trickling filters, with a total capacity of 9 MGD (Table 2-3). With the most recent upgrades and expansions, the combined capacity of the three facilities is 28 MGD. Figure 2-2 shows PUD's permitted monthly average wastewater discharges.

Table 2-3: Initial and Expanded Capacity of ACC WRFs
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Water Reclamation Facility	Initial Capacity (MGD)	Expanded Capacity (MGD)
North Oconee WRF	5	14
Middle Oconee WRF	2	10
Cedar Creek WRF	2	4
Total	9	28

2.4 Existing Wastewater System

ACC PUD currently provides wastewater collection and treatment to ACC industrial and commercial users and to approximately 75 percent of the residential population. This section details the PUD wastewater system, as well a private wastewater system and areas served by private septic systems. As wastewater collection is influenced by the natural drainage of the land, a discussion of the drainage basins in ACC is provided first.

2.4.1 Drainage Basins

With the exception of a small portion in the northeastern corner (Sulphur Springs), land within ACC drains to the Oconee River Basin. Drainage basins separate ACC into 15 major drainage basins and 73 drainage sub-basins (Figure 2-4). Of the 73 sub-basins, 70 are included in either the North Oconee, Middle Oconee, or Cedar Creek drainage basins. Three sub-basins (Little Bear Creek, Sulphur Springs, and Big Creek) and portions of other sub-

basins are located in low-density development areas that have been identified as being better served by onsite septic systems.

The North Oconee drainage basin includes approximately 56,500 people (based on ACC Economic Development 2020 population projections) and encompasses 40 square miles. The drainage basin includes the downtown business district, UGA, and all of the major industrial districts. The Middle Oconee drainage basin includes approximately 49,000 people and encompasses 33 square miles. The drainage basin includes mostly residential and commercial developments. The population of Cedar Creek drainage basin is nearly 25,500 people and encompasses 31 square miles. It is the least populated of the three basins and comprises primarily residential areas.

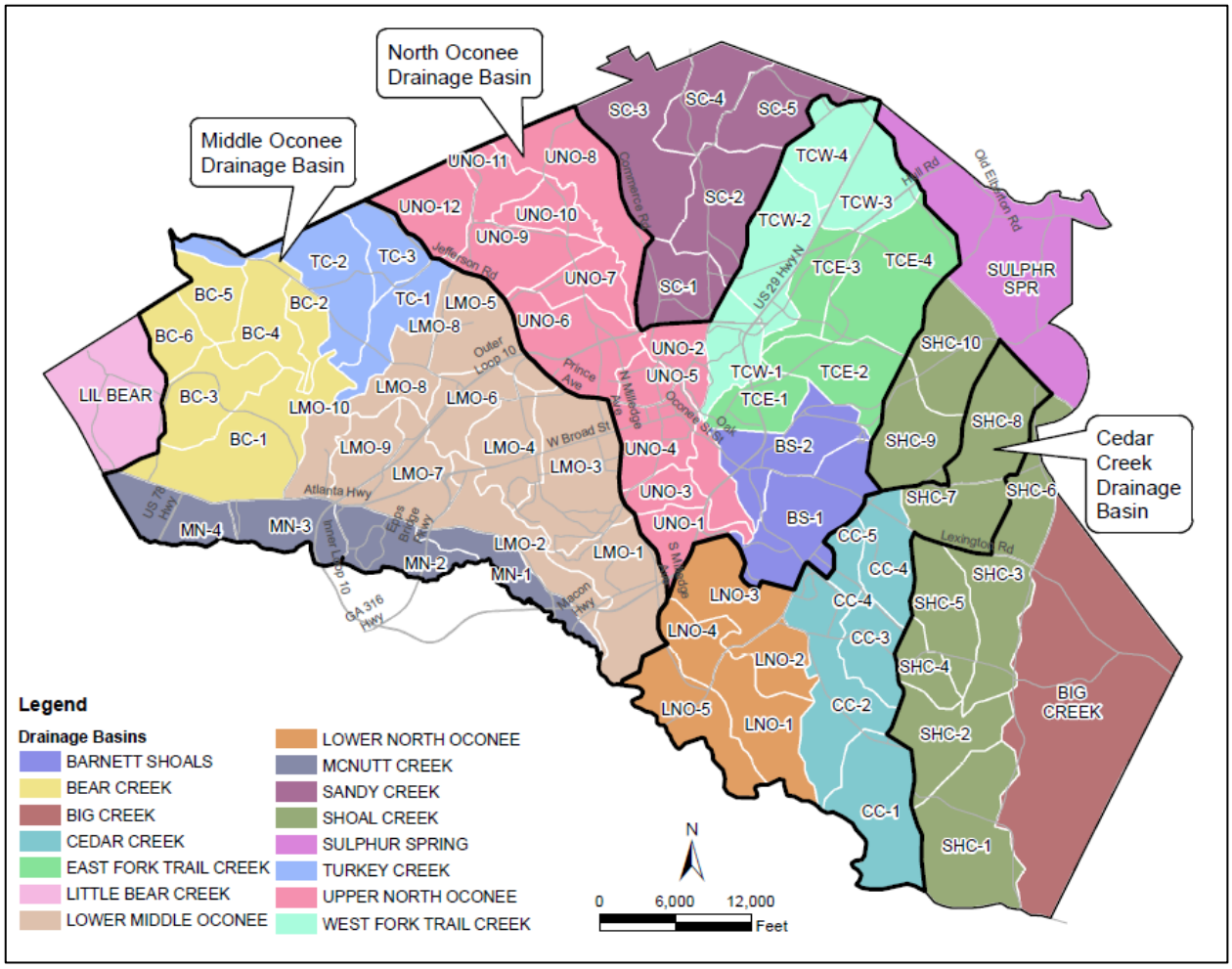

Figure 2-4: Drainage Basins
2020 Service Delivery Plan Update – Infrastructure Element

2.4.2 Wastewater Collection

2.4.2.1 Public Wastewater

PUD's wastewater Service Area is comprised of three major Service Areas: North Oconee, Middle Oconee, and Cedar Creek WRF Service Areas (Figure 2-5). The PUD wastewater collection system consists of approximately 487 miles of gravity sewers and one pump station (Weatherly Woods Pump Station), which serves approximately 2.5 miles of force main piping. Gravity sewer pipes range in size from 8 to 54 inches in diameter and include trunks (pipes along the Middle Oconee, North Oconee, or Oconee River), interceptors (pipes along streams or as outfalls), and smaller collectors and service lines, which are required to establish customer connections.

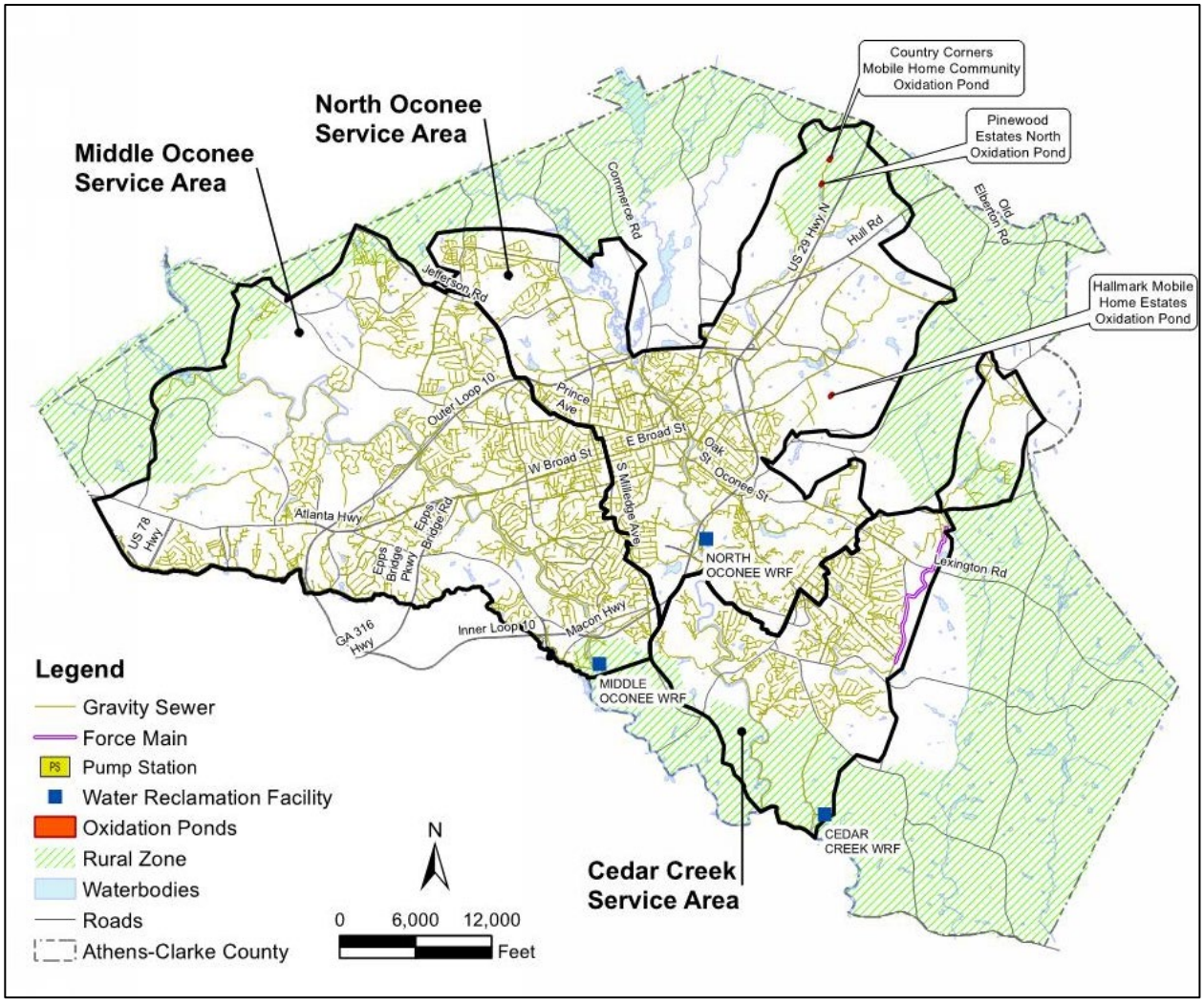

Figure 2-5: Wastewater Service Area
2020 Service Delivery Plan Update – Infrastructure Element

Figures 2-6 through 2-8 provide the layout of North Oconee, Middle Oconee, and Cedar Creek Service Areas, including all of the trunks, interceptors, and collectors. The North Oconee WRF Service Area includes approximately 175 miles of gravity sewer lines, ranging in size from 8 to 54 inches in diameter. The Middle Oconee WRF Service Area includes approximately 229 miles of gravity sewer, ranging in size from 8 to 42 inches in diameter. The Cedar Creek WRF Service Area was originally developed to eliminate several small treatment systems. Within the Cedar Creek WRF Service Area are 83 miles of gravity sewer pipe, ranging from 8 to 36 inches in diameter. Additionally, a pump station located in the Weatherly Woods Subdivision transfers wastewater flow via 2.5 miles of force main from the Upper Shoals Creek Basin to the Cedar Creek Interceptor.

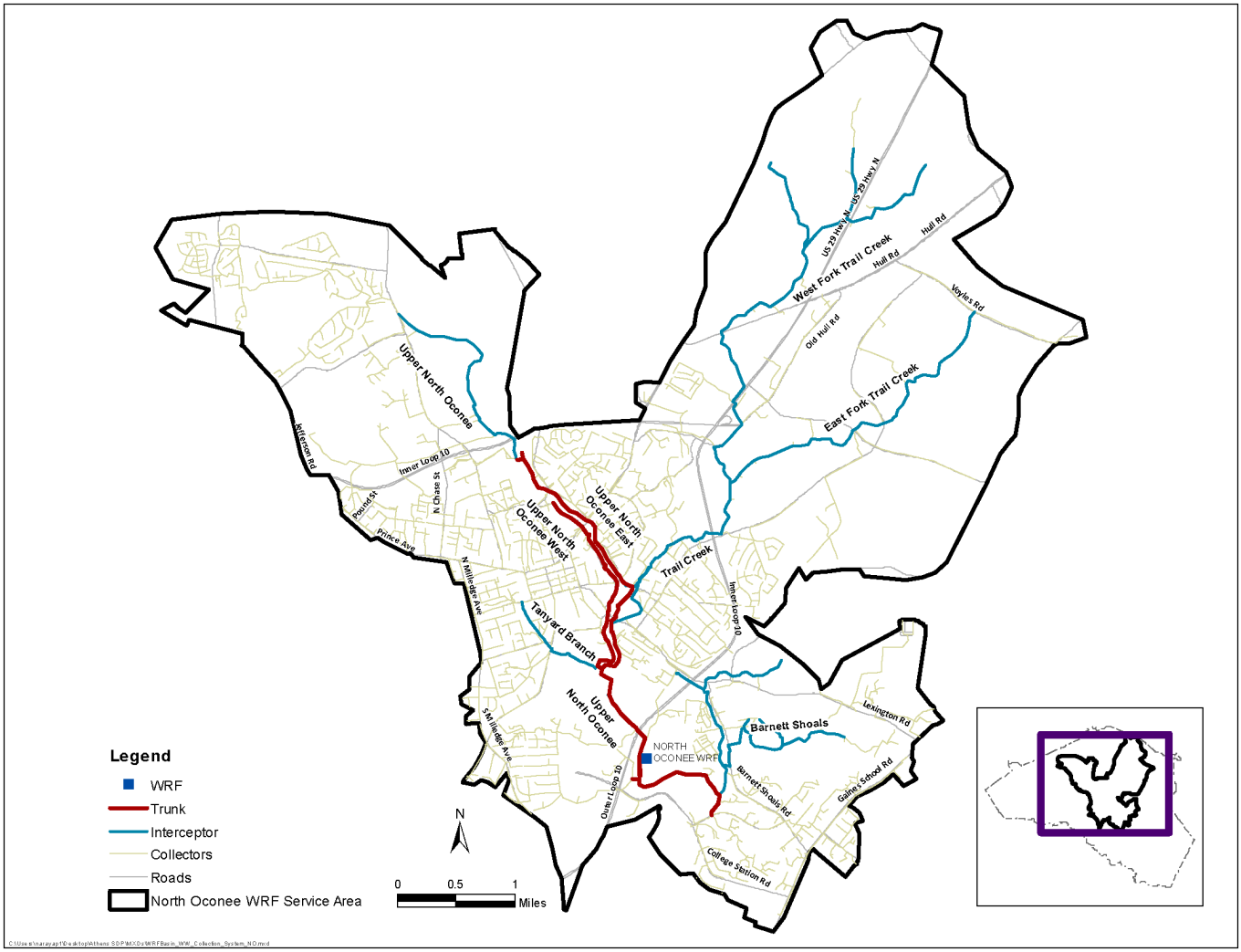

Figure 2-6: North Oconee WRF Service Area – Wastewater Collection System
2020 Service Delivery Plan Update – Infrastructure Element

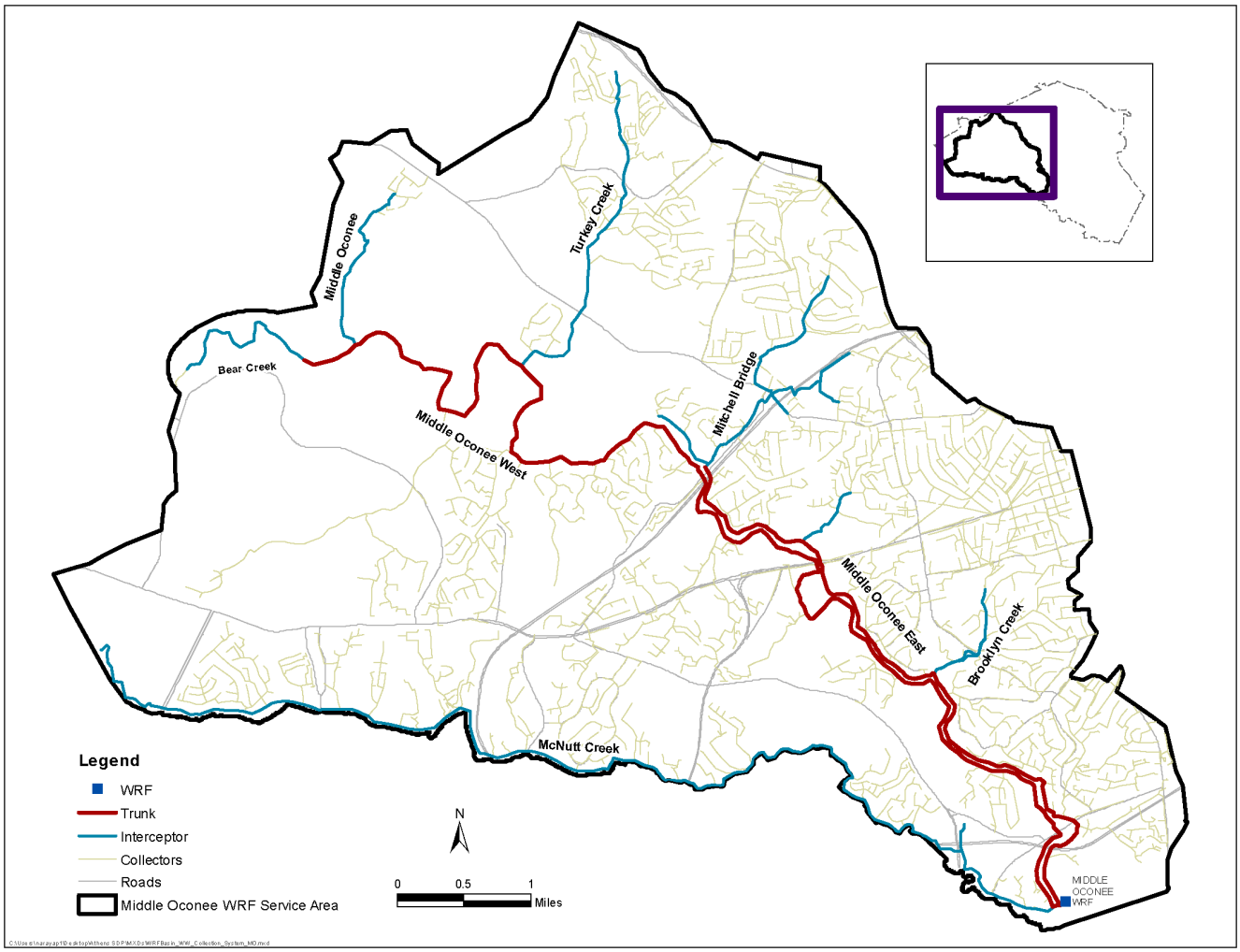

Figure 2-7: Middle Oconee WRF Service Area – Wastewater Collection System
2020 Service Delivery Plan Update – Infrastructure Element

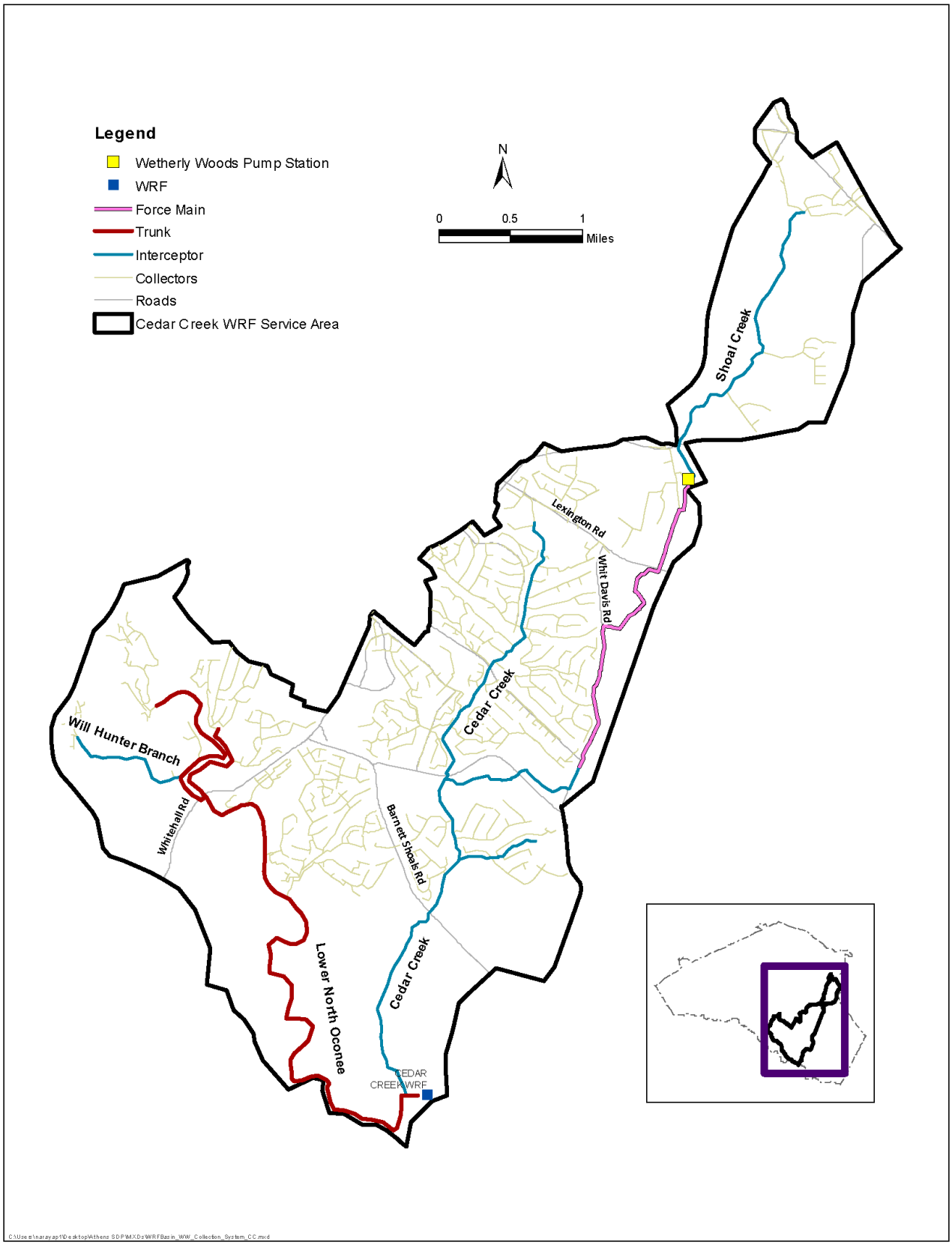

Figure 2-8: Cedar Creek WRF Service Area – Wastewater Collection System
2020 Service Delivery Plan Update – Infrastructure Element

2.4.2.2 Rainfall Derived Inflow and Infiltration and Groundwater Infiltration

In addition to wastewater collected from customers, some amount of rainfall-derived inflow and infiltration (RDII) and groundwater infiltration (GWI) flow into the wastewater collection system is unavoidable. Inflow refers to stormwater flow that enters manholes and gravity sewers through direct flow into the sewer from the surface. Infiltration can originate from either rainfall or groundwater. RDII refers to stormwater flow that filters through pavements or soils before entering the sewer system. In some cases, RDII may come from non-surface sources such as customer foundation drains, roof leaders, or cellar area drains. GWI refers to groundwater that enters the wastewater collection system through defective joints, broken pipes, or cracked manholes. Excessive amounts of RDII or GWI can have detrimental effects on system performance including surcharging pipes, sanitary sewer overflows, and/or increased consumption of hydraulic capacity at WRFs.

PUD conducted flow monitoring studies in 2002, 2010, 2012, and 2015 to quantify RDII and GWI in its wastewater system. Most recently, comprehensive flow monitoring in the sanitary sewer system was performed from February 2 through April 23, 2015, to evaluate dry and wet weather flow in the wastewater collection system. Capturing a significant wet weather event during the study was critical to evaluating volumes of RDII and GWI. The 2015 study utilized 52 flow meters and 10 temporary rain gauges installed in select locations in the 3 major WRF service areas. Active flow monitoring occurred during dry and wet weather periods to collect sufficient data to identify dry weather flows and characterize the relationship between precipitation and sewer system flow.

Data gathered during the 2015 flow monitoring period were analyzed to identify the following for each flow meter basin: rainfall summary, average daily dry weather flow, infiltration, and inflow components of the total flow, net RDII and GWI, hydraulic performance evaluation, and capacity indicators at each meter. Results of the analysis were used to prioritize recommended improvements to the sewer collection system (Section 4).

2.4.2.3 Private Wastewater

Currently, three private oxidation ponds are in ACC (Figure 2-5), with a combined capacity of 0.14 MGD. PUD has completed sewer extension projects to two of these ponds (Country Corners Mobile Home Community and Pinewoods Estates North). Extension of public sewer to the other oxidation pond, at Hallmark Mobile Home Estates, is addressed in this 2020 SDP. In 2019, PUD staff-initiated activity to eliminate these oxidation ponds by encouraging owners to connect to existing sewers.

2.4.2.4 Septic Systems

In areas planned for low-density development, privately owned treatment systems (septic tanks) may satisfy the provision of wastewater service. Wastewater in the remainder of the unsewered areas is treated onsite by proprietary septic systems. The area designated as the ACC Rural Zone (Figure 2-5) includes low-density development that has been identified as being better served by onsite septic systems.

2.4.3 Water Reclamation Facilities

The PUD maintains three WRFs, with a total capacity of 28 MGD. Following the completion of major improvements (renovations and new construction) during 2011 and 2012, the North Oconee WRF capacity is 14 MGD, Middle Oconee WRF capacity is 10 MGD, and Cedar Creek WRF capacity is 4 MGD. Overall site plans are shown on Figures 2-9 through 2-11. Note that the site plans include the proposed location of recommended projects that are identified in Section 4.

All three WRFs treat wastewater using screening and grit removal; biological treatment through advanced activated sludge systems that provide biological degradation, nitrification, and phosphorus removal; settling and clarification; and UV disinfection. Cascade re-aeration is used at the North Oconee and Cedar Creek WRFs. Odor control and noise abatement systems have been implemented at each plant because of proximity to institutions and residential areas.

Each of the WRFs is regulated by the Georgia Department of Natural Resources, Environmental Protection Division (GAEPD). The monthly average permitted effluent limits are summarized in Table 2-4.

Table 2-4: Effluent Permit Limits
2020 Service Delivery Plan Update – Infrastructure Element

Parameter[a]	North Oconee WRF		Middle Oconee WRF		Cedar Creek WRF	
	Monthly Average	Weekly Average	Monthly Average	Weekly Average	Monthly Average	Weekly Average
NPDES Permit Number/Last Issue Date	GA0021725 November 15, 2018		GA0021733 July 1, 2019		GA0034584 March 1, 2019	
Receiving Waters	North Oconee River		Middle Oconee River		Oconee River	
Flow (MGD)	14.0	17.5	10.0	12.0	4.0	5.0
BOD_5 (mg/L)	8.0	12.0	20.0	30.0	21.0	31.5
Total Suspended Solids (mg/L)	20	30	20	30	20.0	30.0
Ammonia, as N (mg/L)	2.0	3.0	7.5	11.3	6.0	9.0
Fecal Coliform Bacteria (#/100 mL)	200	400	200	400	200	400
Total Phosphorus, as P (mg/L)[b]	1.0	1.5	1.0	1.5	1.0	1.5

[a] BOD5 = 5-day biological oxygen demand; mg/L = milligrams per liter; MGD = million gallons per day; mL = milliliters; P = phosphorus

[b] Based on discussions with Georgia Department of Natural Resources, Environmental Protection Division (GAEPD), the Total Phosphorus limit is expected to be reduced during the current permit cycle. Preliminary design reports currently being developed for 2015 SDP Update Projects 1-201, 1-202, and 1-203 assume a monthly average Total Phosphorus limit of 0.5 mg/L.

Prior to the major WRF improvements completed in 2011 and 2012, PUD had evaluated options for treatment regionalization and decided to develop additional capacity and make improvements at each of the three WRFs. As wastewater flows approach the individual permitted capacity of each of the three WRFs, PUD will evaluate the flows and their location within the system and consider pumping to other existing facilities versus increasing the capacity of existing facilities.

2.4.4 Wastewater Solids Handling

Wastewater solids accumulated at the three WRFs are temporarily stored onsite in aerobic sludge holding tanks. The solids are centrifugally dewatered to a solids concentration of 18 to 22 percent. The current disposal method is to transport dewatered solids to the compost facility and landfill at the ACC Municipal Solid Waste Landfill. At this location, a portion of the solids are mixed with shredded wood waste and composted using static piles.

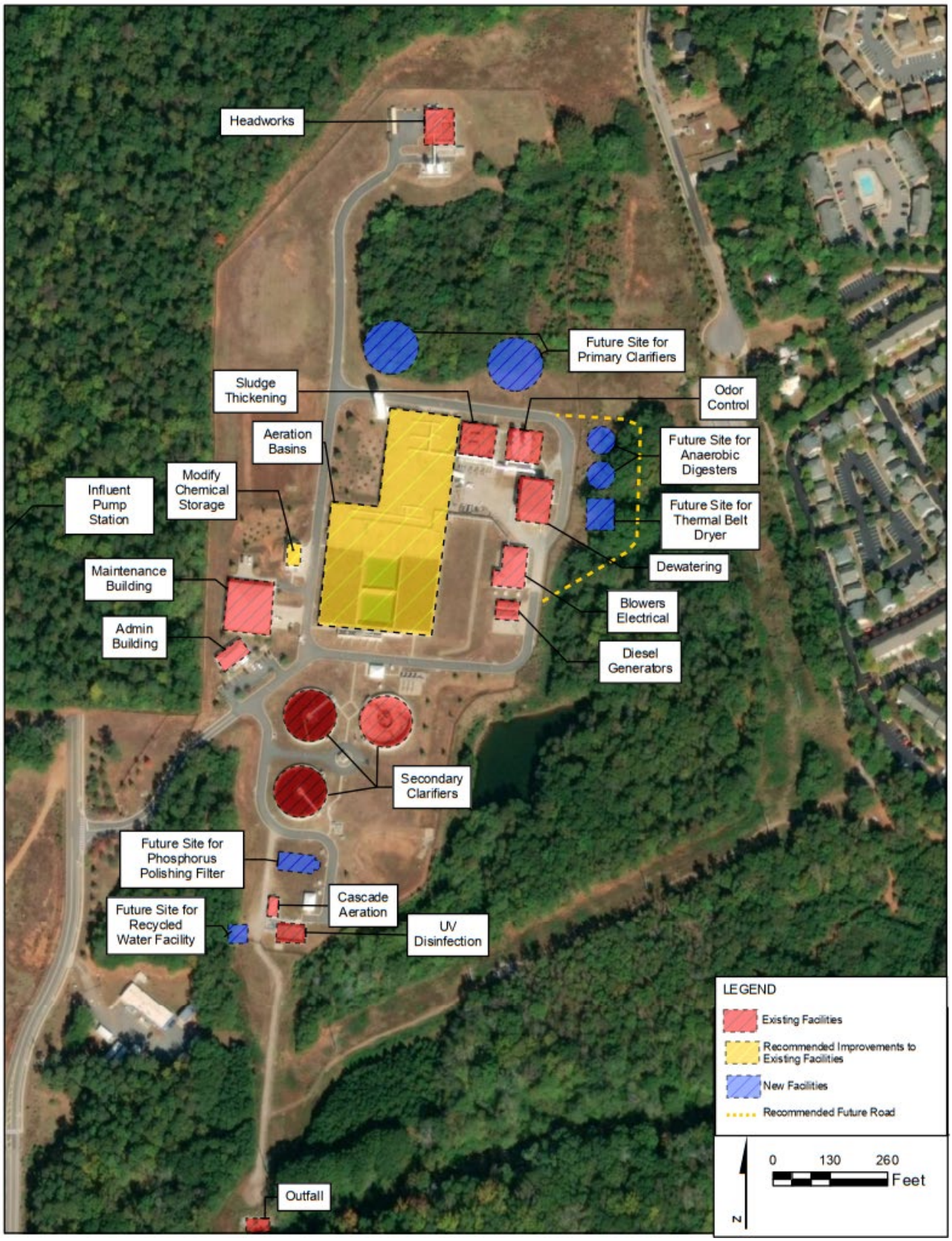

Figure 2-9: North Oconee WRF Site Plan
2020 Service Delivery Plan Update – Infrastructure Element

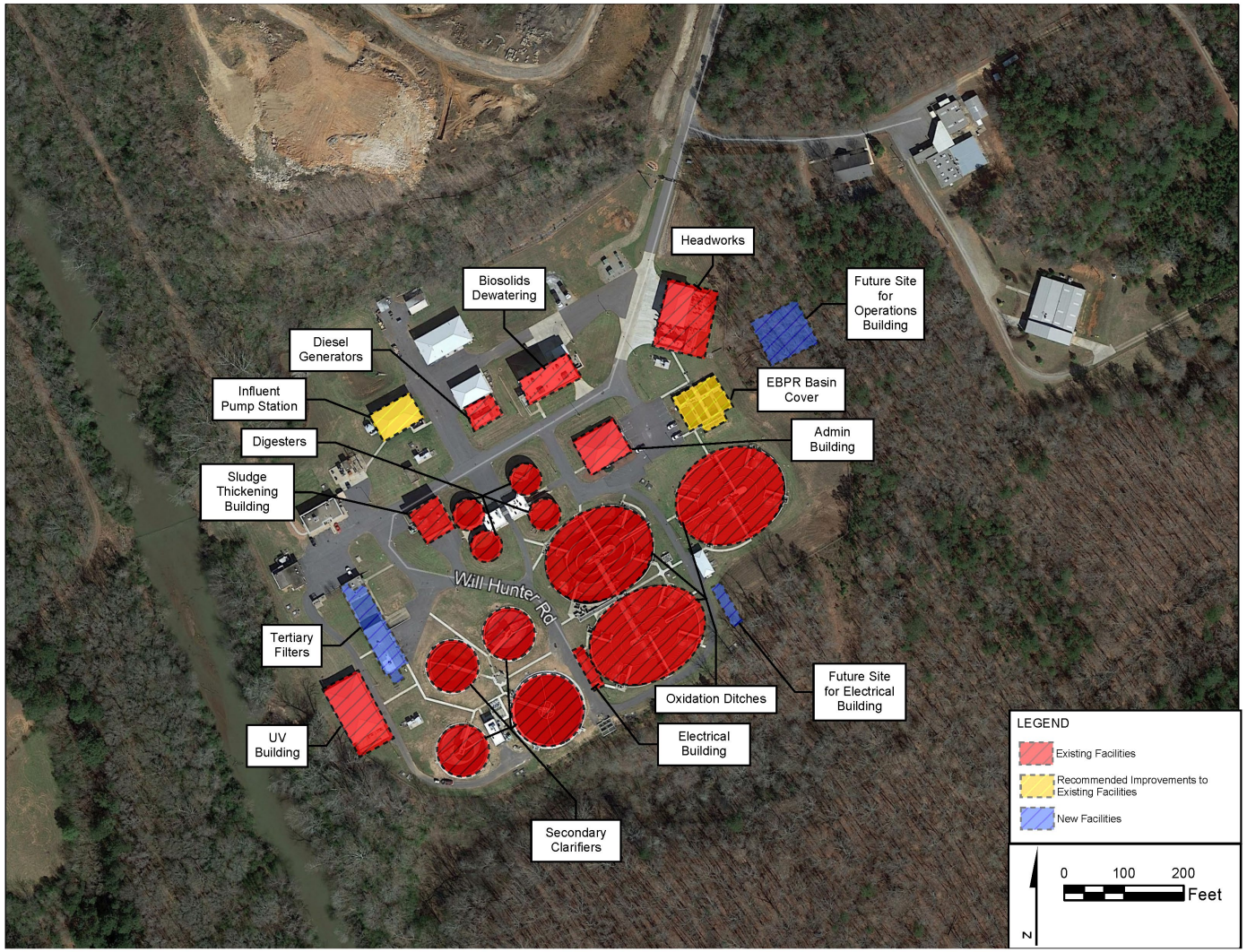

Figure 2-10: Middle Oconee Water Reclamation Facility Site Plan
2020 Service Delivery Plan Update – Infrastructure Element

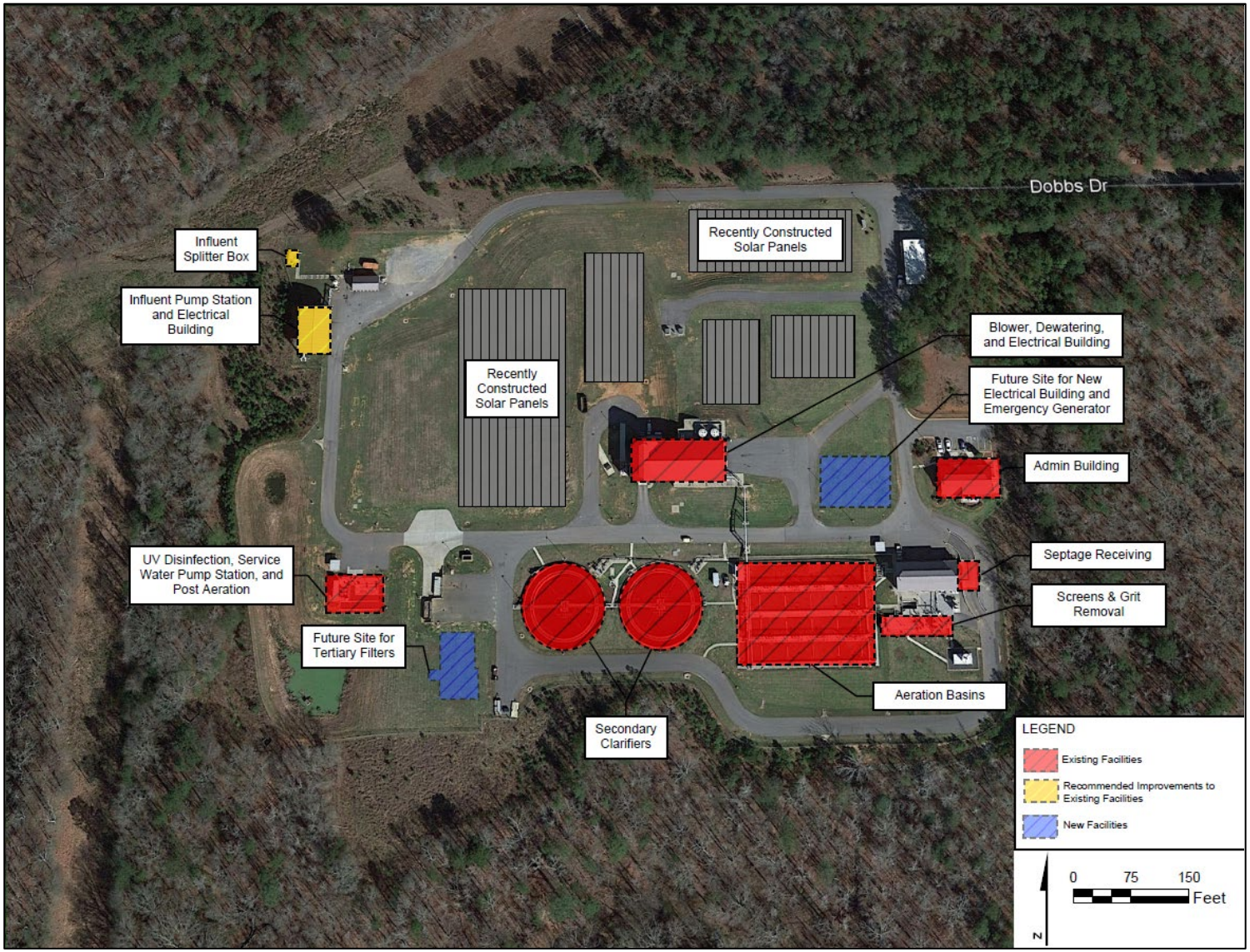

Figure 2-11: Cedar Creek Water Reclamation Facility Site Plan
2020 Service Delivery Plan Update – Infrastructure Element

3. Identification of Future System Needs

Projecting future conditions, or forecasting, is a critical activity to determine a water/wastewater utility's need to plan, design, and construct capital-intensive infrastructure, such as major water supply and treatment facilities. Forecasting is also an essential component of evaluating current and future capacity limitations and creating a timeline for new supplies and infrastructure needs.

This section details the development of projected future water demands and wastewater flows in the ACC Service Area, a key component in identifying and evaluating future system needs. The future needs of the ACC water and wastewater systems were determined by comparing the existing system (Section 2) to PUD's service goals (Section 1) and to projected future water demands and wastewater flows.

3.1 Forecasting Water and Wastewater Demand

The forecast of future water demand and wastewater flow is primarily based on population projections and historical system demands and flows. During the 2015 forecasting analysis, CH2M HILL Engineers, Inc. (CH2M), now Jacobs Engineering Group Inc. (Jacobs), used data from 2006 through 2013 to develop ACCGov's water use profile and the 2015 forecasts (CH2M, 2015). For continuity with that exercise, CH2M collected historical water demand and wastewater flow data from 2014 through 2017 for the *Water Demand and Wastewater Flow Forecast 2018 Update* (Jacobs/CH2M, 2019a). The data were reviewed and summarized annually to establish system characteristics, to compare characteristics to the data collected in 2014, to evaluate the accuracy of the assumptions used for the 2015 Forecast, and to compare actual data from 2014 through 2017 to projections developed in 2015 for those years. Population projections projected in the 2015 SDP versus actual populations are listed in Table 3-1.

Table 3-1: Population Projections 2015 SDP Update Versus Actual Population
2020 Service Delivery Plan Update – Infrastructure Element

Year	Actual Population[a]	Population Projections Used for the 2015 SDP Update[b]
2010	116,000	117,000
2017	126,000	122,000
2020	-	131,000
2030	-	147,000
2040	-	160,000
2050	-	171,000
2060	-	182,000

a Annual Estimates of the Resident Population: April 1, 2010 to July 1, 2017, US Census Bureau, Population Division

b High adjusted growth rate provided by ACC Planning Department.

3.1.1 Population Projections

The first forecasting step for this 2020 SDP Update was the development of population projections, which was completed in 2018 as part of the Forecast 2018 Update (Jacobs/CH2M, 2019a). At this time, the ACC Planning Department has not updated population projections that were used in the 2015 SDP Update (CH2M, 2015). Based on discussions with the Planning Department, PUD extended the projection rate used in the 2015 Forecast through 2060. A summary of the methodology used for the 2015 population projections is provided as follows.

3.1.1.1 2015 Population Projections

In accordance with guidance from the ACC Planning Department, population projections developed for the 2015 SDP Update were used as a basis for this 2020 SDP Update. These projections were developed by the ACC Planning Department and included projections at a drainage sub-basin scale for ACC's 73 drainage sub-basins. The following methodology was used to develop the projections:

- Block Group level population data were converted into drainage basin areas by creating 851 unique polygons resulting from the overlay of the 2010 Census block group boundaries, drainage sub-basin boundaries, and existing zoning geographic information system (GIS) layers. Examining each of these polygons made it possible to convert block group data into basin boundary data.
- Using 2010 Census data as the statistical starting point, four separate categories of population projections (medium, high, medium-adjusted, and high-adjusted) were created for 2015, 2020, 2025, 2030, 2035, 2040, 2045, and 2050. The medium and high projections were developed by applying the uniform growth rates presented in the ACC 2008 Comprehensive Plan (ACCGov, 2008) to the extrapolated 2010 Census data assigned to each sub-basin. The medium-adjusted and high-adjusted projections were determined by taking the existing population and the following factors into account:
  - Existing development patterns
  - Constrained lands
  - Remaining available developable land
  - Existing zoning
  - Household size and household size trends
  - Future land use classification

The adjusted population projections were considered for utilization in developing the water demand and wastewater flow forecast because they represent a detailed analysis of specific development patterns and land use classifications, reflecting development potential within each individual sub-basin. Of the adjusted projections, the high-adjusted projection was used for developing the water demand and wastewater flow forecasts.

Historical Census-based population data provided by the ACC Planning Department in 2015 indicated the overall population in ACC has been growing at a rate of approximately 1 percent annually. This trend is expected to continue, with an average annual growth of 1.2 percent projected for the next 20 years. Growth in the primary service areas ranges from 1.3 percent for the Middle Oconee Drainage Basin to 0.8 percent for the Cedar Creek Basin. For these areas, the greatest increase in population is projected to be in the Middle Oconee Drainage Basin (primarily in the upper portion of the McNutt Drainage Basin, BC-1 in Bear Creek, and portions of the Lower Middle Oconee Drainage Basin), and then in the North Oconee Basin (primarily in the Trail Creek West sub-basins and downtown ACC [Upper North Oconee (UNO)-4 and UNO-5]).

3.1.1.2 2020 Population Projections

As previously mentioned, when the 2018 Water Demand and Wastewater Flow Forecast Update was completed, the ACC Planning Department had not updated the population projections that were used in the 2015 SDP Update. Based on discussions with the Planning Department, PUD extended the projection rate used in the 2015 Forecast through 2060.

For the 2020 SDP Update, projections for years 2020, 2025, 2030, 2035, 2040, 2045, and 2050 were assumed to be the same as the projections for those years in the 2015 SDP Update. Projections for years 2055 and 2060 were developed by applying the uniform growth rates presented by the ACC Planning Department in 2014. Similar to the

2015 SDP Update, the high-adjusted projection was selected for evaluation of future system needs (see rationale in Section 3.1.1).

Figure 3-1 presents the changes in population during the planning period for this 2020 SDP Update, based on the high-adjusted prediction. Figure 3-2 compares the historical population growth and the High Adjusted population projection used for this 2020 SDP Update.

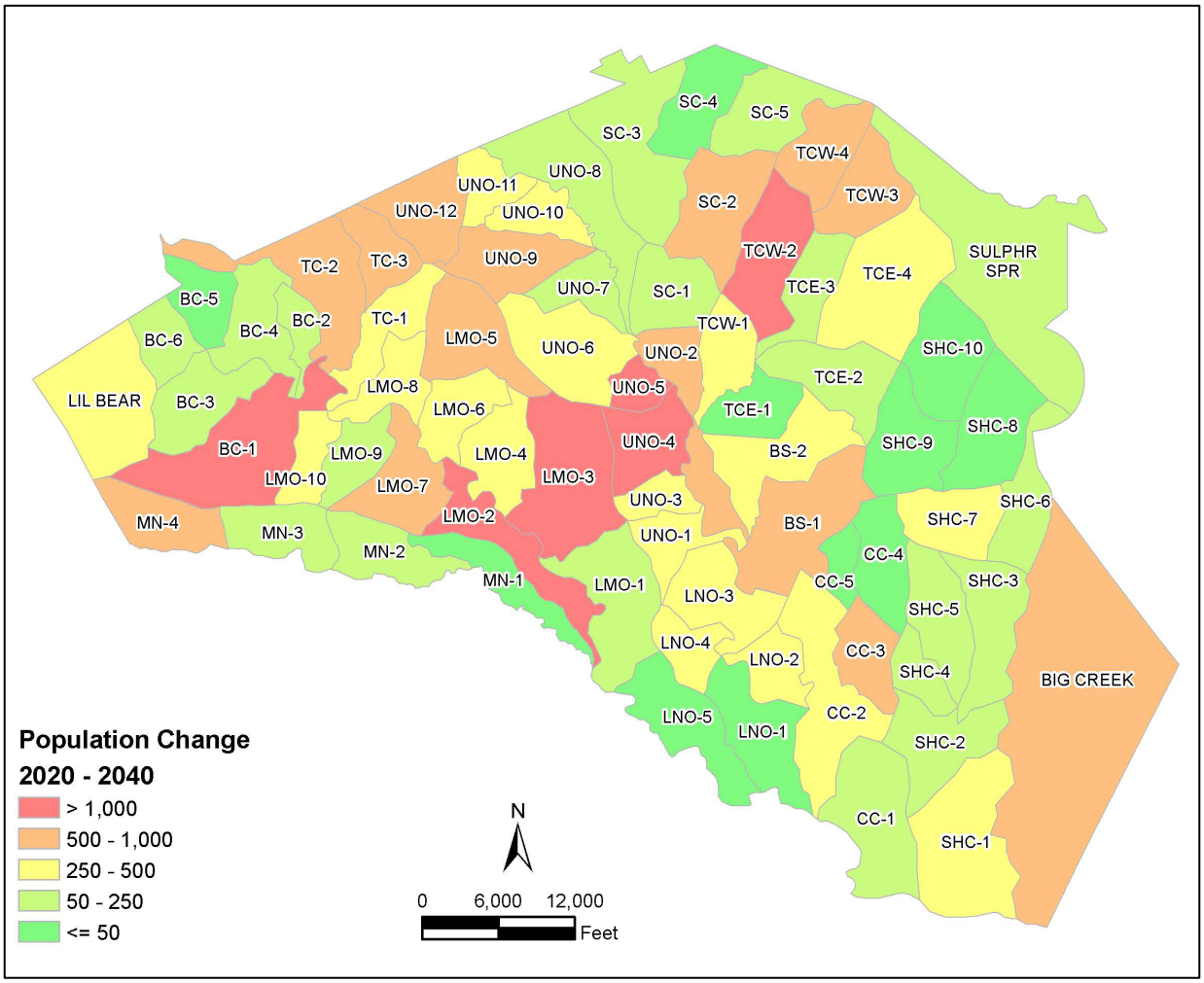

Figure 3-1: Projected Change in Population (2020 to 2040)
2020 Service Delivery Plan Update – Infrastructure Element

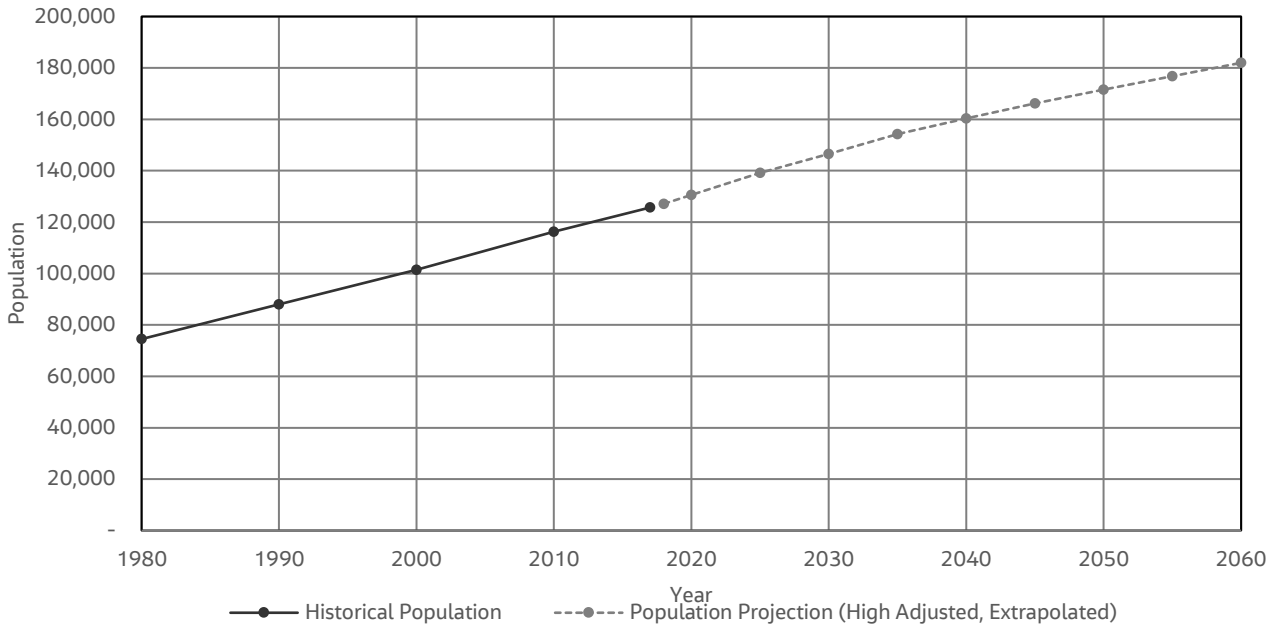

Figure 3-2: Historical Population and High Adjusted Population Projections provided by ACC Planning Department
2020 Service Delivery Plan Update – Infrastructure Element

3.1.2 Residential, Commercial, and Institutional Water Demand Projections

The second step in projecting future water demands and wastewater flows is to conduct a detailed analysis of the water customer base. For this 2020 SDP Update, the detailed water use profile analysis in the Water Use Profile Technical Memorandum (CH2M, 2014b) was used as a basis of the water demand and wastewater flow forecast. The water use profile was developed using data from the period 2006 through 2013, including water and wastewater historical flows and system data, water and sewer customer billing data, population statistics, precipitation records, and GIS data.

The water use profile analysis provided a historical summary of water system production and consumption demands, as well as the customer demographics and use. Five ACC customer categories were identified: Commercial, Industrial, Institutional, Multi-Family Residential, and Single Family Residential. Based on this analysis, unit consumption demands were developed for each of the five customer categories. Unit demands were carried forward for only the residential, commercial, and institutional (excluding UGA) customers, and other customer demands were developed through collaboration with various stakeholders.

The unique system unit demand factors used include:

- Residential use – 50 gallons per capita per day
- Commercial use – 16.4 gallons per capita per day
- Institutional (non-UGA) use – 5.4 gallons per capita per day

PUD plans to re-evaluate the customer unit demands during the 2025 SDP Update.

3.1.3 Industrial Water Demand Projections

Similar to the 2015 SDP Update, future industrial demand for this 2020 SDP Update was determined through discussions with ACCGov Public Utilities, Economic Development, and Planning Departments. Industrial demand in ACC has remained fairly consistent since 2013. For this 2020 SDP Update, new major industrial demands were projected in two basins: McNutt and Trail Creek (East and West). The following assumptions were used to develop the model for the 2020 SDP Update:

- McNutt Creek Basin: a 100 percent probability of a new industrial demand of 229,000 gallons per day (gpd) coming online by 2025 split evenly between 2020 to 2025. This assumption was based on the remainder of the 250,000 gpd that was projected in 2015 but has not yet come online (probabilistic variable).
- Trail Creek Basin: 25 percent annual probability of one new major (250,000 gpd) customer coming online (equating to one new major industrial customer every 4 years)
  - Percent split between East and West: 75 percent East, 25 percent West (probabilistic variable)
  - Split of water demand by sub-basin within each basin, Trail Creek East (TCE) and Trail Creek West (TCW) (deterministic variables):
    - TCE-1: 0.6 percent, TCE-2: 2.3 percent, TCE-3: 49.9 percent, TCE-4: 47.1 percent
    - TCW-1: 48.1 percent, TCW-2: 51.4 percent, TCW-3: 0.5 percent, TCW-4: 0 percent
  - Percentages for each sub-basin are based on 2017 water demand distribution.

These assumptions are slightly different from the previous forecast; they reflect the recorded industrial flows in 2017 and observed growth within the county.

3.1.4 University of Georgia Water Projections

Similar to the 2015 SDP Update, future water demand for UGA for this 2020 SDP Update was estimated through discussions with PUD and UGA staff. The discussions included a review of historical water demand and future infrastructure plans. The 2015 SDP Update future water demand from UGA assumed a 2 percent annual increase from 2012 demands. For this 2020 SDP Update, it was assumed that UGA's future water demand will remain at a 2 percent annual increase in demand from 2017 actual levels.

3.1.5 Recycled Water Projections

To prepare for potential economic impacts from water supply shortages or from required water-use reductions, PUD has investigated various means to reduce potable water demand. The outcome of this investigation was a path forward for implementing a recycled water system[1] in ACC. PUD has developed a *Reuse System Master Plan* (CH2M, 2018b) that provides a framework for implementing a recycled water system with the flexibility for future expansion to a purified recycled water[2] system. The recycled water system distributes recycled water for non-drinking purposes such as irrigation, industrial uses, and cooling.

The *Reuse System Master Plan* details the methodology for identifying potential recycled water customers and demands. PUD identified UGA as an interested recycled water customer. UGA is consolidating their heating and cooling systems into district energy plants (DEP) and plans to use ACC's recycled water for their DEPs. PUD also determined that approximately 20 large potable water customers in the Athens Employment Industrial zone could

[1] Recycled water is highly treated effluent from a Water Reclamation Facility. The recycled water system provides recycled water to non-residential customers for beneficial use.
[2] Purified recycled water is recycled water that is treated to drinking water standards.

become future recycled water users. PUD is moving forward with the design of additional facilities for a recycled water system at the North Oconee WRF.

It is estimated that the recycled water system could displace up to 3.4 MGD of existing potable demand, with up to 7 MGD of recycled water demand in the future. To date, no industrial users have committed to replacing their potable water demand with recycled water. PUD is working on a Memorandum of Understanding (MOU) with UGA for recycled water provisions. UGA estimates their recycled water demand in the next 7 to 10 years to be at 0.4 MGD. This recycled water demand will result in a reduction in forecasted future potable water demand.

3.1.6 Water and Wastewater Demand Forecast Model

A probabilistic forecast model was developed to account for the uncertainty inherent in any forecast (Jacobs/CH2M, 2019a). Using the probabilistic water demand forecast, the range of values calculated were for the 95th, 75th, 50th (median), 25th, and 5th percentiles. The 50th percentile represents a reasonable probability forecast and long-term planning is typically based on that range. However, utilities may choose to base certain decisions on other probabilities depending on the severity of a decision's consequence. For example, a decision with a much higher consequence or longer lead time may be based on a lower probability of risk (e.g., the decision to expand water treatment capacity may be based on a 25 percent chance of not being able to provide finished water to customers); whereas a less severe outcome may be based on a 50 percent probability.

The factors used to create the probabilistic model are:

- Unit consumption
- Growth rate
- Future major industrial and UGA growth
- Future water conservation (assumed savings by 2050, 10 percent system level savings on average)
- System factors (non-revenue water, WTP system process water loss, maximum day water demand peaking factors, wastewater return ratios, and maximum month average day [MMAD] wastewater flow peaking factors)

Based on the evaluation of the data, the probabilistic distribution for the following four variables was updated for this 2018 forecast update as discussed in this section:

- Process loss factor
- Water production peak day peaking factor
- Water production maximum month average day peaking factor
- WRF peak month factors

For the remaining variables, the probabilistic distribution from the 2015 Forecast was used for the 2018 forecast update. The probabilistic distribution for the following variables was not updated:

- Non-revenue water factor
- WRF return factors
- Per capita unit demand factors for residential, commercial, and institutional customers
- Population growth drift rate
- UGA growth rate

The Probabilistic Variable Details Technical Memorandum produced for the Water Demand, Drought and Wastewater Flow Forecast (CH2M, 2014b) provides more extensive descriptions of these Probabilistic Variables.

3.1.7 Finished Water Demand Projections

Average day finished water demands were projected based on the high-adjusted population projections developed by the ACC Planning Department (Section 3.1.1), unit consumption demands for residential, commercial, and institutional (excluding UGA) and land uses (Section 3.1.2), and collaboration and data review for industrial demands, UGA demands, and non-potable reuse projections (Sections 3.1.3 through 3.1.5).

Figures 3-3 and 3-4 present the median (50th percentile) average annual daily finished water demand forecast by sub-basin for 2040 and 2060, respectively. The areas that will have the highest demand during both years include ACC's downtown area and the Trail Creek sub-basins. According to the Future Development Map shown in the Envision Athens Action Agenda (ACCGov, 2017), the future downtown area has a diverse mix of single family residential, traditional neighborhood, and mixed-use development, and the Trail Creek sub-basins are predominantly employment land use.

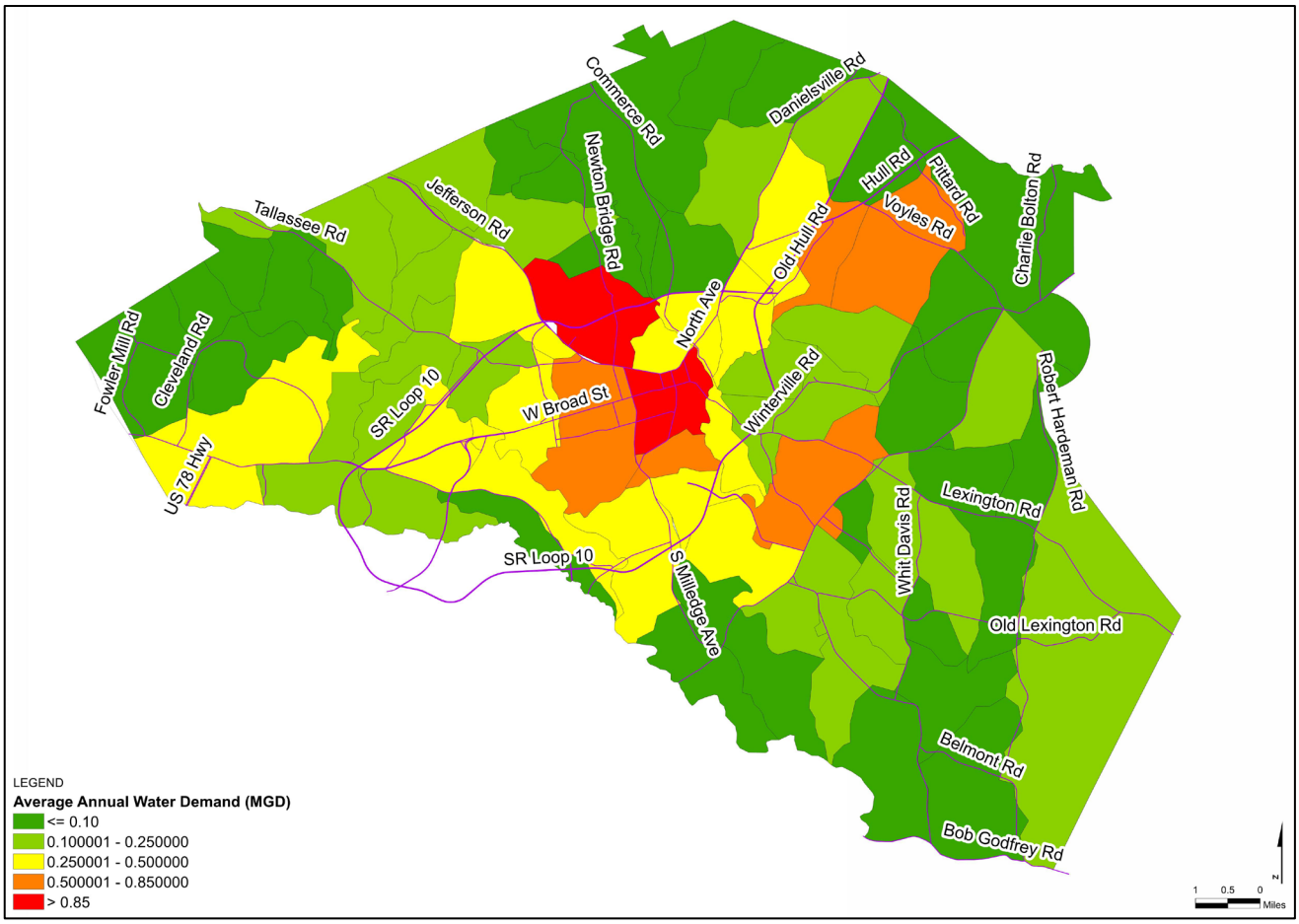

Figure 3-3: 2040 50th Percentile (Median) Annual Average Daily Finished Water Demand Forecast, by Sub-basin
2020 Service Delivery Plan Update – Infrastructure Element

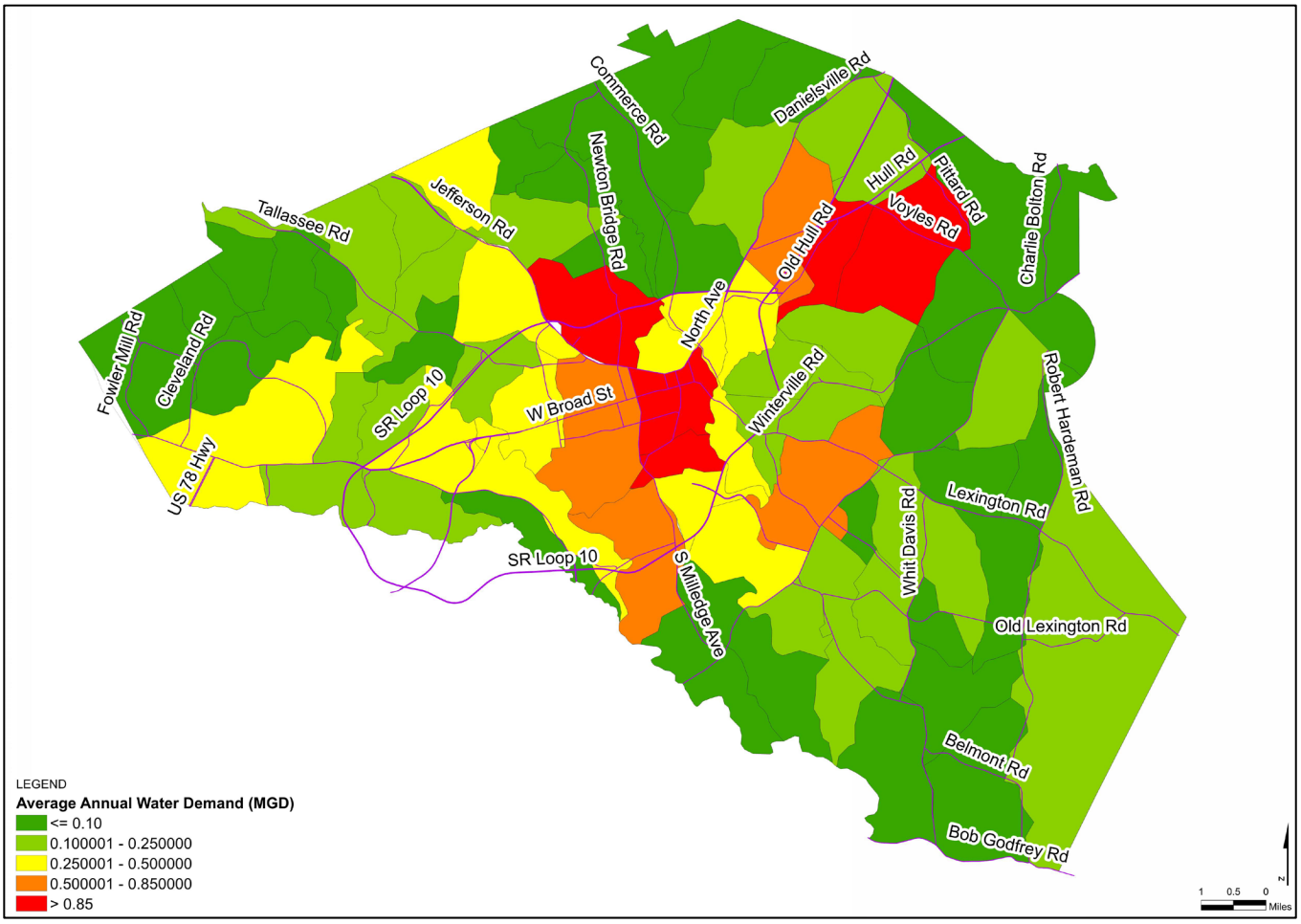

Figure 3-4: 2060 50th Percentile (Median) Annual Average Daily Finished Water Demand Forecast, by Sub-basin
2020 Service Delivery Plan Update – Infrastructure Element

ACC water permit limits are based on monthly averages (raw water supply) and maximum day (raw water supply and treatment capacity) (Table 2-1). Projections for finished water monthly maximum demand (MMAD) and maximum day demand (MDD) were developed by applying "peak factors" to the average day demand. Table 3-2 summarizes the finished water projections.

The "peak month factor" is the ratio of MMAD to average annual daily demand (AADD). This number has historically been 1.2 for the ACC water system but declined after the 2007 drought. Based on historical data, a peak month factor of 1.1 was used to estimate the (MMAD). The "peak day factor" is the ratio of MDD to AADD and typically varies between 1.2 and 2.0 for most systems. For ACC, the peak day factor in 2006 was 1.5, and the peak day factor in 2007 was 1.7. However, water conservation measures taken in response to the drought conditions in 2007 has reduced peak day factors to a maximum of 1.35 since 2008. The peak day factor has held fairly steady since 2008. Based on these results, a peak day factor of 1.3 was applied to annual average demand to estimate MDDs. ACC's low peak day and peak month factors, relative to average utility peak day factors, demonstrates the significant strides that ACC has made in water conservation.

PUD is reviewing the existing rate structure. It is anticipated that a rate structure change may impact water use and peak demand projections in the 2025 SDP update.

Table 3-2: Median (50th Percentile) Projected Finished Water Demand (MGD)
2020 Service Delivery Plan Update – Infrastructure Element

Year	Annual Average Day	Maximum Day
2020	14.7	19.7
2025	16.0	21.5
2030	16.9	22.8
2035	17.9	24.1
2040	18.6	24.9
2045	19.3	25.9
2050	20.0	26.8
2055	20.6	27.6
2060	21.5	28.7
Peak Factor		1.3

3.1.8 Wastewater Flow Projections

Average day projected wastewater flows were developed by applying a wastewater return flow ratio to the water demands developed in Section 3.1.7. A wastewater return flow ratio is the percentage of finished water delivered to customers that is returned to the WRF as wastewater. The wastewater flow ratio is specified to the service area (that is, North Oconee, Middle Oconee, or Cedar Creek) and is based on historical data.

The return flow ratio was calculated as the percentage of average day WRF flow to the average day billed water consumption within the WRF service area. The return ratios were developed based on WRF flow data from October 2013 (assumed to be a normal flow month) and billed water consumption during the same month. Water customers that use onsite septic systems or private wastewater systems reduce the return ratio, since billed water is not returned to the wastewater system. However, RDII and GWI increase the return ratio, as they result in stormwater and groundwater being sent to the water reclamation facilities. Based on historical data, the following return flow ratios were developed for the three service areas:

- North Oconee WRF: 1.17
- Middle Oconee WRF: 1.16
- Cedar Creek WRF: 0.91

The wastewater return ratios were multiplied by the finished water demand by sub-basin, draining to each respective WRF, to determine the average day wastewater flows.

As ACC wastewater permit limits are based on monthly averages, Service Area-specific peaking factors were then applied to average day flows to estimate MMAD flows. The peaking factors were determined from historical influent flow data to each WRF from 2010 through 2013, then updated for 2014 through 2017 in the forecast update. The following peak month factors represent the updated peaking factor from the 2018 forecast for each WRF:

- North Oconee WRF: 1.18
- Middle Oconee WRF: 1.33
- Cedar Creek WRF: 1.39

Similar to the water demand forecasts, use of a probabilistic method resulted in a range of results, with a magnitude likelihood for each result. The probabilistic methodology for wastewater flow used the same list of factors for identifying uncertainty as previously discussed for water demand. The range of flow values calculated were for the 95th, 75th, 50th (median), 25th, and 5th percentiles.

Figure 3-5 and Figure 3-6 present the median (50th percentile) average day wastewater flow for 2040 and 2060, respectively. Wastewater flows are expected to follow the same growth pattern as the water demands. Table 3-3 summarizes the 50th percentile projected wastewater flows.

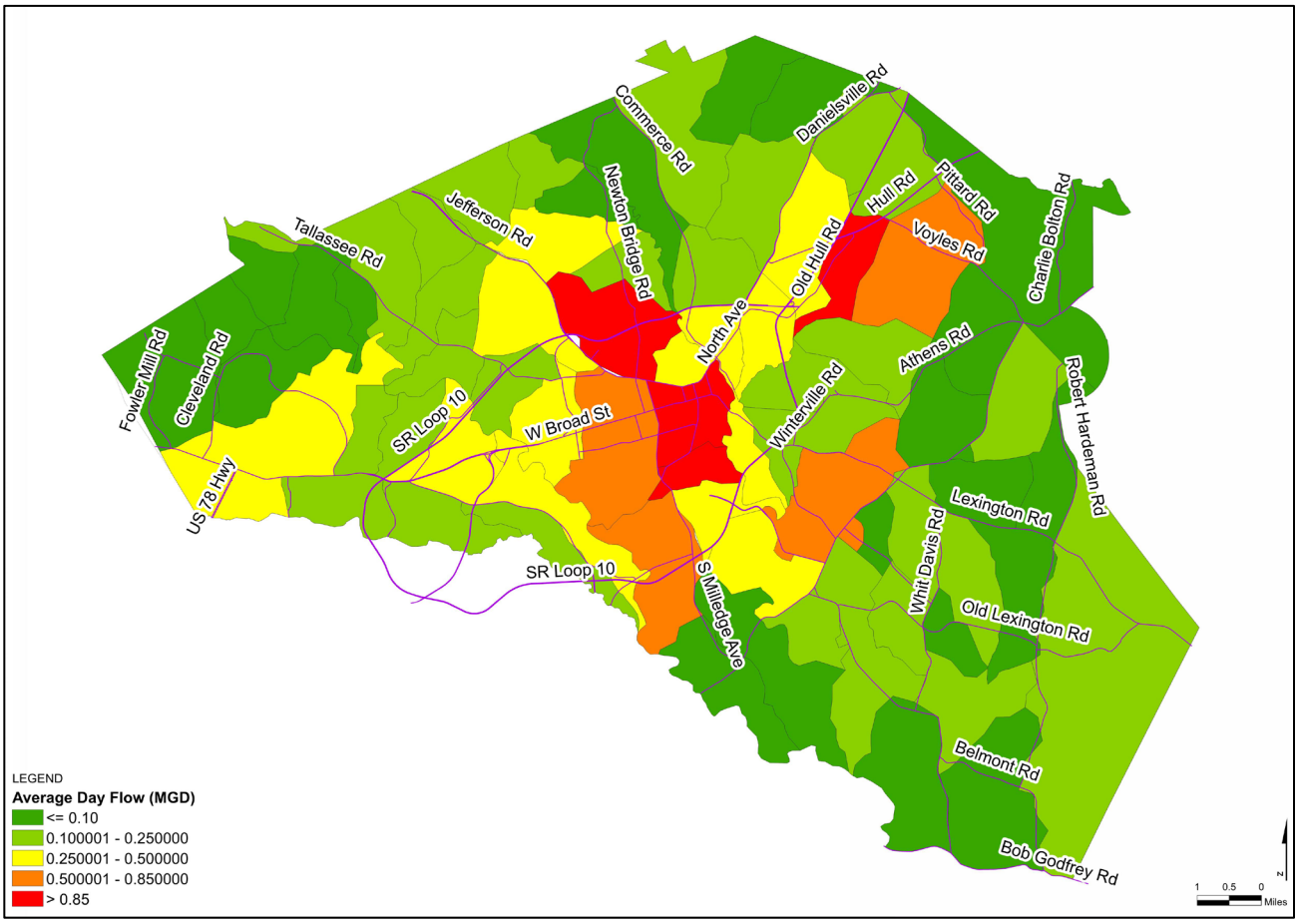

Figure 3-5: 2040 50th Percentile (Median) Average Day Wastewater Flow Forecast, by Sub-basin
2020 Service Delivery Plan Update – Infrastructure Element

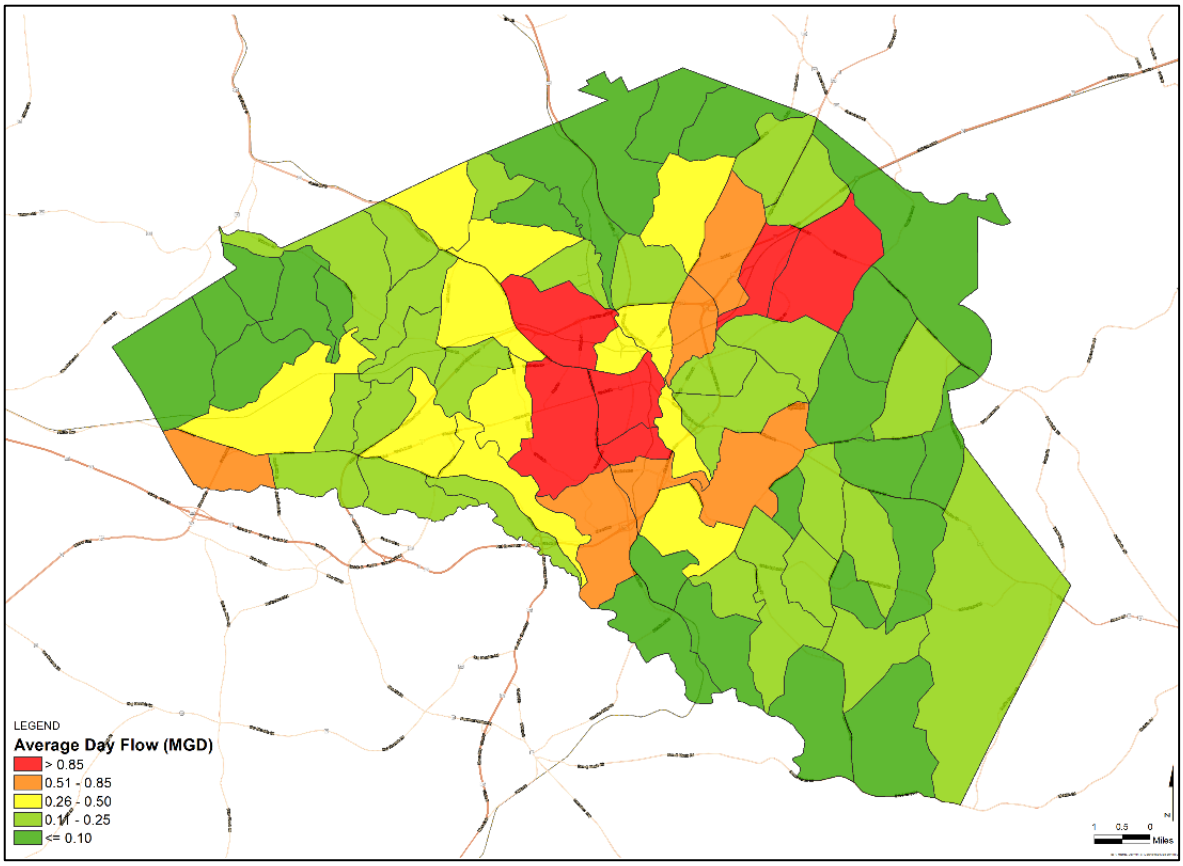

Figure 3-6. 2060 50th Percentile (Median Average Day Wastewater Flow Forecast, by Sub-basin
2020 Service Delivery Plan Update – Infrastructure Element

Table 3-3: Median (50th Percentile) Projected Wastewater Flows
2020 Service Delivery Plan Update – Infrastructure Element

Year	Annual Average Day (MGD)	Maximum Month-Average Day (MGD)			
	ACC PUD Service Area	North Oconee WRF Service Area	Middle Oconee WRF Service Area	Cedar Creek WRF Service Area	ACC PUD Service Area
2020	13.0	9.2	5.9	1.7	16.5
2025	14.4	10.3	6.7	1.8	18.3
2030	15.5	11.4	6.9	1.9	19.7
2035	16.6	12.5	7.3	2.0	21.1
2040	17.6	13.5	7.5	2.1	22.3

3.2 Water System Evaluation

Future water system needs were identified by evaluating the existing water system and projected future needs as discussed in Section 3.1 This analysis is summarized in this section and forms the basis for a subset of the recommended water system improvements (Section 4.1).

3.2.1 Raw Water Supply Capacity

Raw water demand was determined by adding real water losses to finished water demands and applying raw water maximum month and maximum day peaking factors. Based on results of the water use profile, water production and consumption steadily declined between 2006 and 2013, and the difference between the two (water loss) did not change significantly. A water loss factor of 12 percent, representing only real losses, was determined for the ACC system. A 12 percent factor for real losses is not excessive, and according to data from water audits submitted to GAEPD from 2011, 2014, and 2020, water loss in the ACC system is not increasing. Additionally, PUD's leak detection program, which is in its third year, will help reduce the percentage of system water loss. The 2018 Forecast Update model did not adjust the non-revenue water factor as the years progress. It is assumed that preventive and corrective maintenance will balance with the aging of the system (Jacobs/CH2M, 2019a).

Because of the long-range planning requirements for possible new water supply sources, the evaluation of raw water supply capacity was extended beyond the 20-year timeline of the SDP. Projected MDD raw demands (95th, 75th, 50th, 25th, and 5th percentiles), through 2060, were compared to ACC's total permitted maximum day withdrawal limit of 34.75 MGD (Figure 3-7). The 50th percentile forecast reaches 30 MGD in 2060, which is still below the total available capacity (see (1) on Figure 3-7).Based on projected raw water demands, there is a 25 percent chance that the MDD for raw water will reach the cumulative permit limit (34.75 MGD) by the year 2049 (see (2) on Figure 3-7).

While ACC does not have a total permitted water withdrawal monthly average limit, projected maximum month average day demands were compared to permitted monthly average withdrawal from the Bear Creek Reservoir (25.5 MGD), the only source that can be withdrawn from during drought conditions and river flows less than 7Q10 (Figure 3-8). As shown by (1) on Figure 3-8, the MMAD raw water supply permitted capacity has a probability of being exceeded within this forecast period (as early as 2034, within the 75th percentile forecast). Table 3-4 shows the 50th percentile MMAD and MDD raw water demand forecast.

Table 3-4: 50th Percentile Maximum Month Average Day and Maximum Daily Raw Water Demand Forecast
2020 Service Delivery Plan Update – Infrastructure Element

Year	MMAD (MGD)	MDD (MGD)
2018[a]	14.5	16.0
2020	18.1	21.2
2025	19.6	23.1
2030	20.8	24.4
2035	22.0	25.8
2040	22.8	26.8
2045	23.6	27.8
2050	24.5	28.8
2055	25.2	29.6
2060	26.3	30.9

[a] 2018 results represent actual measurements provided by ACC.

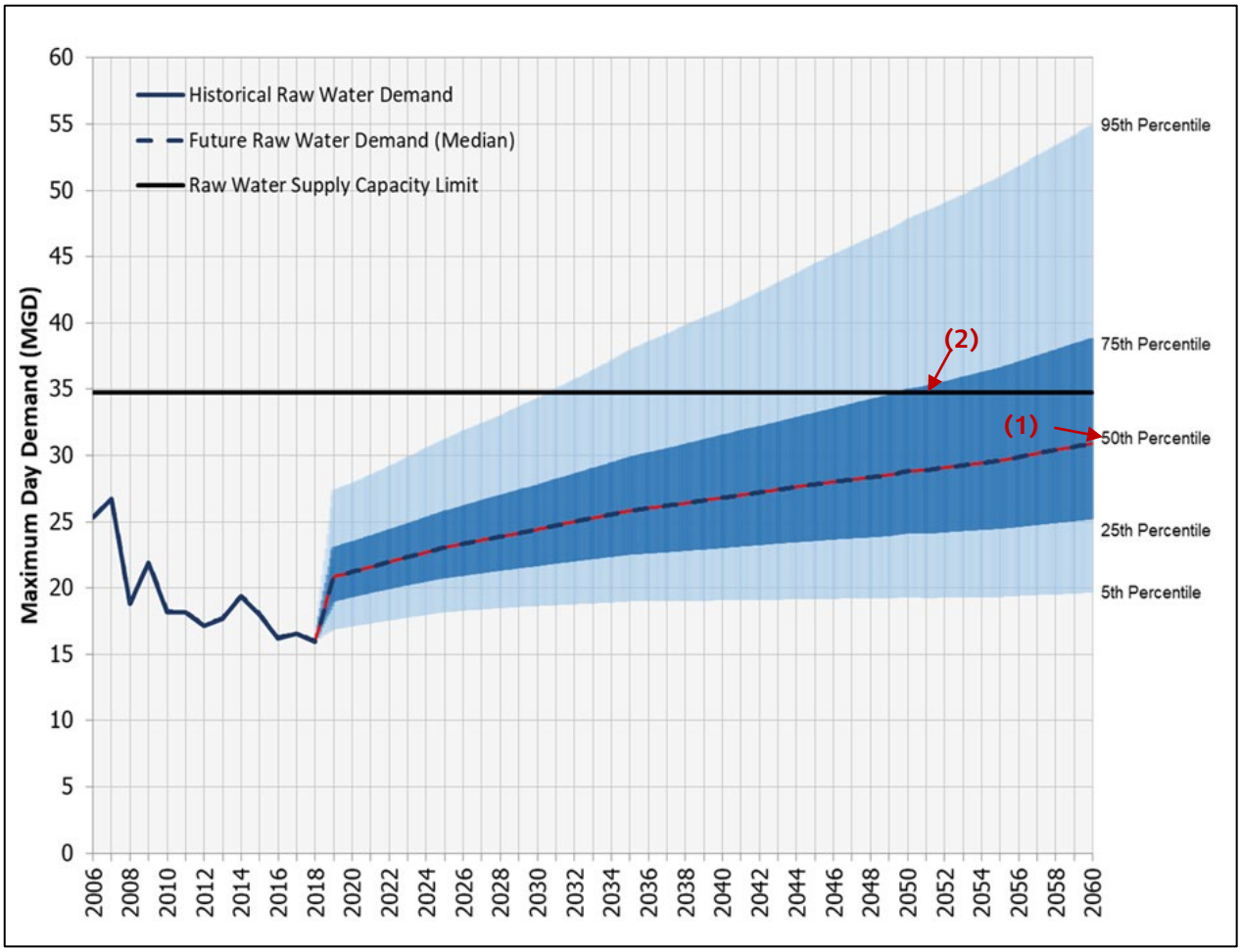

Figure 3-7: Maximum Day Raw Water Demand Forecast, 2006-2060
2020 Service Delivery Plan Update – Infrastructure Element

PUD will likely exceed its monthly withdrawal limit from the Bear Creek Reservoir by 2052 (see (2) on Figure 3-8). Provisions for future additional raw water supply and storage are required to increase drought resiliency. Water reuse and recycling can provide additional supply. The *Reuse System Master Plan* (CH2M, 2018b) establishes the path forward for implementing a recycled water system for use in the Athena Industrial Park and UGA, which have the highest demand for recycled water. The system will have the flexibility for future expansion to a purified recycled water system that would provide an additional source of water to the J.G. Beacham WTP

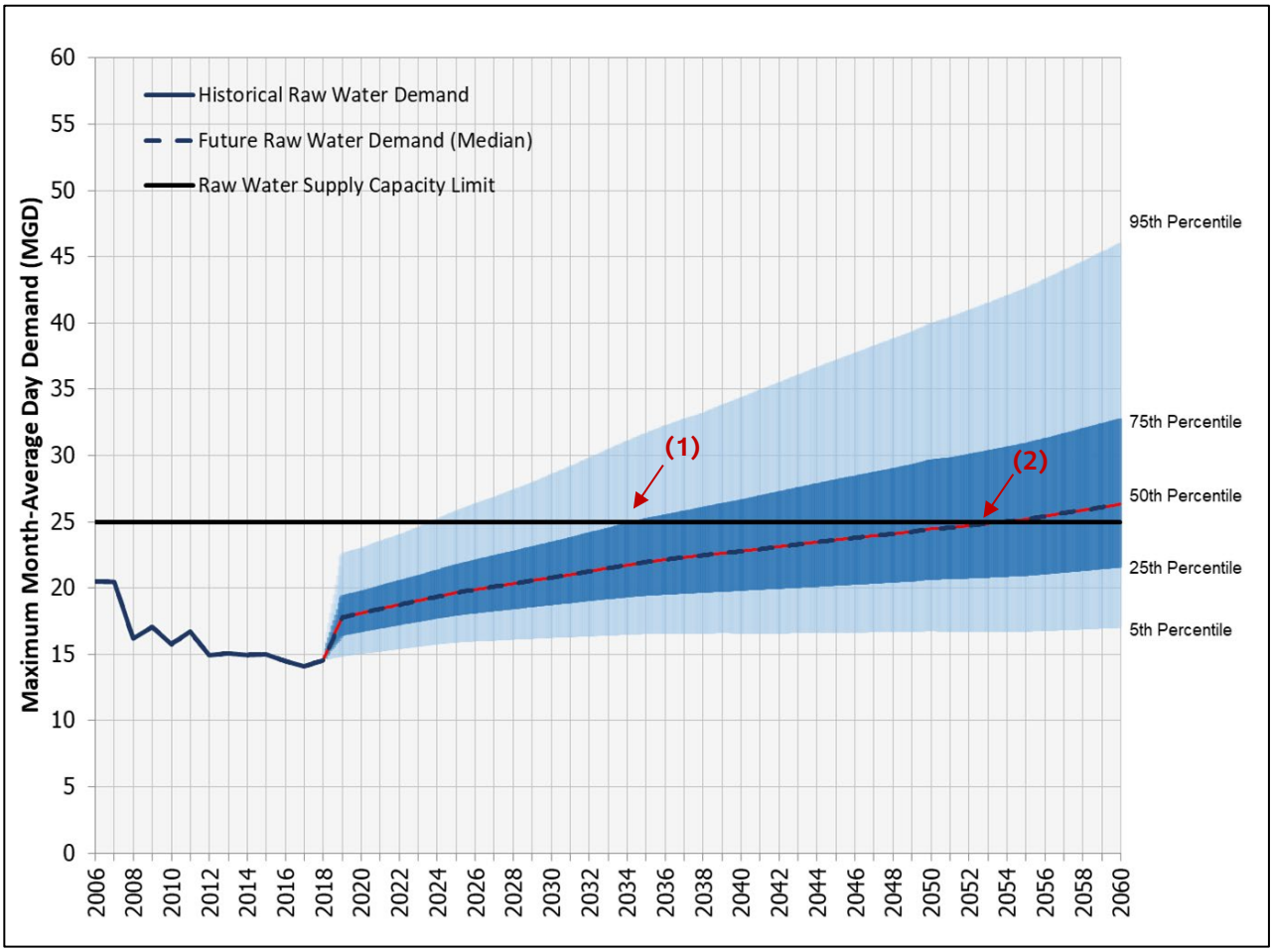

Figure 3-8: Maximum Month Average Day Raw Water Demand Forecast, 2006-2060
2020 Service Delivery Plan Update – Infrastructure Element

3.2.2 Water Treatment Capacity

The water system was evaluated by comparing projected future finished water demands to the existing capacity of the WTP. Figure 3-9 compares the projected maximum day finished water demands, through 2060, to the J.G. Beacham WTP design capacity (36 MGD, maximum day) and permitted capacity (34.75 MGD, maximum day). The 95th percentile forecast crosses the WTP capacity sometime after 2036, which means that the capacity will most likely be sufficient until that year and beyond (see (1) in Figure 3-9). Starting in 2036, the probability that the capacity will be insufficient begins to increase above 5 percent to approximately 25 percent in 2060 (see (2) in Figure 3-9).

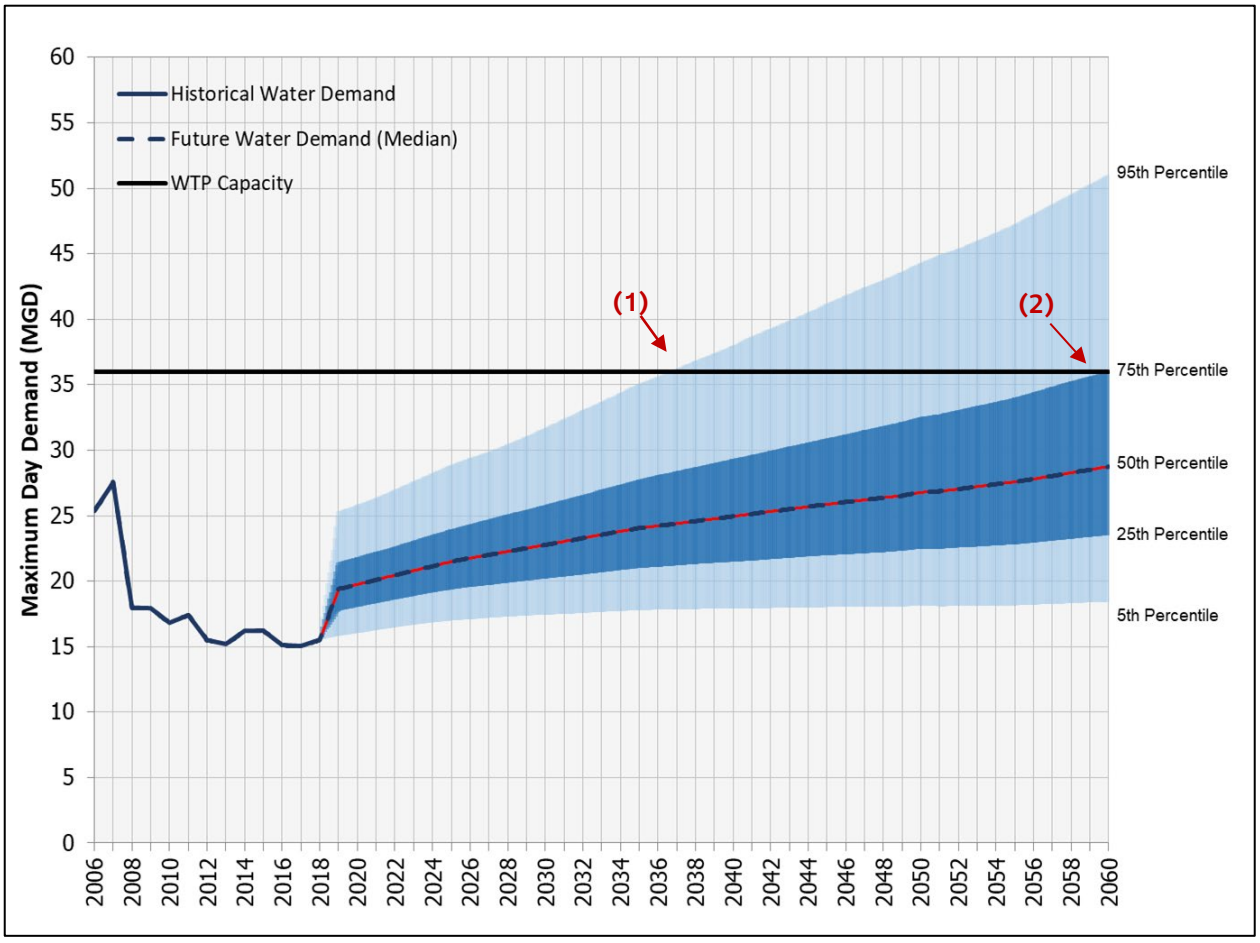

Figure 3-9 Maximum Day Finished Water Demand Forecast, 2006-2060 and Existing WTP Capacity
2020 Service Delivery Plan Update – Infrastructure Element

3.2.3 Water Distribution Capacity

To identify potential water distribution improvements, the 2018 Water Model Update of the ACC PUD water distribution system was run to evaluate the following criteria:

- System pressure
- Operational requirements for the J.G. Beacham WTP
- System velocity and head loss
- Fire flow availability
- Water age
- Water storage requirements
- Water tank turnover rate
- System reliability

Modeling results were compared to criteria for these parameters to identify deficiencies to develop water distribution improvements for this 2020 SDP Update.

3.3 Wastewater System Evaluation

Future wastewater system needs were identified by evaluating the existing wastewater system with respect to projected future needs. The analysis is summarized in this section and forms the basis for a subset of the recommended wastewater system improvements (Section 4.2).

3.3.1 Water Reclamation Capacity

Projected maximum month average day wastewater flows (95th, 75th, 50th, 25th, and 5th percentiles), through 2040, were compared to ACC's total combined permitted monthly average wastewater treatment limit (Figure 3-10). Projected wastewater flows within each WRF service area were compared to the permitted capacity of each WRF (Figures 3-11 through Figure 3-13).

The 50th percentile of wastewater flow expected to be generated by 2060 does not exceed the combined treatment capacity of the WRFs (see (1) in Figure 3-10). However, the combined treatment capacity will be exceeded at the 75th percentile flow as early as 2045. For the North Oconee WRF, shown by (1) Figure 3-11, the 50th percentile forecasted wastewater flow will exceed its current capacity in 2047, while the 75th percentile forecast will exceed the capacity in 2035 (see (2) in Figure 3-11). For the Middle Oconee WRF, shown in Figure 3-12, the capacity is adequate through 2060. For the Cedar Creek WRF, shown in Figure 3-13, the capacity is well above the 95th percentile forecast in 2060. Table 3-4 shows the 50th percentile MMAD and MDD wastewater flow forecast.

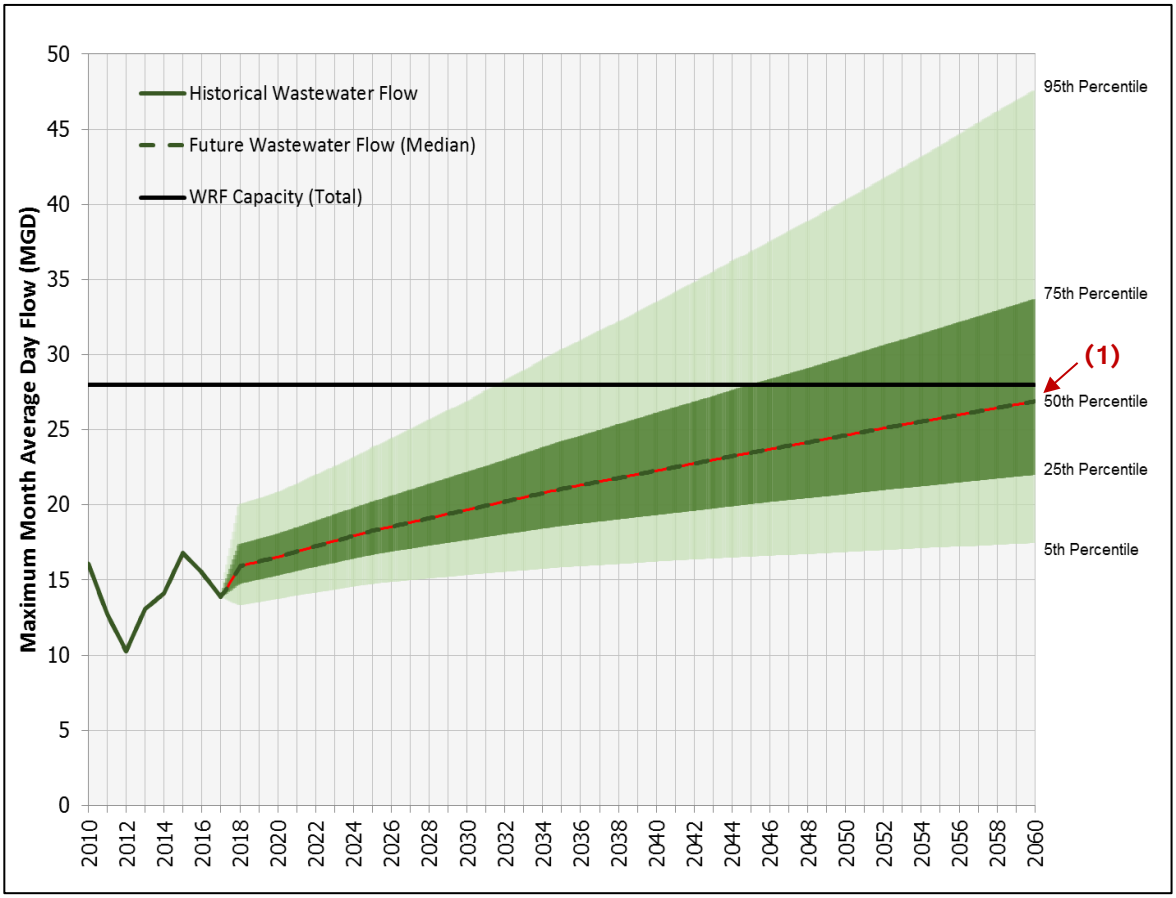

Figure 3-10: Projected Maximum Month Average Day Combined Wastewater Flows
2020 Service Delivery Plan Update – Infrastructure Element

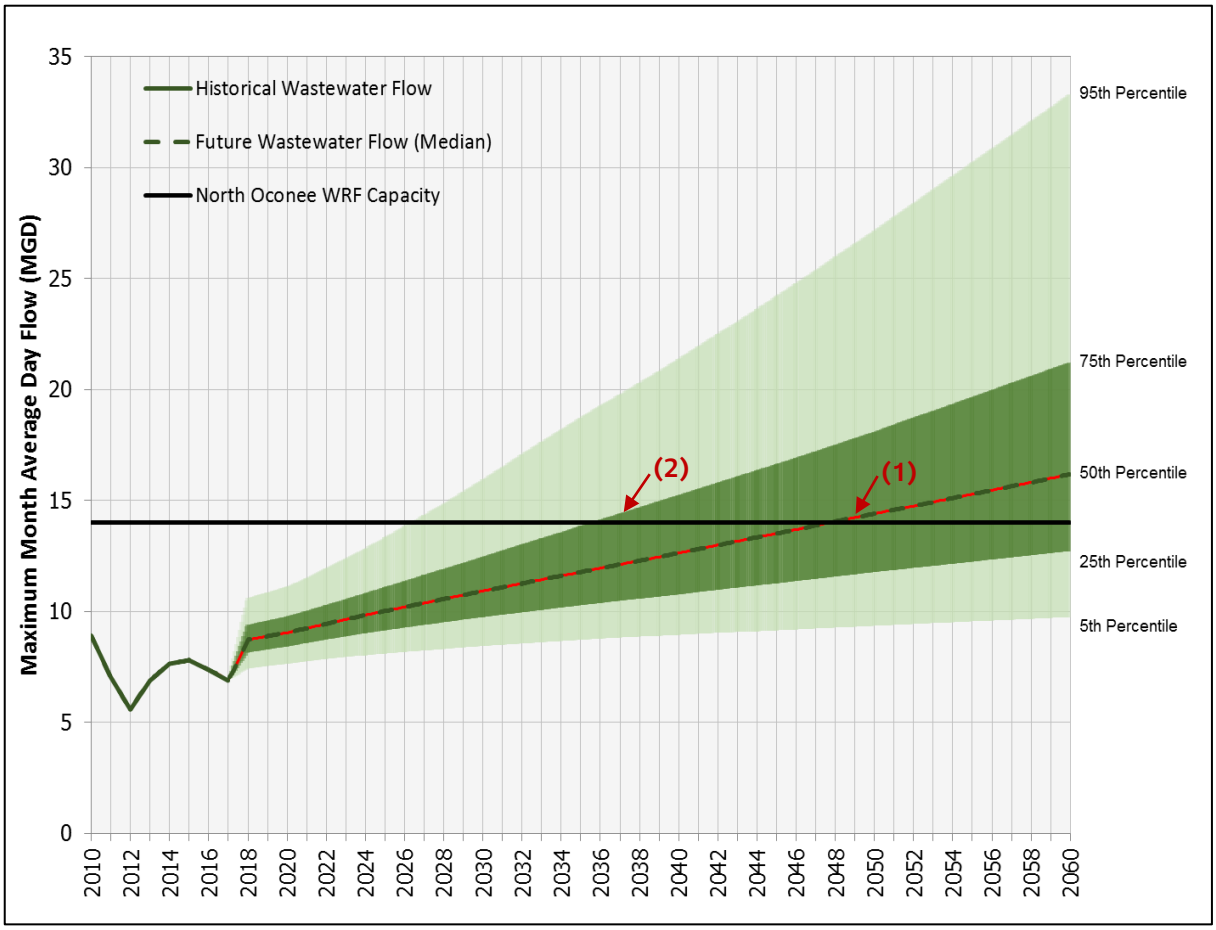

Figure 3-11: Projected Maximum Month Average Day Wastewater Flows – North Oconee Basin
2020 Service Delivery Plan Update – Infrastructure Element

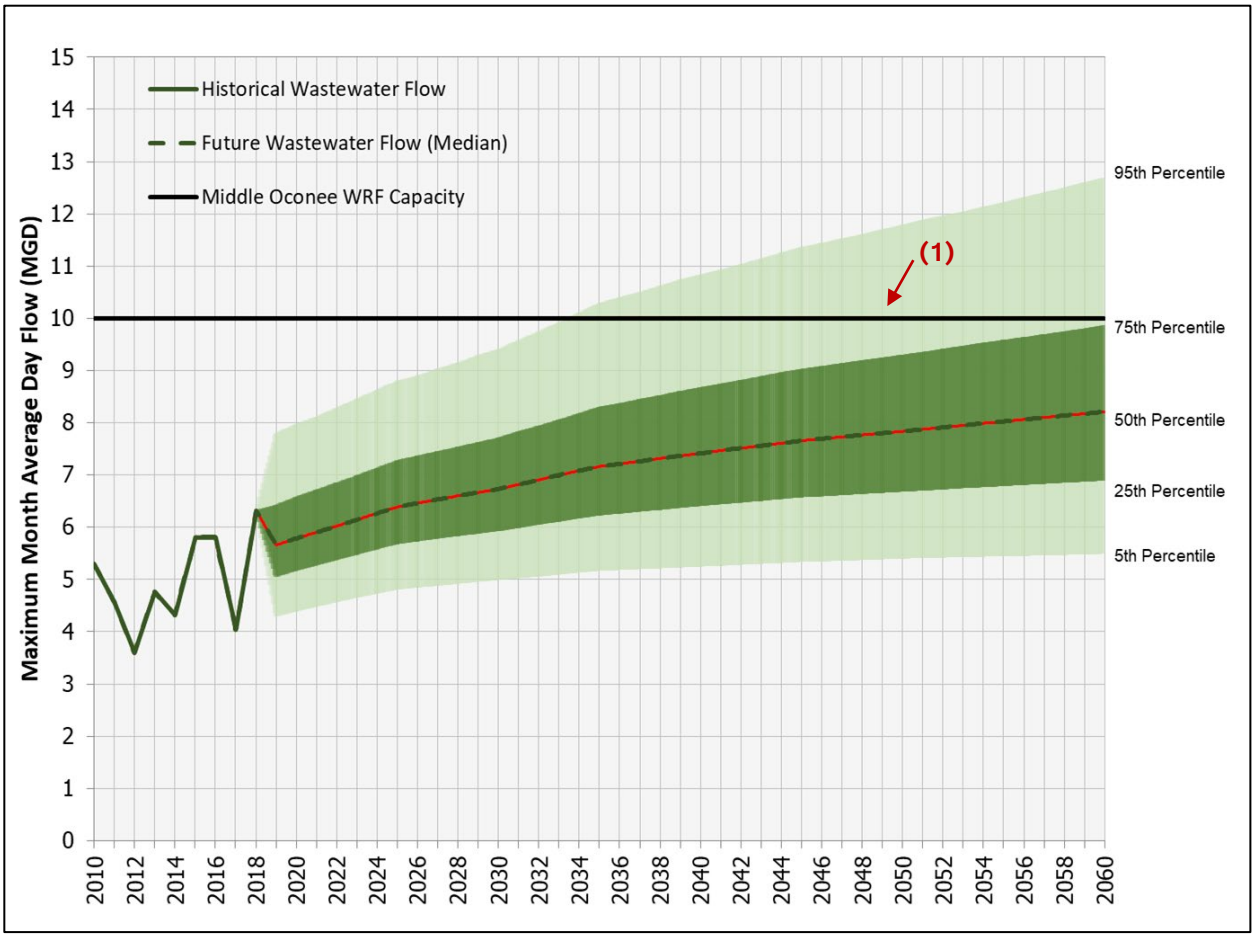

Figure 3-12*:* Projected Maximum Month Average Day Wastewater Flows – Middle Oconee Basin
2020 Service Delivery Plan Update – Infrastructure Element

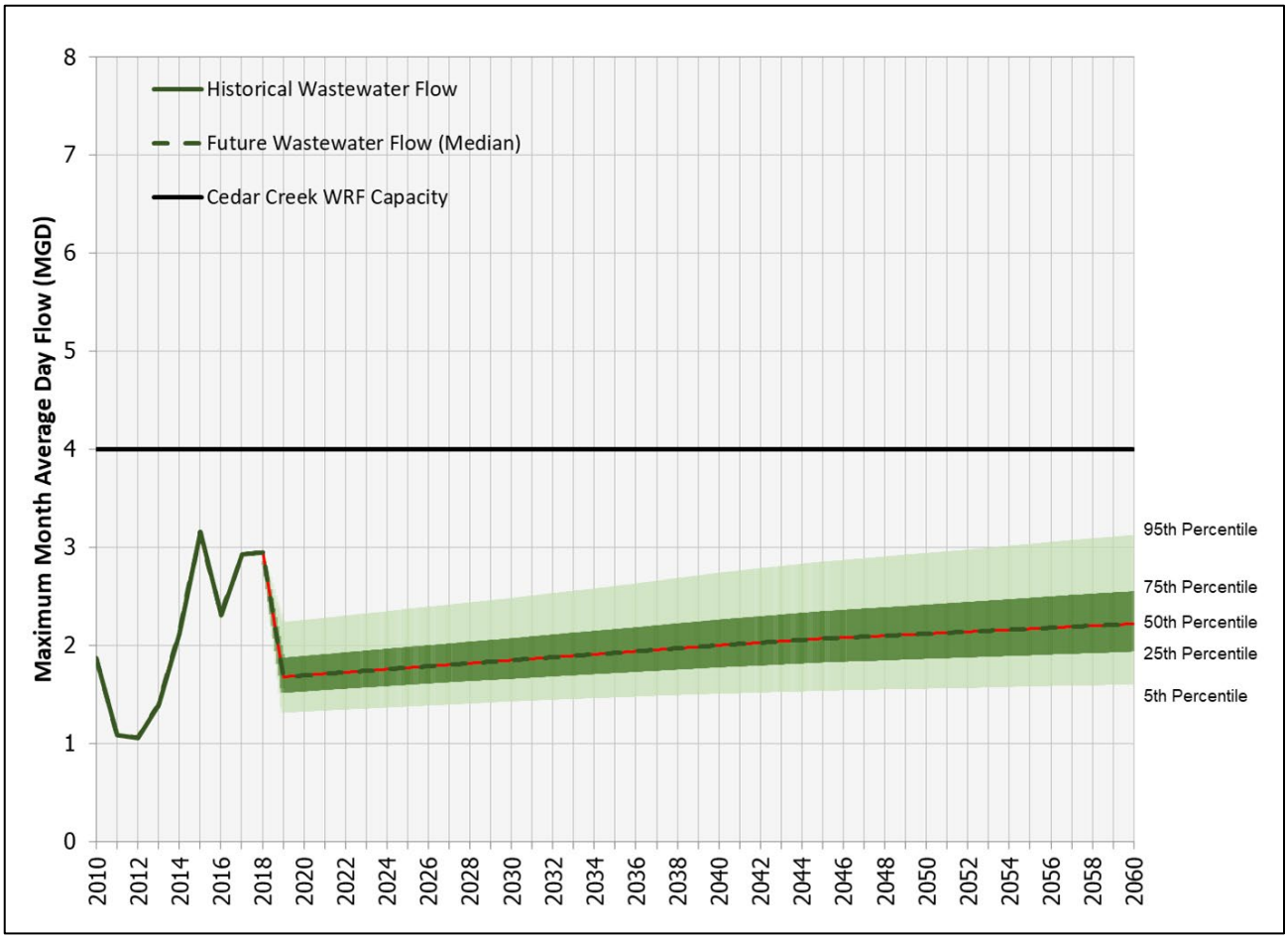

Figure 3-13: Projected Maximum Month Average Day Wastewater Flows – Cedar Creek Oconee Basin
2020 Service Delivery Plan Update – Infrastructure Element

3.3.2 Wastewater Collection Capacity

To support system-wide hydraulic analysis of the collection system, Jacobs developed dynamic hydraulic sewer models. These models serve to identify capacity constraints and provide decision drivers for selecting collection system inspection, rehabilitation, or replacement strategies. They allow PUD to move from compliance-driven operations to a proactive approach where maintenance is more preventive than reactive. The *Sewer Model Report* (Jacobs/CH2M, 2020) provides the methodology and results of the dynamic hydraulic sewer modeling.

Sewer models have been completed for each of PUD's three wastewater service areas (Figures 2-6 through 2-8):

- North Oconee Service Area
  - Tanyard Branch
  - Trail Creek
  - Upper North Oconee
- Middle Oconee Service Area
  - Brooklyn Creek

  - McNutt Creek
  - Middle Oconee East
  - Middle Oconee West
- Cedar Creek Service Area
  - Cedar Creek

Based on institutional knowledge of capacity constraints for the Barnett Shoals interceptor, PUD decided in 2015 to replace the interceptor with larger pipes. The Barnett Shoals Interceptor replacement was completed in 2018. With the interceptor replacement project completed, a sewer model is currently being developed for the Barnett Shoals wastewater Service Area.

The following activities were completed as part of the sewer modeling projects:

- Field Survey – Portions of the system trunks and interceptors were field-surveyed to help ensure that invert elevations and pipe sizes were accurate in the models.
- Inspections and monitoring – Flow monitoring of the entire collection system was conducted to provide data for model flow loading input for both dry-weather flow (DWF), and wet-weather flow (WWF) and model calibration.
- Data analysis and hydraulic modeling – A model network representing the collection system pipelines and manholes was developed, and the flow inputs from the data analysis of the monitored flow data were assigned and distributed throughout the model network. Once the hydraulic model was developed, various flow conditions were modeled including existing and future conditions for both dry- and wet-weather events. The future flows were based on flow projections performed by the team.
- Capital and operations and maintenance (O&M) planning – A capacity analysis was completed to identify problem areas. Alternatives to mitigate those problems were identified for each basin. PUD developed a decision matrix to prioritize the alternatives to meet their capital and O&M goals.

3.3.2.1 Sanitary Sewer Hydraulic Model

A hydraulic model was created using PCSWMM 2016 Professional 2D to identify hydraulic restrictions in the collection system that can result in potential surcharge or overflows (Jacobs/CH2M, 2020). The model also serves as a tool in developing alternatives to either repair or replace the deficient portions of the system by providing additional capacity or by preventing RDII from entering the system. The service area modelled is shown on Figure 3-14.

PUD conducted flow-monitoring studies during 2002, 2010, and 2012 to quantify RDII and GWI in its sanitary sewer system. Comprehensive flow monitoring was performed from February 2 through April 23, 2015, to evaluate DWF and WWF (CH2M, 2016). Active flow monitoring occurred during dry- and wet-weather periods to collect sufficient data to identify DWFs and characterize the relationship between precipitation and sewer system flow.

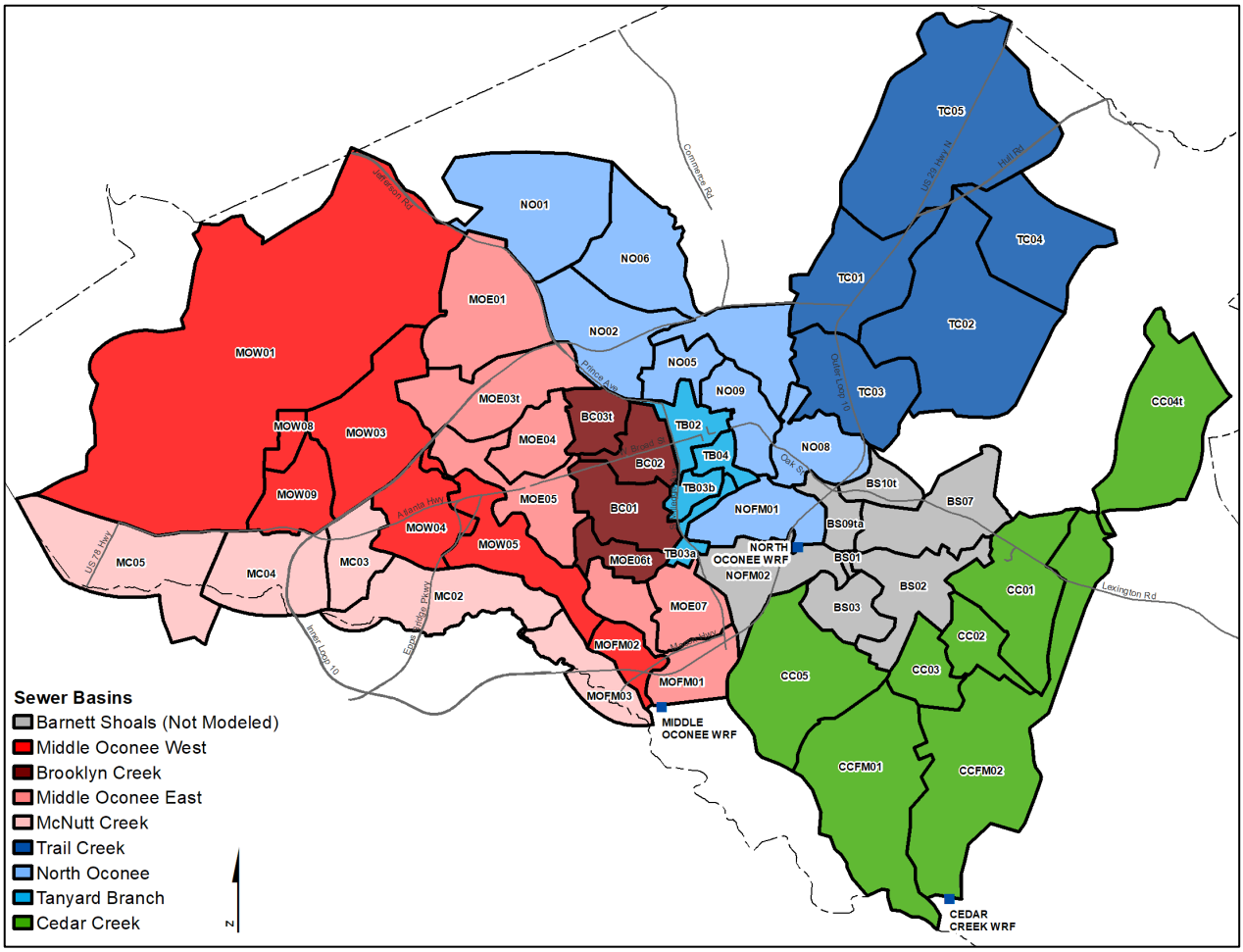

Figure 3-14: Sanitary Sewer Basins Extent
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After the model was fully calibrated for DWF and WWF conditions, computer simulations for all scenarios were performed. To model WWF conditions, synthetic storm unit hydrographs were used to create design storms with region-specific intensity distributions. The model was evaluated using the 2-year, 24-hour design storm because of the low intensity storm monitored. WWF during the years 2015, 2020, 2025, 2030, and 2035 was evaluated using the dynamic wet-weather model.

The dynamic dry- and wet-weather sanitary sewer model used flow loading based on flow-monitoring data recorded in 2015 for existing conditions and flow projections through 2050 for future conditions. The evaluation criteria are based on the surcharge acceptance criteria listed in Table 3-5. Surcharge is not acceptable for Collectors, as it could result in a sewer service backup into laterals and onto private properties. The acceptable ratio of peak flow depth during a design storm event divided by the diameter of the pipe (d/D) criteria for collectors and interceptors/trunks is illustrated on Figures 3-15 and 3-16, respectively.

Table 3-5: Surcharge Acceptance Criteria
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Criteria #	Pipe Classification	Pipe Diameter	Adequate Capacity in DWF	Adequate Capacity in WWF	Inadequate Capacity in WWF
1	Collectors	≤ 10"	d/D < 0.5	d/D < 0.9	d/D > 0.9
2	Interceptors & Trunks	> 10"	d/D < 0.75	Surcharge: less than 2 feet above crown of pipe	Surcharge: more than 2 feet above crown of pipe
3	Interceptors & Trunks	> 10"	d/D < 0.75	Freeboard: greater than 2 feet below manhole rim	Freeboard: less than 2 feet below manhole rim

d = depth of flow, D = Diameter of pipe

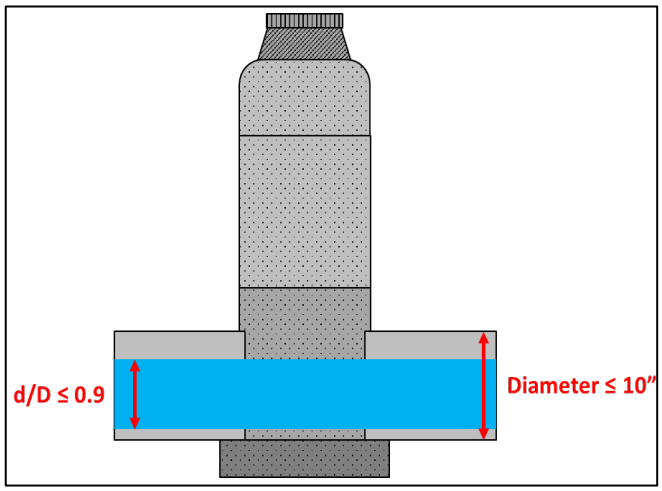

Figure 3-15: Surcharge Acceptance Criteria: Collectors

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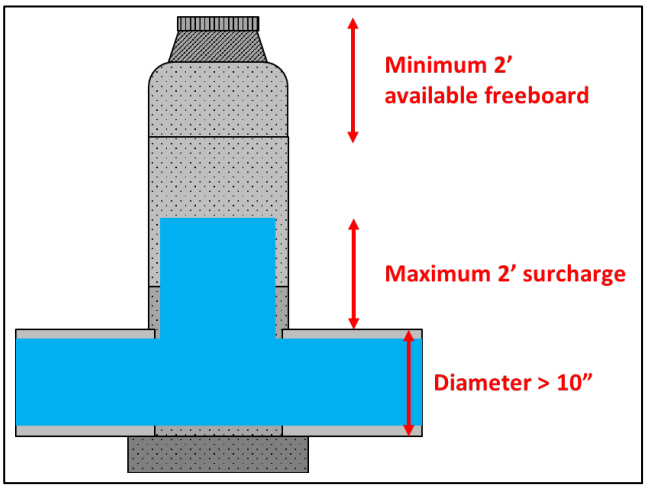

Figure 3-16: Surcharge Acceptance Criteria: Interceptors and Trunks

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For system expansion and renewal projects, new pipe size recommendations were made based on d/D ≤ 0.9, during the 2035 WWF simulation, assuming no RDII reduction. An RDII sensitivity analysis was performed to make an RDII reduction assumption. Based on the relative sensitivity of d/D to RDII reduction and the limited flow data available during development of this 2020 SDP Update, future flows used to size new pipes assumed no RDII reduction for all sewer basins. Dynamic model updates are underway and will incorporate an RDII reduction for the purposes of recommending future pipe sizes.

4. Development of Water and Wastewater Improvements

This section summarizes recommended improvements to the water and wastewater system to be implemented in the 20-year planning period. The development of recommended improvements involved a review of future system needs (Section 3), as well as multiple other studies and reviews detailed in this section. These improvements will be carried forward to the Capital Improvements Element for prioritization. Recommended improvements are noted at the beginning of each subsection, followed by a description of the selection rationale.

4.1 Water System

Identification of water system improvements involved reviewing future system needs (Section 3.2), evaluating current water treatment processes, and evaluating the water distribution system's ability to meet PUD's water service goals (Section 1.2) using the 2018 Water Model Update (Jacobs/CH2M, 2019a) and associated deficiency analysis. These analyses and the resulting recommended improvements are summarized in the following subsections.

4.1.1 Raw Water Supply

Table 4-1 summarizes the recommended improvement related to future water supply and water system reliability.

Table 4-1: Water System Recommended Improvements – Raw Water Supply
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	Details
Middle Oconee River Raw Water Pump Station	Replacement of existing pumps and associated piping and equipment in the existing pump station structure.
North Oconee River Raw Water Pump Stations	Replacement of existing pumps and associated piping and equipment in the existing pump station structure.
Additional Storage	Acquisition of a location as part of a new raw water storage facility.
Water Supply Resiliency and Reliability	Allocation of funds for analysis of future water supply enhancements and implementation of a M&Ca pproved option for future water supply enhancements including engineering, and construction of pump stations, transmission lines and water storage facility improvements.

As previously mentioned, there is a 25 percent likelihood that the monthly average day withdrawal limit for the Bear Creek Reservoir (25.5 MGD) will be exceeded during the maximum month, by the year 2034, and there is a 50 percent likelihood it will be exceeded by the year 2053. Additionally, there is a 25 percent likelihood that the MDD for raw water will exceed the cumulative permit limit (34.75 MGD) by the year 2049.

PUD collaboratively developed a risk-based tool to evaluate the needs for a future water supply source. The risk-based tool considered factors beyond future water demands, such as the risk of entering drought conditions requiring strict water reductions, additional water conservation, water reuse, and additional raw water storage (*Water Supply Assessment – Initial Reliability and Water Supply Source Alternatives Evaluation* [CH2M, 2014a]). Results from the reliability and water supply source alternatives as well as recent regional droughts (in 2007 and 2016), have identified a need for PUD to identify a more resilient water supply system and to improve its drought resiliency. While conservation efforts by ACC over the past 10 years have substantially decreased water demands, future projections suggest that PUD will exceed its monthly raw water withdrawal limit by 2050.

Since the 2015 SDP Update, PUD has explored future water supply storage alternatives as approved by M&C. Costs associated with preliminary analysis related to future water supply enhancements and implementation of an M&C-approved option for future water supply enhancements were included in the 2015 SDP Update, to account for long-term financing. The 2020 SDP Update for future water supply enhancements includes updated costs and identification of engineering projects associated with developing a future raw water storage including pumping and transmission lines for bringing the raw water supply to the raw water storage facility and pumping and transmission lines to connect the raw water storage facility to J.G. Beacham WTP.

4.1.2 Water Treatment

Table 4-2 summarizes the recommended improvements related to future water treatment. Details are provided below.

Table 4-2: Water System Recommended Improvements – Water Treatment
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	Details
J. G. Beacham Water Treatment Plant Solids Handling	Construct facilities to handle backwash and drain water recovery with the latest innovative technology. There will be a need for treating biosolids as the facility reaches capacity.
Future Drinking Water Regulations Treatment	Evaluation leading to new advanced water treatment processes to target removal of compounds regulated in the future under the Safe Drinking Water Act and address potential future taste and odor issues associated with a raw water storage facility.

4.1.2.1 Water Treatment Capacity

The likelihood that the MDD for finished water will not exceed the J.G. Beacham WTP maximum day permitted capacity of 34.75 MGD by 2040 is greater than 75 percent. Therefore, no recommended improvements are related to meeting future demands. Additionally, continued implementation of the water conservation program is expected to maintain the capacity of the WTP. Future system improvements related to capacity will depend on future growth in ACC.

4.1.2.2 Water Treatment Processes

The identification of other needs related to J.G. Beacham WTP involved communications with WTP staff and a review of regulatory drivers with the potential to affect the water system. Jacobs is evaluating facility needs for the WTP to meet current and future regulations as part of *Task Order CH-19-05 Waterworks Drive PUD Properties Master Plan* (CH2M, 2018c). As part of this work, PUD will also determine the best location for their Water and Sewer Maintenance and Operations, including storage yards and meter management.

A workshop with PUD staff was held on January 17, 2019, to identify plant improvements that would be appropriate for inclusion in the SDP 2020 Update. Based on feedback provided at this workshop, review of the existing system, and expected changes in future permit regulations, two projects were identified for inclusion in the SDP: (1) solids handling and (2) treatment to meet future drinking water regulations.

As previously mentioned, there are no facilities at J.G. Beacham WTP to mechanically dewater waste solids. Solids generated by J.G. Beacham WTP are treated passively using a 3-acre, onsite lagoon. This lagoon was dredged in 1994, 2004, 2011, and 2018. Since expansion of J.G. Beacham WTP in 2009, it is anticipated that the lagoon will need to be dredged every 6 to 8 years. Depending on future operating philosophies and future regulations related to backwash water and sludge removal, a solids handling facility at J.G. Beacham WTP may be desired

and/or required. In addition, if solids generation begins to require dredging of the lagoon more frequently, it may be more cost-efficient to develop and operate a solids handling facility. Concepts for a backwash and drain water recovery and solids dewatering system have been developed. The system would include a backwash/drain pump station, backwash recovery basin, gravity thickener, thickened sludge pump station, and a dewatering building with two centrifuges.

It is anticipated that drinking water regulations will continue to develop during the planning period of this SDP. As discussed earlier in this section, PUD is evaluating and planning for a raw water storage facility. A future drinking water regulations project has been identified to assess existing facilities meet future regulations, identify gaps, and characterize raw water quality from three separate sources of supply (Middle Oconee River, North Oconee River, and Bear Creek Reservoir) for taste and odor, contaminants of emerging concern, and per- and polyfluoroalkyl (PFAs) substances compounds. This project will evaluate potential treatment technologies for target compound removal and impacts on total trihalomethane formation potential by bench scale testing. Results of bench scale testing on PUD's raw water supply will be used in conjunction with the latest drinking water requirements to select the best treatment scheme.

4.1.3 Water Distribution

Table 4-3 summarizes recommended improvements related to the water distribution system. Details are provided below.

Table 4-3: Water System Recommended Improvements – Water Distribution
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	Details
Atlanta Highway Elevated Storage Tank and Booster Pump Station	Elevated Storage Tank and Booster Pump Station to develop high pressure zone in western portion of ACC.
Small Diameter Water Main Replacement	Replacement of small diameter (2-inch and 3-inch) water mains with 8-inch diameter pipe to enhance fire protection and improve system reliability.
Water Main Connection Reliability for Improved Water Quality and Fire Protection	Installation of 30,000 LF new water lines to connect areas of existing service, eliminating pipe dead ends and increasing system redundancies by creating loops.
Upgrade Aging Water Mains	Replacement of approximately 16 miles of water mains due to age and/or condition.
Water Main Transmission Redundancy	Identify transmission lines that will provide redundancy in the water main transmission system. Project includes design and construction of large diameter water mains to provide multiple paths for water transmission to all parts of the county.

4.1.3.1 Atlanta Highway Elevated Storage Tank and Booster Pump Station

Based on results of the hydraulic water model, an elevated storage tank and booster pump station in the western portion of ACC is recommended to develop a high-pressure zone west of Loop 10. The project would involve construction of a larger elevated storage tank and a booster pump station, and demolition of the existing 0.5-MG Atlanta Highway Tank and the Bogart Booster Pump Station (Figure 4-1). The higher-pressure zone would provide more consistent water pressures to the western portion of Atlanta Highway, as well as the City of Bogart. The storage tank would provide additional storage (accounting for the demolished 0.5-MG tank), which would serve anticipated industrial development.

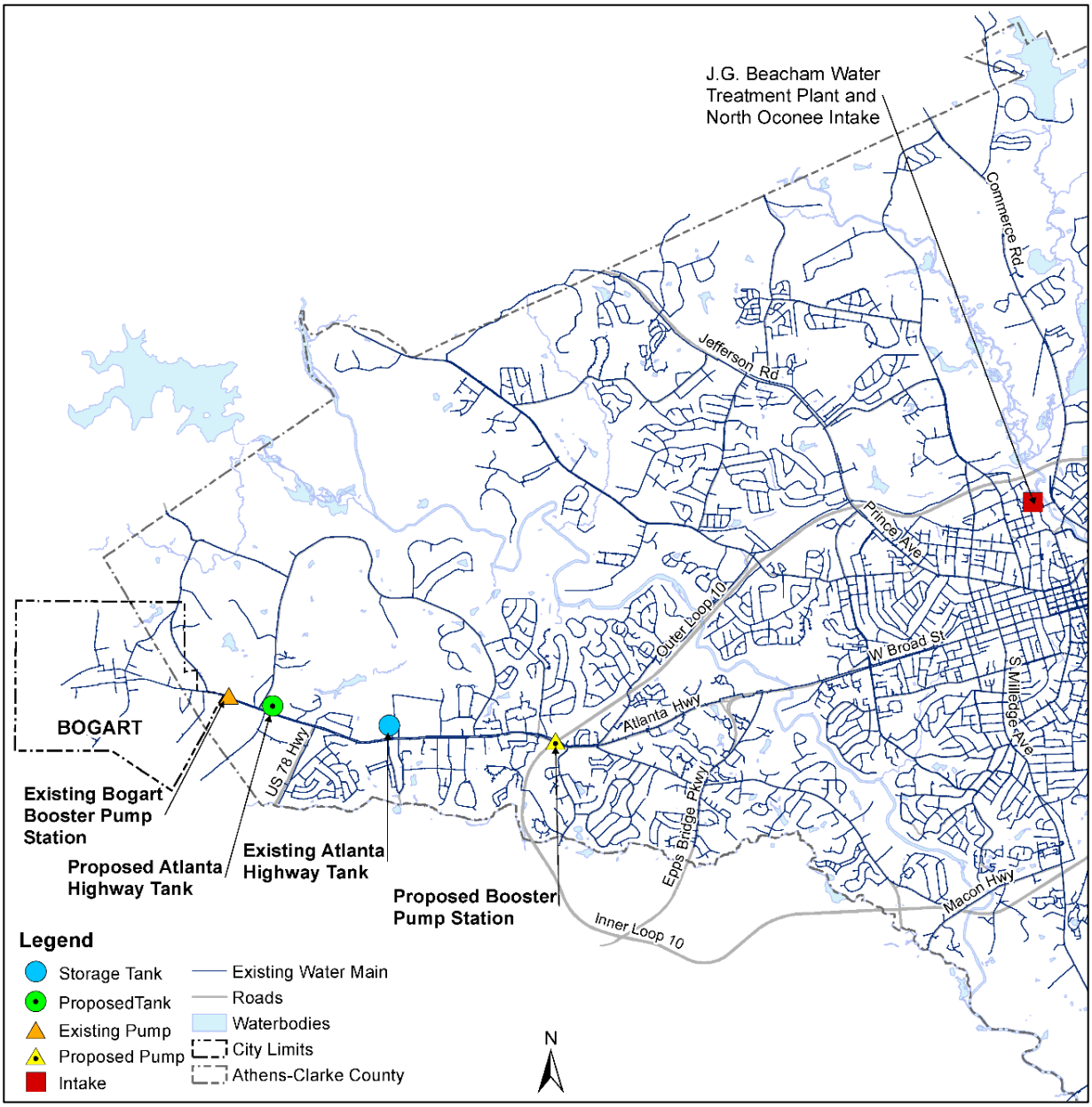

Figure 4-1: Recommended Elevated Storage Tank and Booster Pump Station
2020 Service Delivery Plan Update – Infrastructure Element

4.1.3.2 Small Diameter Water Main Replacement

In the 2015 SDP Update, water main replacement needs were determined by identifying small diameter (i.e., less than 6-inch-diameter) pipes greater than 300 LF in length throughout the system. A total of 22 miles of pipes were identified using the ACC PUD GIS database. This updated project will (2 inch and 3 inch) water mains to enhance fire protection and improve system reliability. Replace the small diameter distribution pipes with 6 inch or 8-in diameter pipe. Fire hydrants will be added to the new pipe network improving fire-fighting capability for the area. The remaining length of small diameter pipe is approximately 14.4 miles (70,000 LF) of pipe. PUD is currently replacing 1.5 miles of 2-inch pipeline per year.

4.1.3.3 Water Main Connections for Improved Water Quality and Fire Protection

As previously mentioned, one of PUD's key strategies to meet its water service goals is to eliminate dead-end pipelines in the system. Dead-end lines were identified using the GIS database. PUD will install new water lines to connect areas of existing service and increase system redundancies by creating loops. These upgrades will improve water quality and fire protection in the service area. This 2020 SDP Update project includes approximately 30,000 LF of pipe.

4.1.3.4 Upgrade Aging Water Mains

This existing SDP project for water main rehabilitation projects included the repair of existing pipe in the water distribution system. Water mains may require repair because of pipe age and/or condition. Water main inspection and rehabilitation projects were prioritized based on pipe age, to account for assumed pipe material and pipe condition. The GIS database was used to identify pipe installation dates. The 2020 update of this project identified the replacement of approximately 16 miles of unlined and lined cast iron water mains installed prior to 1960. Cast iron pipes can become brittle or tuberculated with excessive age. These pipes are more prone to failure which could lead to service outages or boil water advisories. ACC PUD has completed replacing aging water mains in the downtown area.

4.1.3.5 Water Main Transmission Redundancy

Another one of PUD's key strategies to achieve its water service goals is to evaluate the system based on minimum operating pressure and velocity. PUD will provide improved service to the areas identified by installing new transmission mains to create increased system redundancy. Transmission lines have a diameter larger than 8 inches. They convey water across long distances to smaller distribution, and service lines. Redundant transmission lines create a more robust distribution system with more stable operating pressures and velocities. Multiple paths or redundancy also provides improved fire protection and backup sources in case of a water main failure.

4.2 Wastewater System

Identification of wastewater system needs involved a review of future system needs (Section 3.3), a review of WRF processes, and the development and analysis of dynamic hydraulic flow modelling for the wastewater collection system. These analyses and the resulting recommended improvements are summarized in the following subsections.

4.2.1 Water Reclamation

Major renovations were completed to expand the capacity of PUD's water reclamation facilities in the mid-2000s. The majority of water reclamation projects identified in the 2020 SDP update focus on improving and upgrading existing treatment and plant support facilities rather than adding capacity. Table 4-4 summarizes recommended improvements related to the WRFs.

Table 4-4: Wastewater System Recommended Improvements – Water Reclamation
2020 Service Delivery Plan Update – Infrastructure Element

Water Reclamation Facility	Project Name	Details
North Oconee WRF	Phosphorus Polishing	Installation of tertiary filtration technology to reliably meet future effluent Total Phosphorus limit
	Aeration Basins	Installation of valve actuators at drop down points and dissolved oxygen probes will allow for better process control and reduce energy cost considerably.
	Thermal Dryer	Installation of thermal dryer fuelled for upgraded biosolids treatment.
	Biosolids Upgrades	Construct solids handling facilities to assist in reduction of volume and mass of biosolids.
	Aeration Basins Small Blower	Installation of a smaller blower for lower air demands.
	Preliminary Treatment	Installation of grinder to protect downstream equipment from ragging and minimize blockages to ensure efficient operation, reduce maintenance, and optimize flow throughput. Improvements for grit removal and screening as needed.
Middle Oconee WRF	Phosphorus Polishing	Installation of tertiary filtration technology to reliably meet future effluent Total Phosphorus limit. Intermediate pump station will also be required.
	Electrical Building	Construction of new electrical building to replace Electrical Building No1, which is experiencing settling.
	Operations Building	Construction of new one-story operations building.
	Enhanced Biological Phosphorus Removal (EBPR) Basin Cover	Installation of covers to prevent odors, which come naturally with the EBPR process and could become an issue with surrounding residents. Includes odor control carbon scrubbers for air removal and treatment.
	Influent Pumps	Installation of six new influent pumps (5 duty, 1 standby) and one new variable frequency drive (VFD). Five existing VFDs to be used on new influent pumps.
	Preliminary Treatment	Installation of grinders at the influent pump station wet well and improvements for grit removal and screening as needed.
Cedar Creek WRF	Phosphorus Polishing	Installation of tertiary filtration technology to reliably meet future effluent Total Phosphorus limit.
	Emergency Generator	Installation of new emergency generator and main facility switchgear to connect to generator to power necessary equipment during a power outage. Includes new electrical building for switchgear.
	Influent Pumps	Installation of four influent pumps to replace existing pumps. Existing VFDs to be used on new influent pumps.
	Ultraviolet Disinfection	Installation of second ultraviolet (UV) unit within an existing spare channel.

4.2.1.1 Capacity

As previously discussed, there is a low probability (less than 10 percent) that the permitted capacity of the Middle Oconee WRF will be exceeded through the year 2040. There is no probability that the permitted capacity of Cedar Creek WRF will be exceeded beyond the year 2040. There is a less than 50 percent chance that North Oconee WRF will require additional capacity prior to 2040. Therefore, no WRF capacity expansions are included in this 2020 SDP Update.

4.2.1.2 Treatment Processes

GAEPD issued a wasteload allocation for all three WRFs between 2004 and 2006. The updated permit requirements are provided in Table 2-1. Based on the WRFs' current operation, these limits are being met with consistency. However, GAEPD is developing numeric nutrient criteria for lakes, rivers, estuaries, and wetlands (natural), which were expected to impact TP effluent limits in the Oconee River Basin by 2019 and ACC is expecting a new TP limit. The latest NPDES permits for the three WRFs also include a revised seasonal ammonia limit in accordance with GAEPD's permitting strategy to address ammonia toxicity.

While there are several technology approaches to meeting a more stringent TP limit, fabric (cloth media) filtration following the secondary clarifiers provides a cost-effective approach to reliably meet the anticipated effluent TP limit of 0.5 mg/L. The 2015 SDP Update included a project for filters to be installed at each of the WRFs (Table 4-4). (CH2M, 2015) These three projects have been updated to include alum addition and flocculation following secondary clarifiers prior to the cloth filters, which improves the life cycle of the cloth media.

A workshop was held on January 17, 2019, to identify plant improvements that would be appropriate for inclusion in the SDP 2020 Update. The recommended improvements identified are summarized in Table 4-4, along with the purpose for the recommended improvement.

4.2.1.3 Solids Handling

CH2M completed a biosolids alternatives evaluation in 2018 to identify biosolids management and disposal alternatives to potentially eliminate or substantially reduce PUD's current landfilling for its three WRFs. (CH2M, 2018a). Short-term, mid-term, and long-term alternatives were recommended based on a review of available technologies and development of evaluation criteria and weighting factors including non-monetary factors. Solids handling improvements are in included in Table 4-4.

4.2.2 Wastewater Collection System

Recommended wastewater collection improvements for the 2015 SDP Update included sanitary sewer evaluation survey (SSES), pipe rehabilitation, and pipe replacement. Preliminary design reports (PDR) completed for seven projects in the past five years provided recommended improvements for pipeline replacement and rehabilitation. Table 4-5 summarizes the recommended improvements. Figures 4-2 through 4-4 show the location of site-specific rehabilitation and replacement projects (note that expanded sewer Service Areas are also shown on these figures and will be discussed in the next section).

Table 4-5: Wastewater System Recommended Improvements – Existing Wastewater Collection
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	Drainage Sub-basin	Project Details
System-wide		
Targeted Sanitary Sewer Flow Monitoring	Throughout Service Area	Conduct targeted flow monitoring and analyze groundwater infiltration (GWI) and rainfall inflow and infiltration (RDII).
Prioritized Sewer Rehabilitation and Replacement	Throughout Service Area	Replacement and rehabilitation (where needed) on sewer pipes in the highest ranked flow sub-basins.
Long-Term Sanitary Sewer Evaluation Survey (SSES) and Rehabilitation	Throughout Service Area	Perform targeted SSES and rehabilitation on selected pipeline as determined in the future.
North Oconee Basin (Figure 4-2)		
Tanyard Branch Interceptor Improvements	UNO-3, UNO-4	12,800 LF
Upper North Oconee Interceptor – Phase 2B	UNO-2	1,840 LF
Upper North Oconee Interceptor – Phase 2C	UNO-6, UNO-7	9,000 LF
Sanford Stadium Sanitary Sewer Interceptor – Phase 1	UNO-4	1,600 LF
Upper North Oconee West Trunk Improvements	UNO-4, UNO-5	10,400 LF
Voyles Road Sanitary Sewer Upgrade	TCE-4	7,000 LF
Middle Oconee Basin (Figure 4-3)		
Brooklyn Creek Interceptor Improvements	LMO-3	11,460 LF
Middle Oconee East Trunk Improvements - Phase 1	LMO-1, LMO-3, LMO-4, LMO-6	8,700 LF
Middle Oconee West Trunk Improvements - Phase 1	LMO-2, LMO-7, LMO-9, LMO-10, BC-1	29,800 LF.
Middle Oconee East Mill Run Sewer Replacement	LMO-1	1,000 LF
Turkey Creek Interceptor Improvements	TC-1, TC-3	6,400 LF.
Hampton Park Gravity Sewer Interceptor	LMO-4	3,000 LF
Kingswood Subdivision Gravity Sewer Collector Improvements	MN-2	2,200 LF
McNutt Creek Sewer Interceptor Improvements Phase 1	MN-1	27,500 LF
Mitchell Bridge Sewer Interceptor Improvements	LMO-8	6,000 LF
Cedar Creek Basin (Figure 4-4)		
Cedar Creek Interceptor Improvements Phase 1	CC-2, CC-3, CC-4, CC-5	22,800 LF

CC = Cedar Creek; LMO = Lower Middle Oconee; MN = McNUtt

4.2.2.1 SSES and Rehabilitation

Sanitary sewer evaluation survey (SSES) and rehabilitation projects were considered for long-term pipeline needs but were not the primary focus of the SDP 2020 Update. SSES includes cleaning, closed-circuit television

recording, smoke testing, and manhole condition assessment. Targeted SSES and rehabilitation will be performed on selected pipelines as determined in the future.

4.2.2.2 Sewer Replacement

The 2015 SDP Update included pipe replacement recommendations on 46,575 LF of pipe. As previously mentioned, new pipe size recommendations were made based on:

- d/D ≤0.9, during the 2035 wet-weather conditions, assuming no RDII reduction, for areas included in the dynamic wet-weather model.

In the 5 years since the 2015 SDP Update, preliminary design reports have been completed by CH2M/Jacobs for the following trunks and interceptors:

- Tanyard Creek Interceptor
- Upper North Oconee Interceptor Phase 2C
- Brooklyn Creek Interceptor
- Middle Oconee East Trunk
- McNutt Creek Interceptor
- Cedar Creek Interceptor
- Mitchell Bridge Interceptor

Since the 2015 SDP Update, pipeline replacement projects have been completed following design by internal PUD engineering as well as outside consultants and construction by on-call contractors and bid selected contractors. Table 4-5 provides an updated list of the pipeline replacement projects which total more than 25 miles (approximately 147,000 LF).

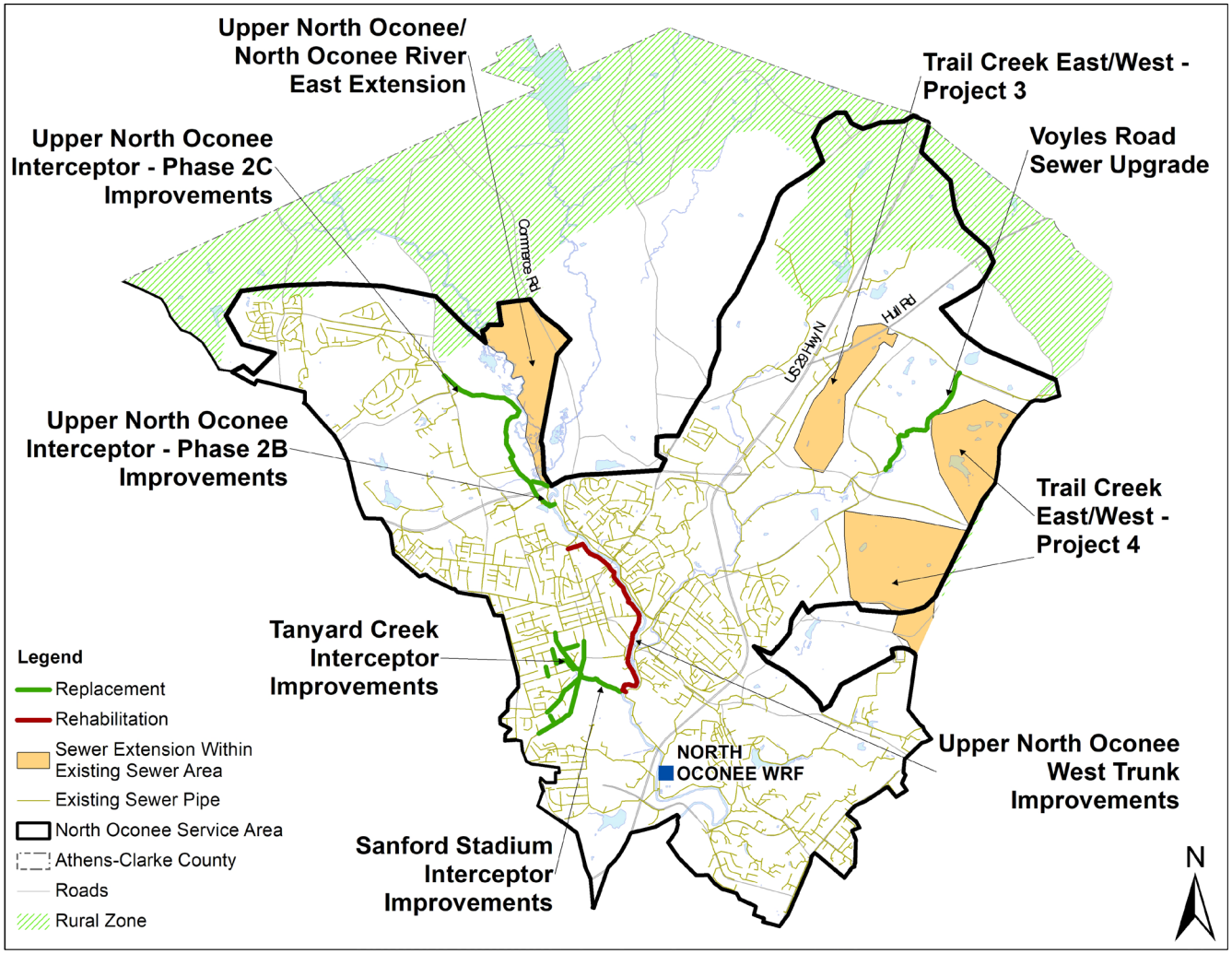

Figure 4-2: Recommended Wastewater Collection Improvements – North Oconee WRF Service Area
2020 Service Delivery Plan Update – Infrastructure Element

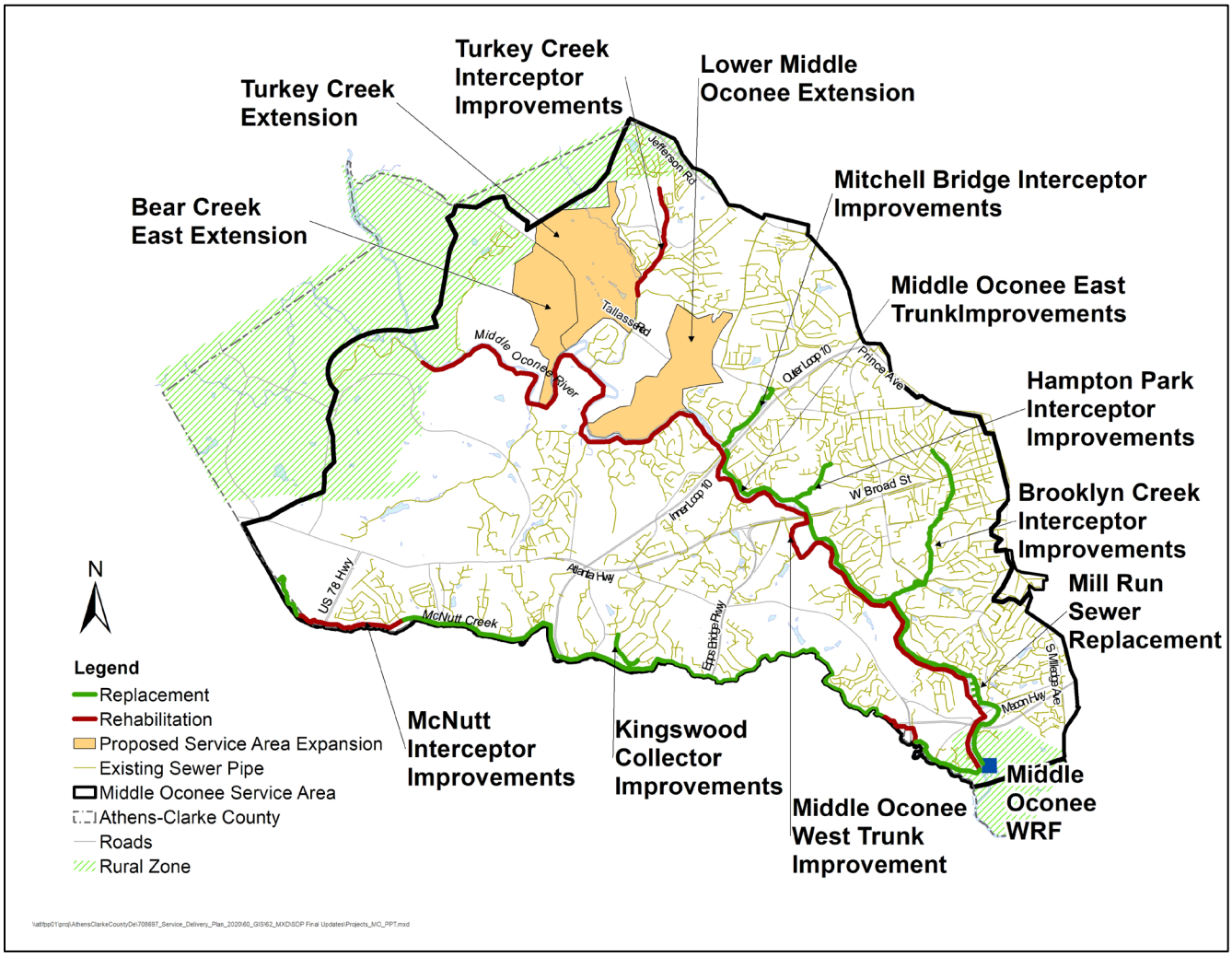

Figure 4-3: Recommended Wastewater Collection Improvements – Middle Oconee WRF Service Area
2020 Service Delivery Plan Update – Infrastructure Element

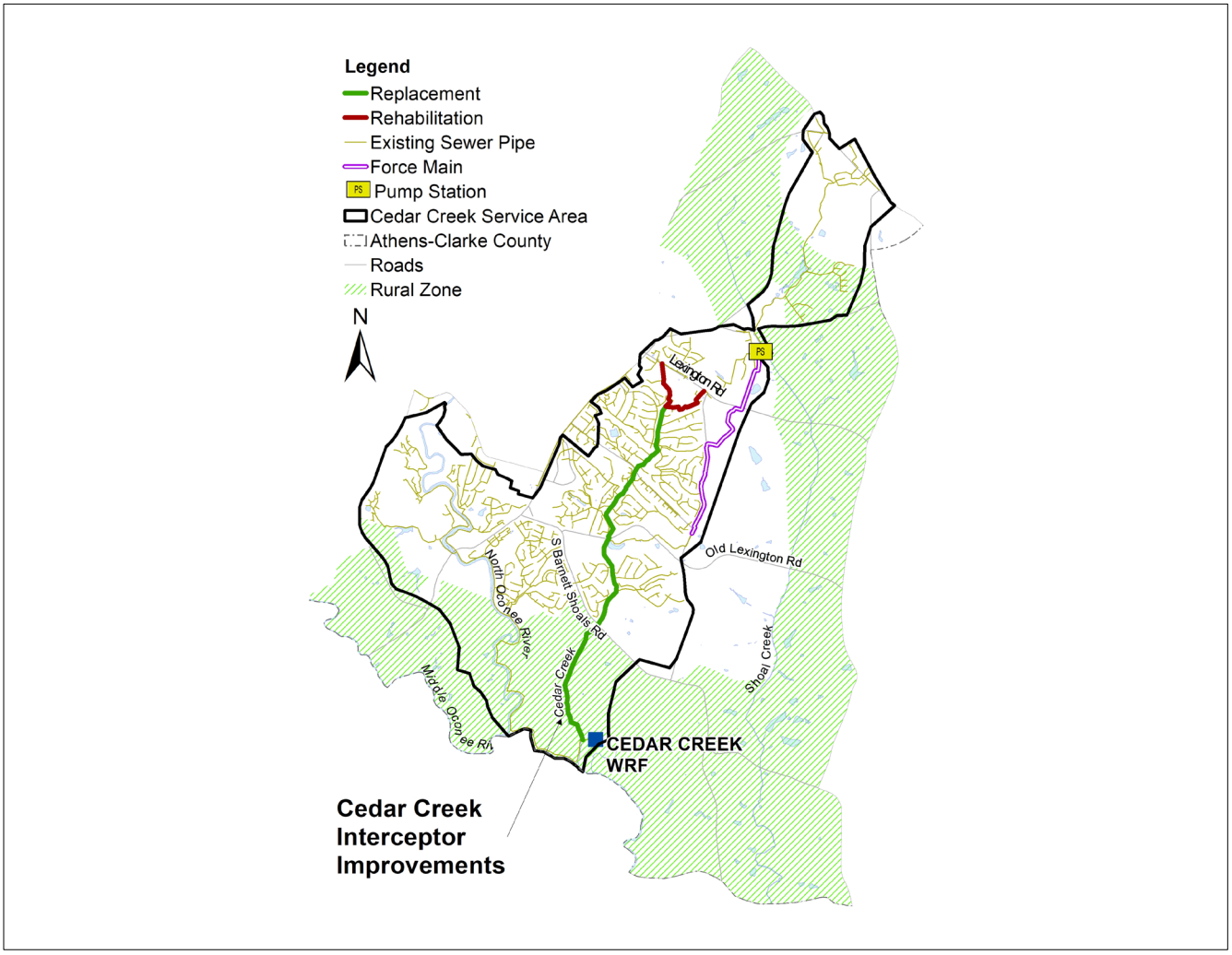

Figure 4-4: Recommended Wastewater Collection Improvements – Cedar Creek WRF Service Area
2020 Service Delivery Plan Update – Infrastructure Element

4.2.3 Future Wastewater Collection System

For the 2020 SDP Update, two types of future wastewater collection projects were identified: those that extend wastewater collection within the Service Area and those that would require a revision to the existing public wastewater Service Area. Figure 4-5 shows the projected future (2040) wastewater flows and the existing sanitary sewer pipe. This map was used to evaluate the extension of future sewer service with consideration to PUD's goals for sewer service to:

- Provide wastewater service to 90 percent of ACC residents (approximately 10 percent of residents are located in rural land use areas and may be better served by onsite systems based on population density and cost effectiveness).
- Provide service to the upper 200 acres of each sub-basin and in 200-acre areas adjoining each trunk or interceptor.

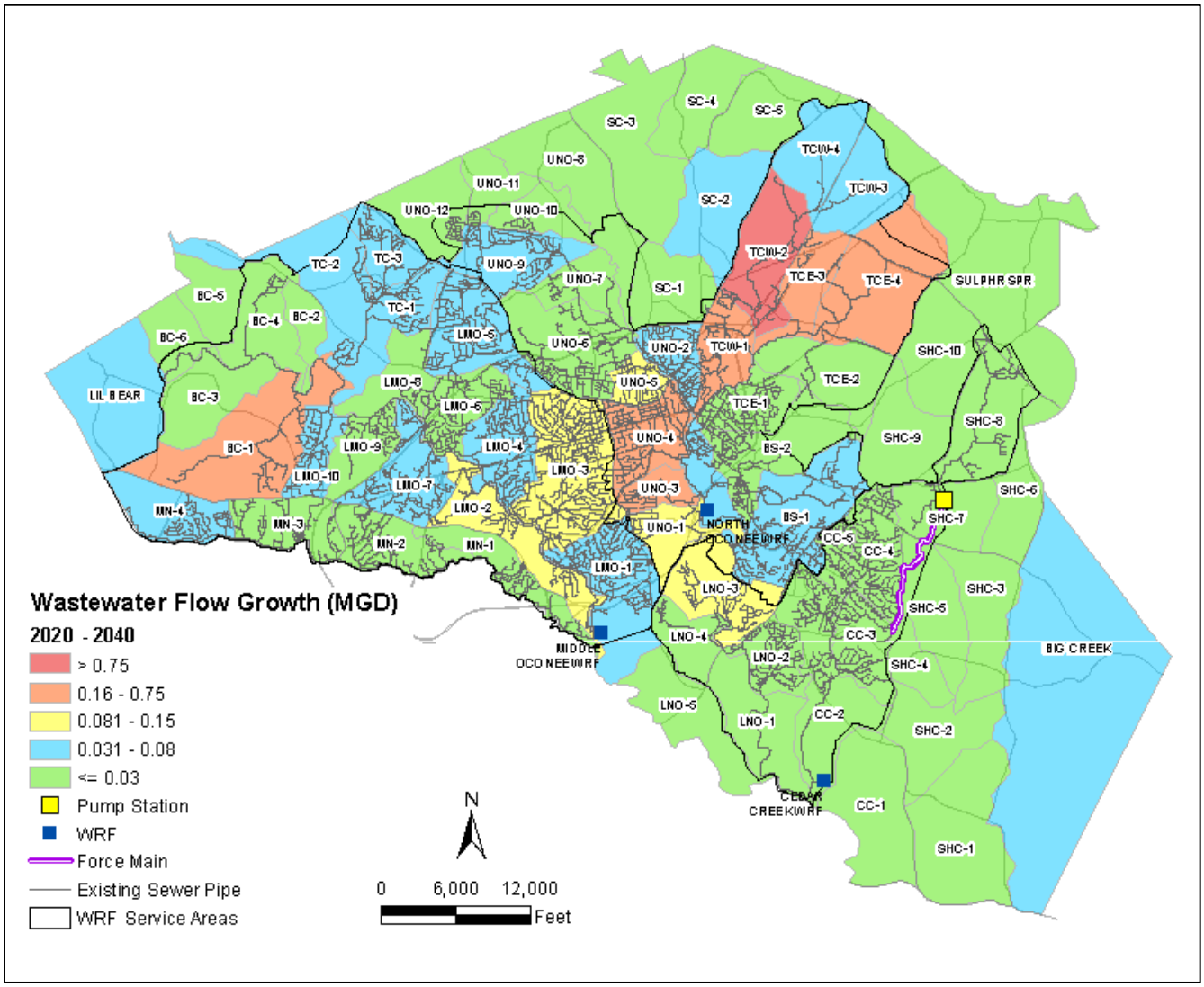

Figure 4-5: Comparison of Existing Sewered Areas to Projected Wastewater Flow Growth
2020 Service Delivery Plan: Infrastructure Element

4.2.3.1 Extension of Wastewater Collection within Service Area

Table 4-6 summarizes recommended projects to extend wastewater collection within the existing Service Area. These projects are shown on Figure 4-2 (North Oconee Service Area) and Figure 4-3 (Middle Oconee Service Area). The projects include extending wastewater service in 3,050 acres of the Trail Creek, Bear Creek, Turkey Creek, Upper North Oconee, and Lower Middle Oconee drainage basins for future customers.

Table 4-6: Wastewater System Recommended Improvements – Extension of Wastewater Collection within Service Area
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	Drainage Sub-basin	Details
North Oconee Service Area (Figure 4-2)		
Trail Creek East/West Extension – Project 3	TCE-3	Extension of sewer service to 300 acres in the Trail Creek East drainage basin
Trail Creek East/West Extension – Project 4	TCE-2, TCE-4	Extension of sewer service to 1,000 acres in the Trail Creek East drainage basin ITCE-2 and TCE-4)
Upper North Oconee/North Oconee River East Extension	UNO-8	Extension of sewer service to 350 acres in the Upper North Oconee drainage basin
Middle Oconee Service Area (Figure 4-3)		
Bear Creek Gravity Sewer Extension	BC-2	Extension of gravity sewer service to 300 acres in the Bear Creek drainage basin
Turkey Creek Gravity Sewer Extension	TC-2	Extension of gravity sewer service to 600 acres in the Turkey Creek drainage basin
Lower Middle Oconee Gravity Sewer Extension	LMO-8	Extension of gravity sewer service to 500 acres in the Lower Middle Oconee drainage basin

4.2.3.2 Expanded Public Sewer Service Area

M&C removed expanded sewer service to the Lower Shoal Creek basin in 2004, and to Sandy Creek in 2010. Aging septic systems currently provide wastewater service in these areas, with the average age of these systems greater than 25 years, reaching or extending beyond the average life expectancy of a septic system (25 years). In the Sandy Creek drainage area, outside of the rural zone, there are more than 1,200 septic tanks, with an average age of 31 years. In the Shoal Creek drainage area, there are more than 1,100 septic tanks, with an average age of 26 years. The quantity of septic tanks that are densely clustered in the drainage basins, and the aging condition of these systems, could adversely impact public health and water quality.

Based on the motion approved by M&C in 2015, expanded service in these areas will utilize solutions other than gravity sewer lines, will avoid environmentally sensitive areas, and will serve only existing structures or lots of record. Expanded service would be implemented only after approval by M&C. For the 2020 SDP, Alternate Sewer Solutions as described in Table 4-7 will provide design for alternatives to gravity sewer in areas that have failing septic tanks. Alternatives could include force main collection, onsite wastewater treatment options, neighborhood-based wastewater treatment and disposal, or other future concepts for wastewater treatment and disposal. Tracking septic tank pumping manifests from the Cedar Creek WRF septage receiving station allows areas of potential septic tank failure to be identified as shown in Figure 4-6.

Table 4-7: Wastewater System Recommended Improvements – Expanded Sewer Service Area
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	Drainage Sub-basin	Details
North Oconee Basin (Figure 4-2), Cedar Creek Basin (Figure 4-4)		
Alternate Sewer Solutions	TBD	Expansion of the public sewer service to existing developments in the unsewered portion of the county where PUD will utilize solutions other than gravity sewer lines, will avoid environmentally sensitive areas, and will serve only existing structures or lots of record.

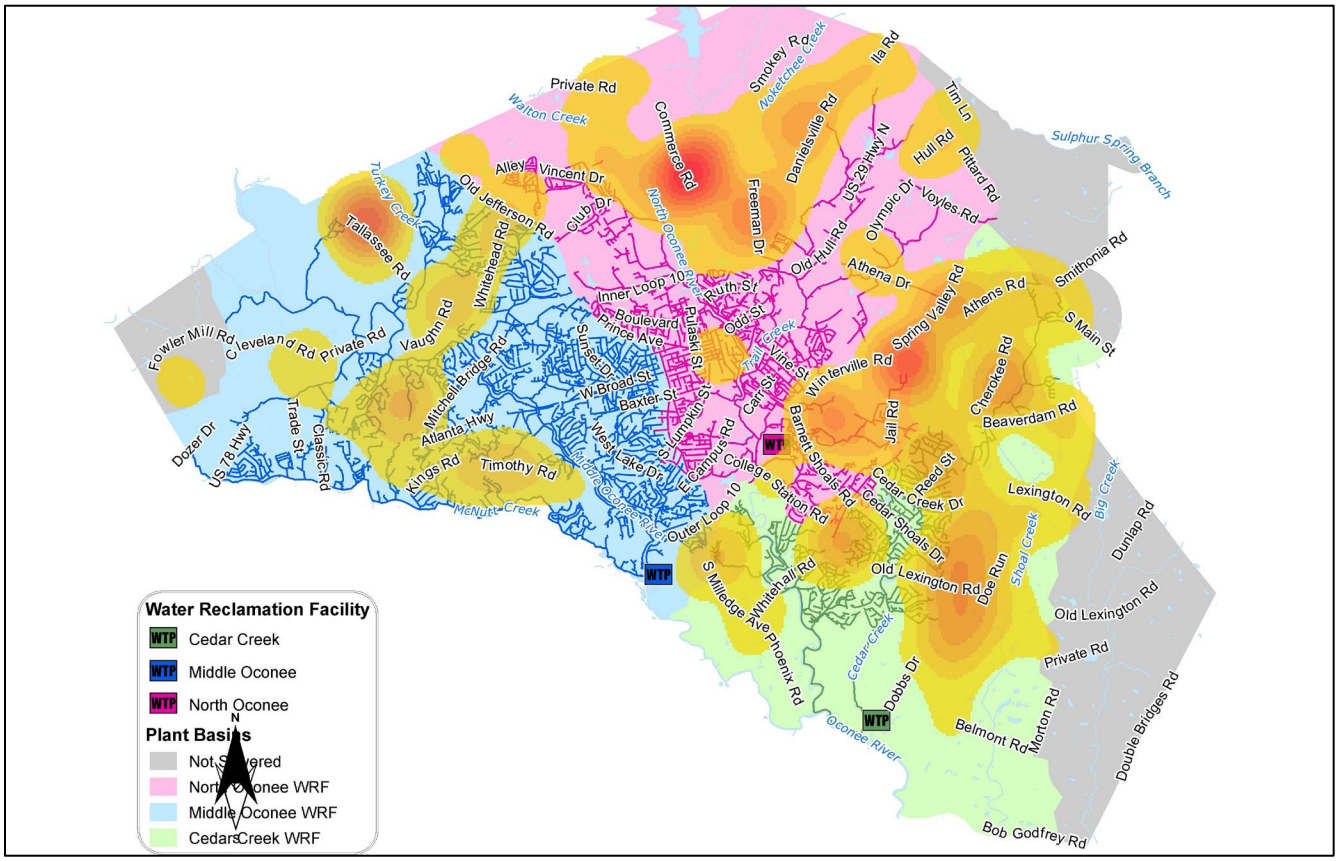

Figure 4-6: Pumped Septic Tank Locations 2017-2019
2020 Service Delivery Plan: Infrastructure Element

4.3 Recycled Water

Water reductions required during or entering extreme drought conditions could have a significant impact on ACC's residents, businesses, and current and future overall economy. The regional droughts in 2007 and 2016 significantly reduced the surface water available from these sources and revealed a need for PUD to identify and develop a more resilient water supply system. A recycled water system provides additional drought resiliency by displacing potable water demands and preserving raw water supply resources. A recycled water system provides

reclaimed wastewater for industrial or other applicable uses. To increase its drought resiliency, PUD is assessing the feasibility of expanding the recycled water system to include a purified recycled water system that will augment raw water supplies for drinking water in the future.

A recycled water system has the following benefits:

- Makes ACC more drought resilient by reducing potable demands
- Preserves water resources and protects from economic impacts of water restrictions
- Extends the effectiveness of the Bear Creek Reservoir
- Allows for future economic growth through water reliability
- Mitigates peak demands from irrigation and cooling which are highest in hot months, just when our rivers are at their lowest

GAEPD encourages the use of recycled water as a substitute for potable water for uses such as agricultural irrigation (feed crops), residential/commercial landscape irrigation, dust control, etc. Urban water reuse is a term generally applied to the use of recycled water for the beneficial irrigation of areas that are intended to be accessible to the public, such as golf courses, residential and commercial landscaping, parks, athletic fields, and roadway medians. Recycled water can be put to beneficial use for cooling industrial processes. An urban water reuse system provides benefits to both potable water and wastewater utilities.

PUD investigated various means to reduce potable water demand, resulting in the *Reuse System Master Plan* (CH2M, 2018b). PUD's *Reuse System Master Plan* establishes the path forward for implementing a recycled water system. A recycled water system treats reclaimed water to an extent appropriate to use for irrigation, industrial, cooling, and other non-drinking purposes. The conceptual design for a recycled water system was developed as part of the *Reuse System Master Plan*, beginning with identifying potential recycled water customers, categorizing these customers, determining their proximity to each other and potential recycled water sources, and assessing potential transmission pipeline routes. PUD identified UGA as an interested recycled water customer and determined that potable water customers in the Athens Employment-Industrial zone could become future recycled water customers.

Preliminary planning for a purified recycled water system includes using recycled water from North Oconee WRF as the source water for advanced treatment facilities. Advanced Tertiary treatment can clean water to drinking water standards. The *Reuse System Master Plan* also provides several operational scenarios for potable reuse as well as multiple factors that will require further evaluation to appropriately analyze the operational scenarios.

Table 4-8 summarizes recommended recycled water improvements, and Figure 4-7 presents a conceptual plan of a recycled water system.

Table 4-8: Recycled Water Recommended Improvements
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	Details
North Oconee WRF Recycled Water Facility	Design and construction of facilities at North Oconee WRF to provide chlorine residual in the transmission system and a recycled water pump station to send recycled water to the University of Georgia and the Athena Industrial Park area.
UGA Recycled Water Transmission Line	Installation of 4,100 LF of 10-inch recycled water transmission line from North Oconee WRF to UGA.

Athena Industrial Park Recycled Water Transmission Line	Installation of 30,000 LF of 16-inch recycled water transmission line from North Oconee WRF to UGA

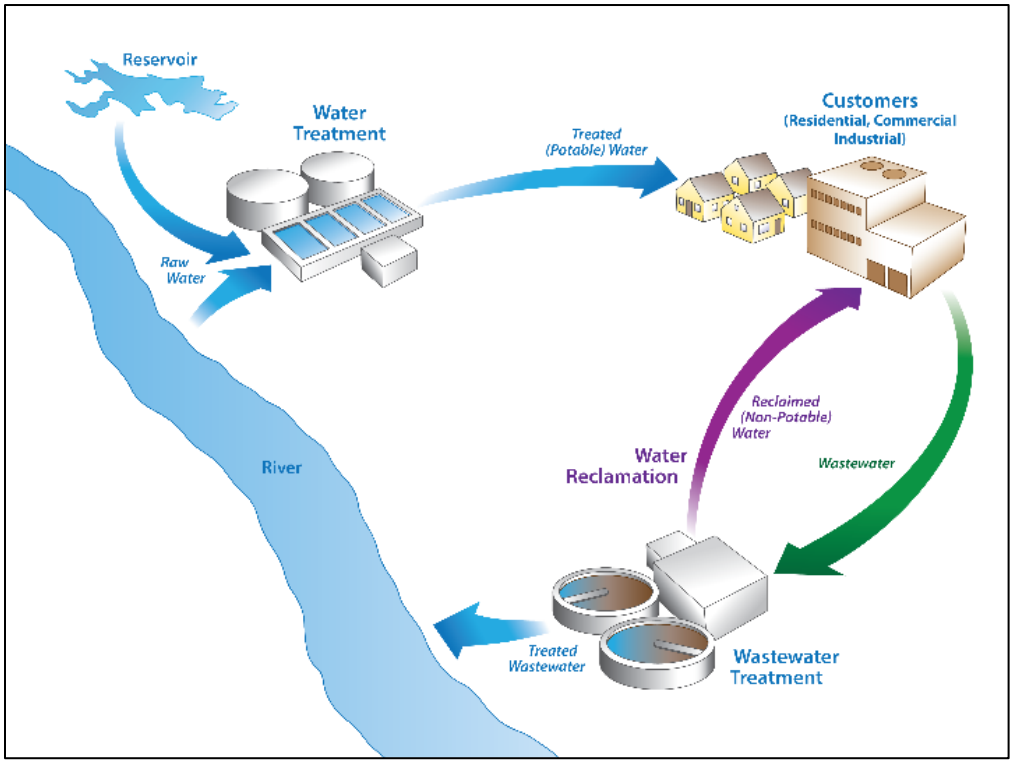

Figure 4-7: Recycled Water Conceptual Plan
2020 Service Delivery Plan Update – Infrastructure Element

4.3.1.1 North Oconee WRF Recycled Water Facility

PUD's North Oconee WRF was identified as the optimal reclaimed water source because of its large size and proximity to potential customers. As part of the *Reuse System Master Plan* a hydraulic model was developed to determine recommended pipe sizes based on system capacity, pipe velocity, and system pressure. A preliminary pump station design and layout was developed based on the proposed recycled water distribution system and delivery end points. Under a 2015 SDP Update non-potable reuse (NPR) project, PUD initiated design services to develop the NPR system proposed in the *Reuse System Master Plan*.

4.3.1.2 UGA Recycled Water Transmission Lines

PUD's water reuse strategy as discussed in Section 4.3 includes a non-potable reuse system (Section 4.3.1) located at the North Oconee WRF. Recycled water from this system will be pumped from the North Oconee WRF to UGA and the Athena Industrial Park for use by recycled water customers. The recycled water transmission lines are a separate category of pipeline from water distribution and wastewater collection.

4.4 Utility Wide

Table 4-9 summarizes recommended improvements related to facility and space planning as well as improvements that impact the entire utility.

Table 4-9: Utility Wide Recommended Improvements
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	Details
Combined Meter Management/Water and Sewer Facility	Property acquisition of approximately 30 acres, design and construction of the combined Water and Sewer and Meter Management facility to provide sufficient space for current fleet, yard storage for pipes, manholes, etc. and employee parking.
Billing System Project	Evaluation and procurement of financial software be used by ACC Public Utilities Department water business office for billing.
Alternate Energy	Evaluation and implementation of potential alternative energy sources that could be used by ACC Public Utilities Department

4.4.1 Combined Meter Management/Water and Sewer Facility

As part of the assessment for future facility needs, conceptual space planning had been completed for the Meter Management and Cross Connection and the Water and Sewer Construction and Maintenance sections, as well as J.G. Beacham WTP. Planning included anticipating current and future staff levels by both quantity and type, using the ACC space standards by employee type, available property, and potential efficiency improvements through facility upgrades. Two conceptual master plan site layout options were developed based on the space needs. Cost estimates were also developed for each option.

An updated analysis of adjacent properties available for PUD expansion was performed under the CH-19-05 Waterworks Drive Master Plan project in 2019. The study area included properties neighbouring the J.G. Beacham WTP located on Waterworks Drive. This Master Plan concluded that there is insufficient property available to meet the needs of a Combined Meter Management/Water and Sewer Facility. Properties that were once available to be acquired by ACC are no longer available. Additionally, the Water and Sewer Maintenance Department anticipates a need for increased storage space for new maintenance equipment and materials to support PUD's planned recycled water projects. The need to relocate the Combined Meter Management/Water and Sewer Facility and the increased storage area needs were considered when selecting projects for this 2020 SDP Update. Relocation of the current facilities will also allow for needed expansion at the water treatment plant.

4.4.2 Alternate Energy

As part of the SDP, it is recommended that PUD evaluate renewable energy generation technologies. These technologies could be generated by PUD and be used to power WTP and/or WRF processes. Additionally, energy generation could provide additional revenues for local municipalities. Alternative energy sources that could be evaluated include sewage biogas conversion and solar power.

4.5 Progress Since 2015 Update

Since development of the 2015 SDP, PUD has made substantial progress towards improving water and wastewater service to customers. Table 4-10 summarizes projects that were included in the 2010 SDP and 2015 SDP and have since been completed. Table 4-11 summarizes projects that were included in the 2010 SDP and 2015 SDP and are currently in progress.

Table 4-10: 2010 and 2015 SDP Projects Completed
2020 Service Delivery Plan Update – Infrastructure Element

2015 SDP Project Number	Project Name
2-002	Automatic Meter Reading
2-108	Computerized Maintenance Management System
2-109	Wastewater Hydraulic Model
2-221	Cedar Creek WRF – Solar Energy
6-103	Barnett Shoals

Table 4-11: 2010 and 2015 SDP Projects In Progress
2020 Service Delivery Plan Update – Infrastructure Element

2015 SDP Project Number	Project Name
1-201	North Oconee WRF - Phosphorus Polishing
1-202	Middle Oconee WRF - Phosphorus Polishing
1-203	Cedar Creek WRF - Phosphorus Polishing
2-202	Tanyard Branch Interceptor Improvements
2-203	Brooklyn Creek Interceptor Improvements
2-205	Leak Detection Program
2-207	Cedar Creek Interceptor Improvements Phase 1
2-210	Small Diameter Water Main Replacement
2-212	Water Main Connection for Improved Water Quality and Fire Protection
2-218	Sanford Stadium Sanitary Sewer Interceptor Improvements Phase 1
2-222	McNutt Creek Sewer Interceptor Improvements Phase 1
2-226	North Oconee WRF Recycled Water Facility
6-203	Upper North Oconee Interceptor Phase 2C
6-205	Water Supply Resiliency and Reliability
n/a	Additional Storage
n/a	Upper North Oconee Interceptor Phase 2B
n/a	UGA Recycled Water Transmission Line
n/a	Mitchell Bridge Sewer Interceptor Improvements
n/a	Athena Industrial Park Recycled Water Transmission Line

5. Summary of Recommended Improvements

Table 5-1 summarizes the water and wastewater improvements that were identified in Section 4. Planning-level cost estimates were developed for this final list of projects, which were carried forward and prioritized as described in the following sections.

Table 5-1: Summary of Recommended Improvements and Estimated Cost (2020 Dollars)
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	Planning-Level Estimated Cost (2020 Dollars)
Raw Water	
Middle Oconee River Raw Water Pump Station	$460,000
North Oconee River Raw Water Pump Station	$800,000
Additional Storage	$15,000,000
Water Supply Resiliency and Reliability	$45,000,000
Raw Water Subtotal	*$61,260,000*
Drinking Water	
Future Drinking Water Regulations	$ 1,000,000
Atlanta Highway Tank and Booster Pump Station	$ 8,000,000
Small Diameter Water Main Replacement	$ 15,000,000
Upgrade Aging Water Mains	$ 20,000,000
Water Main Connection Reliability for Improved Water Quality and Fire Protection	$ 8,500,000
Water Main Transmission Redundancy	$ 4,000,000
J. G. Beacham Water Treatment Plant Solids Handling	$ 20,000,000
Drinking Water Subtotal	*$76,500,000*
Wastewater System	
North Oconee WRF - Aeration Basins	$ 800,000
North Oconee WRF - Aeration Basins Small Blower	$ 1,100,000
North Oconee WRF – Preliminary Treatment	$ 1,200,000
North Oconee WRF - Phosphorus Polishing	$ 11,100,000
North Oconee WRF - Thermal Dryer	$ 12,000,000
North Oconee WRF - Biosolids Upgrades	$ 35,000,000
Middle Oconee WRF - Enhanced Biological Phosphorus Removal Basin Cover	$ 800,000
Middle Oconee WRF – Preliminary Treatment	$ 500,000
Middle Oconee WRF - Phosphorus Polishing	$ 14,000,000

Table 5-1: Summary of Recommended Improvements and Estimated Cost (2020 Dollars)
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	Planning-Level Estimated Cost (2020 Dollars)
Middle Oconee WRF Influent Pumps	$ 2,200,000
Middle Oconee WRF Electrical Building	$ 6,200,000
Middle Oconee WRF Operations Building	$ 2,000,000
Cedar Creek WRF – Ultraviolet Disinfection	$ 600,000
Cedar Creek WRF - Phosphorus Polishing	$ 6,300,000
Cedar Creek WRF Influent Pumps	$ 1,200,000
Cedar Creek WRF Emergency Generator	$ 6,000,000
Targeted Sanitary Sewer Flow Monitoring	$ 500,000
Prioritized Sewer Rehabilitation and Replacement	$ 8,000,000
Long-term Sanitary Sewer Evaluation Survey (SSES) and Rehabilitation Program	$ 500,000
Tanyard Branch Interceptor Improvements	$ 10,300,000
Upper North Oconee West Trunk Improvements	$ 2,900,000
Upper North Oconee Interceptor – Phase 2B	$ 11,500,000
Upper North Oconee Interceptor – Phase 2C	$ 8,400,000
Sanford Stadium Sanitary Sewer Interceptor Improvements Phase 1	$ 5,800,000
Voyles Road Sanitary Sewer Upgrade	$ 3,900,000
Brooklyn Creek Interceptor Improvements	$ 11,600,000
Middle Oconee East Trunk Improvements Phase 1	$ 13,000,000
Middle Oconee West Trunk Improvements Phase 1	$ 12,500,000
Middle Oconee East Mill Run Sewer Replacement	$ 1,000,000
Turkey Creek Interceptor Improvements	$ 1,500,000
Hampton Park Gravity Sewer Interceptor	$ 1,500,000
Kingswood Subdivision Gravity Sewer Collector Improvements	$ 1,100,000
McNutt Creek Sewer Interceptor Improvements Phase 1	$ 14,000,000
Mitchell Bridge Sewer Interceptor Improvements	$ 6,000,000
Cedar Creek Interceptor Improvements - Phase 1	$ 2,500,000
Trail Creek East/West Extension – Project 3 (TCE-3)	$ 1,200,000
Trail Creek East/West Extension – Project 4 (TCE-2, TCE-4)	$ 1,400,000
Upper North Oconee/North Oconee River East Extension (UNO-8)	$ 750,000
Bear Creek Gravity Sewer Extension (BC-2)	$ 1,500,000
Turkey Creek Gravity Sewer Extension (TC-2)	$ 1,700,000

Table 5-1: Summary of Recommended Improvements and Estimated Cost (2020 Dollars)
2020 Service Delivery Plan Update – Infrastructure Element

Project Name	**Planning-Level Estimated Cost (2020 Dollars)**
Lower Middle Oconee Gravity Sewer Extension (LMO-8)	$ 2,000,000
Alternative Sewer Solutions	$ 5,000,000
Wastewater System Subtotal	*$231,050,000*
Recycled Water	
Athena Industrial Park Recycled Water Transmission Line	$ 14,000,000
UGA Recycled Water Transmission Line	$ 1,600,000
North Oconee WRF Recycled Water Facility	$ 3,400,000
Water Recycling Subtotal	*$19,000,000*
Utility-wide	
Combined Meter Management/Water and Sewer Facility	$ 9,000,000
Billing System Project	$ 400,000
Alternate Energy	$ 2,790,000
Utility-wide Subtotal	*$12,190,000*
Total	**$400,000,000**

Section 2
Capital Improvements Element

6. Methodology for Project Priority Ranking

A specific procedural process was developed with the 1995 SDP to assign a priority ranking for each improvement and an associated project identification number. This process involved:

1) Identifying a specific list of criteria to determine project ranking (Step 1)
2) Assigning individual projects to categories reflecting these criteria (Step 2)
3) Prioritizing the project categories based on goals, values, and objectives, as approved by the M&C (Step 3)
4) Developing a mechanism for ranking projects within each category (Step 4)

The 2020 SDP methodology is the same as the 2015 methodology with the differences noted in this section. Differences in the methodologies include additional supporting information sources being used to identify criteria for project ranking (Step 1) and changes to the project categories (Step 2) as summarized in Section 6.2. Individual projects were placed in categories, and categories were prioritized as discussed in Section 6.2 (Step 2 and 3). Lastly, the projects were ranked within their category in Step 4 (Section 6.3).

6.1 Supporting Information (Step 1)

Previous SDP updates used input and information from the sources below to help develop a basis for evaluating capital projects. For the 2020 SDP Update, the Envision Athens Action Agenda (ACCGov, 2017) and FY20 Mayor & Commission Strategic Commitments and Goals were included as additional sources of information. A complete list of the supporting information used to evaluate the importance of the capital projects is listed here:

- **Land Use Plan** – Comprehensive Plans developed by the ACC Planning Department, and associated future population projections, should be used as the basis for the SDP.
- **Growth and Development** – Growth and development trends should be analysed for rate of growth, quantity of growth, density of growth, and land use patterns. Population projections developed by the ACC Planning Department should also be used.
- **University Growth** – Water and wastewater capacity should be estimated using current water billing records and through collaboration with staff from UGA.
- **Transportation Plan** – Proposed transportation projects, including relocations, improvements, and extensions, should be considered, and any recent transportation studies or projects should be reviewed.
- **Current Availability of Water and Sewer** – Potential projects should be evaluated based on currently available capacity for water and wastewater systems. The effects of future population growth on the current capacity should be considered.
- **Public Health Considerations** – Sections of the ACC water and wastewater system with service delivery problems that may impact public heath are typically high priority candidates for project selection.
- **Regulatory and Permitting Issues** – ACC is subject to environmental regulations for water and wastewater systems issued by GAEPD, as well as federal and local issuing authorities. Potential projects affecting compliance with current, revised, or new regulations are high priority candidates for project selection.
- **External Development Forces** – Some external development forces fall outside the control of ACC and the Comprehensive Plan. These forces influence project selection and may include projects from entities such as the Georgia Department of Transportation (GDOT).
- **Industrial Service** – Potential projects for utility services to areas designated for industrial development required an analysis of typical industrial needs and the timing for industrial development. Since future water

and wastewater demands for new industrial customers were developed as a reserve amount, the effects of future industrial growth on capacity were considered.

- **System Reliability** – This 2020 SDP Update places higher emphasis on system reliability and sustainability over projects involving expansion or extension of service. Projects were evaluated and ranked to prioritize the water and wastewater systems operating consistent with existing permit conditions.
- **Cost per Resident** – A cost per resident ratio was used to compare the costs between individual projects. Potential projects serving the highest number of residents at the least cost were shown preference. For projects identified to expand or extend sewer service, the cost per resident was weighted to give preference to water over wastewater, existing customers over future customers, and industrial customers over residential customers.
- **Envision Athens –** Envision Athens Action Agenda should be used as a guide to accomplish the goals and priority actions of ACC in the areas of land use, environment, neighbourhoods, housing, agriculture, economic development, education, health, safety, social services, arts and culture, civic engagement, transportation, and infrastructure (added for SDP 2020 update).
- **FY20 Mayor and Commission Strategic Commitments and Goals –** All of ACCGov's services aligned with one of six strategic commitments should be considered as they relate to providing water and wastewater service and infrastructure to ACC residents (added for SDP 2020 update).

6.2 Project Categories and Priority Ranking (Steps 2 and 3)

For the 2020 SDP Update the six project categories and their priority are as follows:

Priority 1 – Public Health Regulatory Requirement Projects

Regulatory requirement projects must comply with current or proposed regulations coupled with the known or anticipated time frame required for implementation. These include environmental regulations issued by federal, state, or local authorities.

Priority 2 – Public Health Initiatives Projects

Public health projects are determined by the M&C as needs or concerns are identified.

Priority 3 – Rehabilitation and Replacement Projects

Rehabilitation and replacement projects are necessary to maintain current water and wastewater systems consistent with existing permits. This project category includes replacement or rehabilitation of system components due to age or condition that may jeopardize system operations. This also includes projects that are necessary to ensure reliable service to existing water and wastewater customers served by PUD.

Priority 4 – System Expansion Projects

System expansion projects add capacity in existing service areas in order to provide service for new customers. In some cases, system expansion is driven by the increased demands of an existing customer.

Priority 5 – System Extension Projects

System extension projects provide capacity in areas where service does not currently exist and are specifically oriented to providing service to new customers.

Priority 6 – Mayor and Commission Strategic Commitments and Key Performance Indicator Projects

PUD tracks key performance indicators (KPIs) for the operation of the water and wastewater systems and infrastructure to track progress to goals and M&C strategic consultants. Projects to improve KPIs that do not fall in Priorities 1 through 5 are included in this priority.*

6.3 Project Ranking (Step 4)

Each of the 59 projects identified (Section 4) was assigned to one of the six prioritized categories (Section 6.2). The final step ranked the projects within each of their identified categories based on the ranking criteria described in this section. The method for numbering the capital improvement projects is summarized in Section 7.

As previously discussed, identification of water and wastewater improvements for the 2020 SDP Update involved multiple studies, analyses, and staff coordination, through which a robust set of system information was compiled. Therefore, in addition to criteria used to rank projects in prior SDP updates, new information was used to collaboratively prioritize the recommended improvements and develop a schedule for project implementation over 20 years. The methodology used to rank projects within each of the six priorities is discussed below.

6.3.1 Priority 1 – Public Health Regulatory Requirement Projects

Ranking of Priority 1 projects is driven by external requirements by federal, state, or local environmental regulations. Ranking is generally dependent on the permitting process or consent order, and PUD must comply with the regulatory schedules set forth by the issuing authority. Within this category, projects were ranked according to the regulatory requirement date.

6.3.2 Priority 2 – Public Health Initiatives Projects

Ranking of Priority 2 projects is based on the date of need. Water system projects are assigned a higher priority than wastewater system projects. Water and wastewater system projects are evaluated based on the total project cost compared to the number of customers served with higher priority given to water over wastewater projects.

6.3.3 Priority 3 – Rehabilitation and Replacement Projects

Ranking of Priority 3 projects involved a review of multiple pieces of information for each project. Information considered included:

* Georgia Department of Transportation and Economic Projects and Industrial Development Projects (Priority 4 and 5 in previous SDPs), were removed from the Priority Project ranking used in previous SDP Updates as these projects have an annual appropriation. Therefore, projects in these two categories are not considered capital projects. In previous SDP Updates the existing seven project categories approved by M&C were as follows:

1) Regulatory Requirement Projects
2) System Renewal Projects
3) Public Health Projects
4) Department of Transportation Relocations, Extensions, or Improvement Projects
5) Economic and Industrial Development Projects
6) System Expansion Projects
7) System Extension Projects

Date of Need – Date of need was the first criterion evaluated; however, because most projects did not have a specific date of need, projects were initially ranked according to immediate need, mid-planning period need, or long-term need.

Risk Score (Wastewater Collection projects only) – For sewer rehabilitation and replacement projects, the asset risk score was reviewed. Projects were ranked from highest to lowest risk score, as determined in the Risk-based Prioritization Project (CH2M, 2016) and discussed in the Infrastructure Element.

Project Cost – It may not be feasible for multiple large-scale projects to be completed during the same timeframe. Therefore, project ranking took project size (in terms of overall cost) into consideration.

Weighted Cost/Resident – The number of residents benefiting from a project was estimated, when applicable. For WTP improvements, the number of residents served was considered. For WRF improvements, the number of residents served by the specific WRF was considered. For sewer rehabilitation and replacement projects, the number of residents was considered as residents served by PUD sewer at or upstream of the project. For water distribution projects, the number of residents was assumed to be the number of water residents served by the distribution lines included in the project.

Flow Meter Basin "R" Value (Wastewater Collection projects only) **–** Flow Meter Basin "R" Value is the proportion of rainfall that enters the collection system as inflow or infiltration. Each project was assigned an "R" value according to the flow meter basin in which the project is located, based on the 2015 flow monitoring study, detailed in the Infrastructure Element. (CH2M, 2015)

Calibrated Model – Projects that were identified through a calibrated modeling activity were ranked higher than those identified through other means, due to the higher degree of certainty provided through hydraulic modeling. Project identification involved use of calibrated models to identify wastewater collection and water distribution deficiencies.

Staff Perception – In addition to the more objective criteria summarized above, the institutional knowledge of PUD's operational staff was included in the evaluation. Projects were ranked in order of importance based on communications with PUD staff. WRF and WTP staff identified their preferred ranking of plant improvement projects, and W&S staff provided input on wastewater collection and water distribution projects based on institutional knowledge and field conditions.

Water system projects are assigned a higher priority than wastewater system projects. The total project cost compared to the number of customers served was considered for water and wastewater system projects. After all of the above information was collected, iterations of project rankings were reviewed and discussed to determine the final ranking of Priority 3 projects.

6.3.4 Priority 4 – System Expansion Projects

Ranking of Priority 4 projects used a methodology similar to ranking Priority 3 projects. The date of need evaluated for Priority 4 was reflective of the date of needed expansion. Also, preference is given to water over wastewater, existing customers over future customers, and industrial customers over residential customers.

6.3.5 Priority 5 – System Extension Projects

System extension projects include only wastewater collection projects, because PUD has met its water service goals. To rank Priority 5 projects, highest priority is given to projects that could connect to existing sewer lines with sufficient capacity to handle the increased flows. Where sufficient capacity does not exist, the project was evaluated based on the cost per resident with preference to industrial customers over residential customers.

6.3.6 Priority 6 – Mayor and Commission Strategic Commitments and Key Performance Indicator Projects

Ranking of Priority 6 projects is determined by M&C based on date of need. Projects related to the KPIs were evaluated based on the KPI goals that PUD has established

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7. Project Numbering

7.1 Project Categories

SDP capital improvement projects have been identified by the prioritized category followed by a 3-digit number. The 3-digit number provides the ranking within a category. Water projects are given higher priority than wastewater projects as discussed in Section 6.3. Date of project need is also an important part of the project rankings.

Table 7-1 provides a comparison of the Project Categories used in the prioritization of capital projects in this 2020 update to the Project Categories used in the 2004, 2010, and 2015 SDP updates. The changes to the project categories for the 2020 update are presented in Section 6.

Table 7-1: SDP Update Project Category Comparison

2020 Service Delivery Plan Update – Capital Improvements Element

Priority Number	2020 SDP Update Category	2015 and prior SDP Update Category
1	Public Health Regulatory Requirements	Regulatory Requirements
2	Public Health Initiative	System Renewal
3	Rehabilitation and Replacement	Public Health
4	System Expansion	Department of Transportation, Extensions or Improvements
5	System Extension	Economic and Industrial Development
6	Mayor and Commission Strategic Commitments and Key Performance Indicator Projects	System Expansion
7	N//A	System Extension

7.2 2020 Update Project Numbering

Recommended capital projects, including those identified during previous SDP updates, were renumbered based on the priorities outlined above and in Section 6. The first of the four digits in the new project number reflects the project's priority number. The identifying update year number of 3 for 2020 is reflected after the priority number as the first digit after the dash. The last two digits of the project number are based on project ranking. Projects were ranked according to timing of need and type of project as discussed in Section 6. The project number template follows the example below:

$$\underbrace{1}_{Priority} = \underbrace{3}_{SDP2020} \underbrace{01}_{Ranking}$$

7.2.1 Priority 1 Public Health Regulatory Requirements Project Numbering

The priority 1 project category has remained unchanged, continuing to include regulatory requirement projects. Table 7-2 provides the 2020 SDP Update project numbers and the corresponding project number from the 2015 Update r previously identified projects.

Table 7-2: Priority 1 Project Numbering

2020 Service Delivery Plan Update – Capital Improvement Elements

2020 Update Project Number	2015 Update Project Number	Project Name
1-301		Future Drinking Water Regulations
1-302	1-201	North Oconee WRF – Phosphorus Polishing
1-303	1-202	Middle Oconee WRF – Phosphorus Polishing
1-304	1-203	Cedar Creek WRF – Phosphorus Polishing

7.2.2 Priority 2 Public Health Initiatives Project Numbering

There is currently one project, Alternate Sewer Solutions, assigned to Priority 2. This new project (2-301) combines two projects that were included in the 2015 SDP Update, 3-201 Sandy Creek Basin and 3-202 Shoal Creek Basin.

7.2.3 Priority 3 Rehabilitation and Replacement Project Numbering

In the 2015 SDP update rehabilitation and replacement projects were Priority 2. Table 7-3 maps the 2015 SDP Update projects to their new 2020 Update project number. All Priority 3 projects are ranked and provided in Table 7-3.

Table 7-3: Priority 3 Project Numbering

2020 Service Delivery Plan Update – Capital Improvement Elements

2020 Update Project Number	2015 Update Project Number	Project Name
3-301	2-216	Upgrade Aging Water Mains
3-302		Water Main Transmission Redundancy
3-303	2-210	Small Diameter Water Main Replacement
3-304		Middle Oconee River Raw Water Pump Station
3-305		North Oconee River Raw Water Pump Station
3-306	2-212	Water Main Connection Reliability for Improved Water Quality and Fire Protection
3-307	2-228	J. G. Beacham Water Treatment Plant Solids Handling
3-308	2-202	Tanyard Branch Interceptor Improvements
3-309	2-203	Brooklyn Creek Interceptor Improvements

2020 Update Project Number	2015 Update Project Number	Project Name
3-310		Upper North Oconee Interceptor – Phase 2B
3-311	6-203	Upper North Oconee Interceptor – Phase 2C
3-312		Middle Oconee East Mill Run Sewer Replacement
3-313	2-218	Sanford Stadium Sanitary Sewer Interceptor Improvements Phase 1
3-314	2-201	Middle Oconee East Trunk Improvements Phase 1
3-315	2-206	North Oconee WRF - Aeration Basins
3-316		Mitchell Bridge Sewer Interceptor Improvements
3-317	2-222	McNutt Creek Sewer Interceptor Improvements Phase 1
3-318	2-211	Prioritized Sewer Rehabilitation and Replacement
3-319		Middle Oconee WRF - Electrical Building
3-320		North Oconee WRF - Thermal Dryer
3-321	6-202	Hampton Park Gravity Sewer Interceptor
3-322		Cedar Creek WRF Emergency Generator
3-323	2-217	Middle Oconee West Trunk Improvements Phase 1
3-324		Voyles Road Sanitary Sewer Upgrade
3-325	2-229	Targeted Sanitary Sewer Flow Monitoring
3-326	2-213	Upper North Oconee West Trunk Improvements
3-327		North Oconee WRF - Biosolids Upgrades
3-328	2-209	Kingswood Subdivision Gravity Sewer Collector Improvements
3-329	2-230	Long-term Sanitary Sewer Evaluation Survey (SSES) and Rehabilitation Program
3-330		North Oconee WRF - Aeration Basins Small Blower
3-331		Middle Oconee WRF Operations Building
3-332	2-219	Middle Oconee WRF - Enhanced Biological Phosphorus Removal Basin Cover
3-333		Middle Oconee WRF Influent Pumps
3-334		Cedar Creek WRF Influent Pumps
3-335	2-225	North Oconee WRF – Preliminary Treatment
3-336	2-207	Cedar Creek Interceptor Improvements - Phase 1

2020 Update Project Number	2015 Update Project Number	Project Name
3-337	2-224	Middle Oconee WRF – Preliminary Treatment
3-338	2-208	Turkey Creek Interceptor Improvements
3-339		Cedar Creek WRF – Ultraviolet Disinfection
3-340	2-227	Combined Meter Management/Water and Sewer Facility

7.2.4 Priority 4 System Expansion Project Numbering

In the 2015 SDP update system expansion projects were Priority 6; thus, existing projects from past SDP updates are renumbered as shown in Table 7-4. There were not any additional System Expansion projects in this 2020 SDP update.

Table 7-4: Priority 4 Project Numbering

2020 Service Delivery Plan Update – Capital Improvement Elements

2020 Update Project Number	2015 Update Project Number	Project Name
4-301	6-205	Additional Storage
4-302	6-201	Atlanta Highway Tank and Booster Pump Station
4-303	6-205	Water Supply Resiliency and Reliability

7.2.5 Priority 5 System Extension Project Numbering

In the 2015 SDP update system extension projects were Priority 7; thus, existing projects from past SDP updates are renumbered as shown in Table -5. New system extension projects were also ranked and numbered as shown in Table 7-5.

Table 7-5: Priority 5 Project Numbering

2020 Service Delivery Plan Update – Capital Improvements Element

2020 Update Project Number	2015 Update Project Number	Project Name
5-301		UGA Recycled Water Transmission Line
5-302	2-226	North Oconee WRF Recycled Water Facility
5-303		Athena Industrial Park Recycled Water Transmission Line
5-304	7-205	Trail Creek East/West Extension – Project 3 (TCE-3)
5-305	7-202	Trail Creek East/West – Project 4 Extension (TCE-2, TCE-4)
5-306	7-204	Bear Creek Gravity Sewer Extension (BC-2)

5-307	7-201	Lower Middle Oconee Gravity Sewer Extension (LMO-8)
5-308	7-203	Turkey Creek Gravity Sewer Extension (TC-2)
5-309	7-206	Upper North Oconee/North Oconee River East Extension (UNO-8)

7.2.6 Priority 6 Mayor and Commission Strategic Commitments and KPI Project Numbering

Table 7.6 presents the project numbering for the two Priority 6 projects. One of these projects was a Priority 2 – System Renewal project in the 2015 SDP Update.

Table 7-6: Priority 6 Project Numbering

2020 Service Delivery Plan Update – Capital Improvements Element

2020 Update Project Number	2015 Update Project Number	Project Name
6-301		Billing System Project
6-302	2-231	Alternate Energy

8. Project Ranking and Summary

Each of the projects identified in the 2020 SDP Update was assigned to one of the six project categories (Section 6.2). The following number of projects and estimated project cost was assigned to each category as follows for a total of 59 projects with a total estimated capital cost of $400,000,000:

1) Public Health Regulatory Requirements (4 projects, $32,400,000)
2) Public Health Initiatives (1 project, $5,000,000)
3) Rehabilitation and Replacement (40 projects, $263,860,000)
4) System Expansion (3 projects, $68,000,000)
5) System Extension (9 projects, $27,550,000)
6) Mayor and Commission Strategic Commitments and KPIs (2 projects, $3,190,000)

After the project categories were assigned, projects within each category were ranked according to the appropriate methodology outlined in Section 6.3 and the project timing (Section 8.7). Project numbers were then assigned based on the category, timing of need, and type of project; water, wastewater, or utility services.

Table 8-1 summarizes the four projects assigned to Priority 1. Implementation of these projects would depend on the timeline provided by the Georgia Environmental Protection Division (GAEPD). Based on current information, all PUD water and wastewater systems are currently in compliance. The projects included in Priority 1 are in anticipation of upcoming regulations. Modeling to determine nutrient limits for lakes has been completed. GAEPD has begun assigning permit limits to upstream dischargers to Lake Oconee. The projects in Table 8-1 are listed in order of their ranking.

Table 8-1: Priority 1 – Public Health Regulatory Requirements Projects
2020 Service Delivery Plan Update – Capital Improvements Element

SDP Project Number	Project Name	Project Cost[1] (2020 Dollars)
	Priority 1 – Water System	
1-301	Future Drinking Water Regulations	$1,000,000
	Priority 1 – Wastewater System	
1-302	North Oconee WRF – Phosphorus Polishing	$11,100,000
1-303	Middle Oconee WRF – Phosphorus Polishing	$14,000,000
1-304	Cedar Creek WRF – Phosphorus Polishing	$6,300,000
	Priority 1 Total	**$32,400,000**

[1] **Costs for projects in previous SDP update have been updated to reflect changes in project scope and pricing.**

8.1 Public Health Initiatives Projects

Table 8-2 summarizes the project assigned to Priority 2. This project involves alternative sewer solutions for two basins: Sandy Creek (see Figure 4-2) and Lower Shoal Creek (see Figure 4-4). Further discussion of the current wastewater service in these areas is found in Section 4.2.3.2 Expanded Public Sewer Service Area.

Based on the motion approved by M&C in 2015, Public Health Initiatives Projects shall utilize solutions other than gravity sewer lines, shall avoid environmentally sensitive areas, and shall serve only existing structures or lots of record. Expanded service would be implemented only after approval by M&C.

Table 8-2: Priority 2 – Public Health Initiatives Projects
2020 Service Delivery Plan Update – Capital Improvements Element

SDP Project Number	Project Name	Project Cost[1] (2020 Dollars)
Priority 2 – Water System		
	There were no Priority 2 water projects identified	
Priority 2 – Wastewater System		
2-301	Alternative Sewer Solutions	$5,000,000
	Priority 2 Total	**$5,000,000**

[1]Costs for projects in previous SDP update have been updated to reflect changes in project scope and pricing.

8.2 Rehabilitation and Replacement Projects

Table 8-3 summarizes the 40 projects assigned to Priority 3. Each of these projects was identified as necessary to maintain current water and wastewater systems consistent with existing permits. The projects include replacement or rehabilitation of system components due to age or condition, as well as projects that are necessary to ensure reliable service to the existing water and wastewater customers served by ACC-PUD. Water system Priority 3 projects are shown on Figures 2-3 and 4-1. Wastewater system Priority 3 projects are shown on Figures 2-9 through 2-11 and Figures 4-2 through 4-4.

Table 8-3: Priority 3 – Rehabilitation and Replacement Projects
2020 Service Delivery Plan Update – Capital Improvements Element

SDP Project Number	Project Name	Project Cost[1] (2020 Dollars)
Priority 3 – Water System		
3-301	Upgrade Aging Water Mains	$20,000,000
3-302	Water Main Transmission Redundancy	$4,000,000
3-303	Small Diameter Water Main Replacement	$15,000,000
3-304	Middle Oconee River Raw Water Pump Station	$460,000
3-305	North Oconee River Raw Water Pump Station	$800,000
3-306	Water Main Connection Reliability (Improved Water Quality & Fire Protection)	$8,500,000
3-307	J. G. Beacham Water Treatment Plant Solids Handling	$20,000,000
	Priority 3 Water System Total	$68,760,000
Priority 3 – Wastewater System		
3-308	Tanyard Branch Interceptor Improvements	$10,300,000

Table 8-3: Priority 3 – Rehabilitation and Replacement Projects
2020 Service Delivery Plan Update – Capital Improvements Element

SDP Project Number	Project Name	Project Cost[1] (2020 Dollars)
3-309	Brooklyn Creek Interceptor Improvements	$11,600,000
3-310	Upper North Oconee Interceptor – Phase 2B	$11,500,000
3-311	Upper North Oconee Interceptor – Phase 2C	$8,400,000
3-312	Middle Oconee East Mill Run Sewer Replacement	$1,000,000
3-313	Sanford Stadium Sanitary Sewer Interceptor Improvements Phase 1	$5,800,000
3-314	Middle Oconee East Trunk Improvements Phase 1	$13,000,000
3-315	North Oconee WRF - Aeration Basins	$800,000
3-316	Mitchell Bridge Sewer Interceptor Improvements	$6,000,000
3-317	McNutt Creek Sewer Interceptor Improvements Phase 1	$14,000,000
3-318	Prioritized Sewer Rehabilitation and Replacement	$8,000,000
3-319	Middle Oconee WRF Electrical Building	$6,200,000
3-320	North Oconee WRF - Thermal Dryer	$12,000,000
3-321	Hampton Park Gravity Sewer Interceptor	$1,500,000
3-322	Cedar Creek WRF Emergency Generator	$6,000,000
3-323	Middle Oconee West Trunk Improvements Phase 1	$12,500,000
3-324	Voyles Road Sanitary Sewer Upgrade	$3,900,000
3-325	Targeted Sanitary Sewer Flow Monitoring	$500,000
3-326	Upper North Oconee West Trunk Improvements	$2,900,000
3-327	North Oconee WRF - Biosolids Upgrades	$35,000,000
3-328	Kingswood Subdivision Gravity Sewer Collector Improvements	$1,100,000
3-329	Long-term Sanitary Sewer Evaluation Survey (SSES) and Rehabilitation Program	$500,000
3-330	North Oconee WRF - Aeration Basins Small Blower	$1,100,000
3-331	Middle Oconee WRF Operations Building	$2,000,000
3-332	Middle Oconee WRF - Enhanced Biological Phosphorus Removal Basin Cover	$800,000
3-333	Middle Oconee WRF Influent Pumps	$2,200,000
3-334	Cedar Creek WRF Influent Pumps	$1,200,000
3-335	North Oconee WRF – Preliminary Treatment	$1,200,000
3-336	Cedar Creek Interceptor Improvements - Phase 1	$2,500,000
3-337	Middle Oconee WRF – Preliminary Treatment	$500,000
3-338	Turkey Creek Interceptor Improvements	$1,500,000
3-339	Cedar Creek WRF – Ultraviolet Disinfection	$600,000

Table 8-3: Priority 3 – Rehabilitation and Replacement Projects
2020 Service Delivery Plan Update – Capital Improvements Element

SDP Project Number	Project Name	Project Cost[1] (2020 Dollars)
	Priority 3 Wastewater System Total	$186,100,000
Priority 3 – Utility Wide		
3-340	Combined Meter Management/Water and Sewer Facility	$9,000,000
	Priority 3 Utility Wide Total	$9,000,000
	Priority 3 Total	$263,860,000

[1]Costs for projects in previous SDP update have been updated to reflect changes in project scope and pricing.

8.3 System Expansion Projects

Table 8-4 summarizes the 3 projects assigned to Priority 4. System expansion projects add capacity in existing service areas in order to provide service for new customers. In some cases, system expansion is driven by the increased demands of an existing customer.

Table 8-4: Priority 4 – System Expansion Projects
2020 Service Delivery Plan Update – Capital Improvements Element

SDP Project Number	Project Name	Project Cost (2020 Dollars)
Priority 4 – Water System		
4-301	Additional Storage	$15,000,000
4-302	Atlanta Highway Tank and Booster Pump Station	$8,000,000
4-303	Water Supply Resiliency and Reliability	$45,000,000
Priority 4 – Wastewater System		
	There are no Priority 4 wastewater projects identified	
	Priority 4 Total	**$68,000,000**

[1]Costs for projects in previous SDP update have been updated to reflect changes in project scope and pricing.

8.4 System Extension Projects

For the 2020 SDP Update, no water extension projects were identified. Table 8-5 summarizes recycled water projects and the 6 wastewater projects assigned to Priority 5, that extend wastewater collection within the existing public sewer Service Area. Wastewater system extension projects are shown on Figure 4-2 (North Oconee Basin) and Figure 4-3 (Middle Oconee Basin).

Table 8-5: Priority 5 – System Extension Projects
2020 Service Delivery Plan Update – Capital Improvements Element

SDP Project Number	Project Name	Project Cost (2020 Dollars)
	Priority 5 – Recycled Water System	
5-301	UGA Recycled Water Transmission Line	$1,600,000
5-302	North Oconee WRF Recycled Water Facility	$3,400,000
5-303	Athena Industrial Park Recycled Water Transmission Line	$14,000,000
	Priority 5 Recycled Water System Total	$19,000,000
	Priority 5 – Wastewater System	
5-304	Trail Creek East/West Extension – Project 3 (TCE-3)	$1,200,000
5-305	Trail Creek East/West Extension – Project 4 (TCE-2, TCE-4)	$1,400,000
5-306	Bear Creek Gravity Sewer Extension (BC-2)	$1,500,000
5-307	Lower Middle Oconee Gravity Sewer Extension (LMO-8)	$2,000,000
5-308	Turkey Creek Gravity Sewer Extension (TC-2)	$1,700,000
5-309	Upper North Oconee/North Oconee River East Extension (UNO-8)	$750,000
	Priority 5 Wastewater System Total	**$8,550,000**
	Priority 5 Total	**$27,550,000**

[1]Costs for projects in previous SDP update have been updated to reflect changes in project scope and pricing.

8.5 Mayor and Commission Strategic Commitments and Key Performance Indicators Projects

Table 8-6 summarizes the 2 Priority 6 projects. These two utility wide projects will help to improve overall performance of the utility.

Table 8-6: Priority 6 – Mayor and Commission Strategic Commitments Projects
2020 Service Delivery Plan Update – Capital Improvements Element

SDP Project Number	Project Name	Project Cost (2020 Dollars)
	Priority 6 – Utility Wide	
6-301	Billing System Project	$400,000
6-302	Alternate Energy	$2,790,000
	Priority 6 Total	**$3,190,000**

[1]Costs for projects in previous SDP update have been updated to reflect changes in project scope and pricing.

8.6 Project Timing

With each of the 59 recommended capital improvement projects prioritized and ranked within their respective categories, projects were then ranked against each other based on time of need for the improvement. PUD staff used the project ranking methodology discussed in Section 6 and the time of need of the capital improvements to identify the timing of the capital improvement projects relative to each other. For example, a Priority 1 capital project may be needed later than a Priority 3 project depending on when regulatory requirements require the Priority 1 project to be completed.

Table 8-7 lists each of the recommended capital improvement projects based on time of need to be completed.

Table 8-7: Project Timing for Capital Improvement Projects
2020 Service Delivery Plan Update –Capital Improvements Element

SDP Project Number	Project Name	Project Timing
1-302	North Oconee WRF – Phosphorus Polishing	1
1-303	Middle Oconee WRF – Phosphorus Polishing	2
3-308	Tanyard Branch Interceptor Improvements	3
3-309	Brooklyn Creek Interceptor Improvements	4
3-310	Upper North Oconee Interceptor – Phase 2B	5
3-311	Upper North Oconee Interceptor – Phase 2C	6
5-301	UGA Recycled Water Transmission Line	7
1-304	Cedar Creek WRF – Phosphorus Polishing	8
5-302	North Oconee WRF Recycled Water Facility	9
1-301	Future Drinking Water Regulations	10
3-312	Middle Oconee East Mill Run Sewer Replacement	11
4-301	Additional Storage	12
6-301	Billing System Project	13
3-313	Sanford Stadium Sanitary Sewer Interceptor Improvements Phase 1	14
2-301	Alternative Sewer Solutions	15
3-340	Combined Meter Management/Water and Sewer Facility	16
3-314	Middle Oconee East Trunk Improvements Phase 1	17
3-301	Upgrade Aging Water Mains	18
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3-316	Mitchell Bridge Sewer Interceptor Improvements	20
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Table 8-7: Project Timing for Capital Improvement Projects
2020 Service Delivery Plan Update –Capital Improvements Element

SDP Project Number	Project Name	Project Timing
3-321	Hampton Park Gravity Sewer Interceptor	25
5-304	Trail Creek East/West Extension – Project 3 (TCE-3)	26
3-302	Water Main Transmission Redundancy	27
3-303	Small Diameter Water Main Replacement	28
3-322	Cedar Creek WRF Emergency Generator	29
5-323	Middle Oconee West Trunk Improvements Phase 1	30
5-303	Athena Industrial Park Recycled Water Transmission Line	31
3-324	Voyles Road Sanitary Sewer Upgrade	32
3-304	Middle Oconee River Raw Water Pump Station	33
3-305	North Oconee River Raw Water Pump Station	34
3-325	Targeted Sanitary Sewer Flow Monitoring	35
4-302	Atlanta Highway Tank and Booster Pump Station	36
4-303	Water Supply Resiliency and Reliability	37
3-326	Upper North Oconee West Trunk Improvements	38
3-306	Water Main Connection Reliability for Improved Water Quality and Fire Protection	39
3-327	North Oconee WRF - Biosolids Upgrades	40
3-328	Kingswood Subdivision Gravity Sewer Collector Improvements	41
3-329	Long-term Sanitary Sewer Evaluation Survey (SSES) and Rehabilitation Program	42
3-307	J. G. Beacham Water Treatment Plant Solids Handling	43
3-330	North Oconee WRF – Aeration Basins Small Blower	44
3-331	Middle Oconee WRF Operations Building	45
3-332	Middle Oconee WRF – Enhanced Biological Phosphorus Removal Basin Cover	46
6-302	Alternate Energy	47
5-305	Trail Creek East/West Extension – Project 4 (TCE-2, TCE-4)	48
3-333	Middle Oconee WRF Influent Pumps	49
3-334	Cedar Creek WRF Influent Pumps	50
3-335	North Oconee WRF – Preliminary Treatment	51
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3-338	Turkey Creek Interceptor Improvements	54
3-339	Cedar Creek WRF – Ultraviolet Disinfection	55

Table 8-7: Project Timing for Capital Improvement Projects
2020 Service Delivery Plan Update –Capital Improvements Element

SDP Project Number	Project Name	Project Timing
5-306	Bear Creek Gravity Sewer Extension (BC-2)	56
5-307	Lower Middle Oconee Gravity Sewer Extension (LMO-8)	57
5-308	Turkey Creek Gravity Sewer Extension (TC-2)	58
5-309	Upper North Oconee/North Oconee River East Extension (UNO-8)	59

8.7 Summary and Next Steps

The following pages include project details for each of the 59 recommended improvements included in the Infrastructure Element and Capital Improvements Element. The Financial Element will be updated based on this document and will identify the funding sources to be used for each project category and the source of funds and financing mechanisms necessary to implement these projects. Also included in the Financial Element will be a schedule for the project implementation which is crucial to PUD's rate setting process. Project prioritization may be modified, based on funding or financials availability. .

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Project Fact Sheets

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
1-301

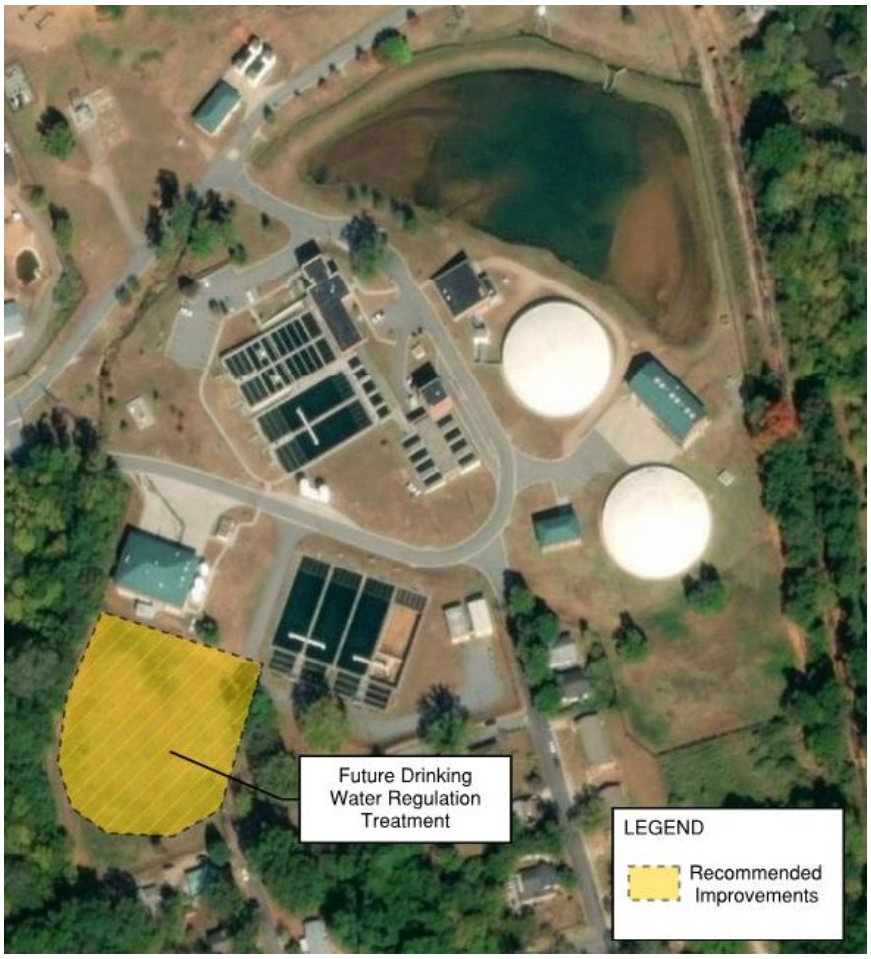
Project Name
Future Drinking Water Regulations Treatment

Project Category
Public Health
Regulatory Requirement

Project Cost
$1,000,000

Key Elements

1. Assess impact of future regulations on existing treatment
2. Evaluate potential treatment technologies for target compound removal and ability to meet future regulations



Project Description

•Assess impact of future drinking water regulations treatment scheme. Assess how existing facilities meet future regulations and identify gaps where new treatment technologies can be implemented to meet future regulations.
•Evaluate potential treatment technologies for future regulated compound removal and ability to meet future regulations.
•Characterize raw water quality from three separate sources of supply (Middle Oconee River, North Oconee River and Bear Creek Reservoir) for taste and odor, contaminants of emerging concern (CECs), and PFAS compounds.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
1-302

Project Name
North Oconee WRF
Phosphorus Polishing

Project Category
Public Health
Regulatory Requirement

Project Cost
$11,100,000

Key Elements

1. Construction of tertiary filter facilities
2. Meet future effluent Total Phosphorus limit

Project Description

Construct tertiary filters to meet new total phosphorus limits. This includes any ancillary equipment needed to meet new permit requirements.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
1-303

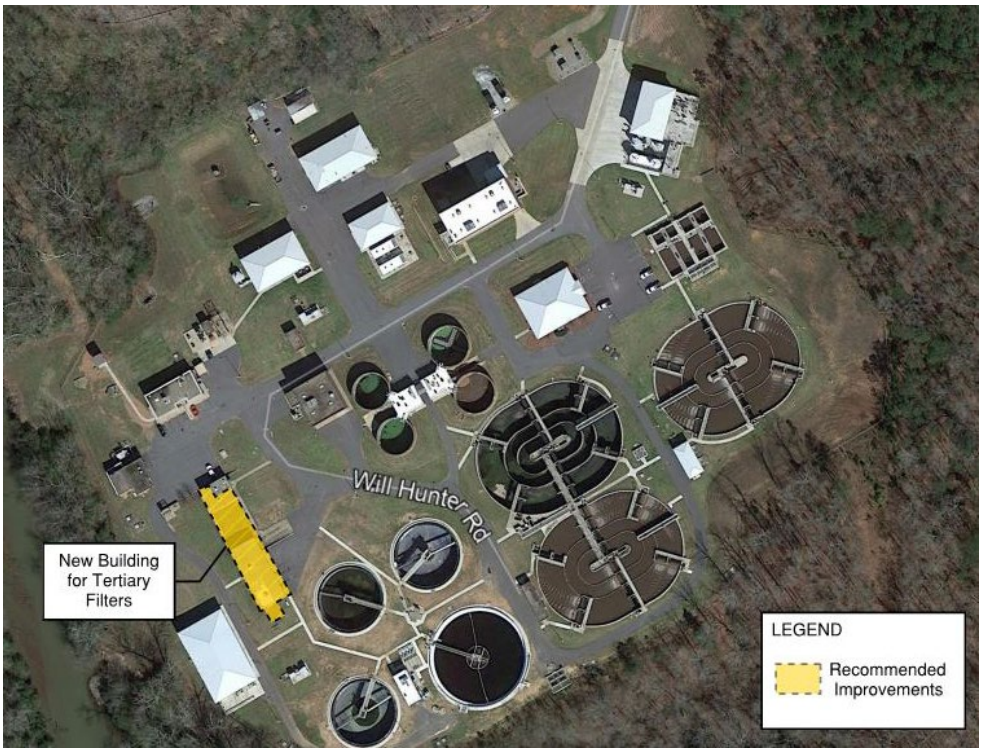
Project Name
Middle Oconee WRF
Phosphorus Polishing

Project Category
Public Health
Regulatory Requirements

Project Cost
$14,000,000

Key Elements

1. Construction of filtration facilities.
2. Meet future effluent Total Phosphorus limit
3. Construction of intermediate pump station



Project Description

Relocate the existing maintenance building and construct tertiary filters to meet new total phosphorus permit. This includes any ancillary equipment needed to meet new permit requirements.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
1-304

Project Name
Cedar Creek WRF
Phosphorus Polishing

Project Category
Public Health
Regulatory Requirements

Project Cost
$6,300,000

Key Elements

1. Construction of filtration facilities
2. Meet anticipated future effluent Total Phosphorus limit

Project Description

Construct tertiary filters to meet new phosphorus limits. This includes any ancillary equipment needed to meet new permit requirements.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
2-301

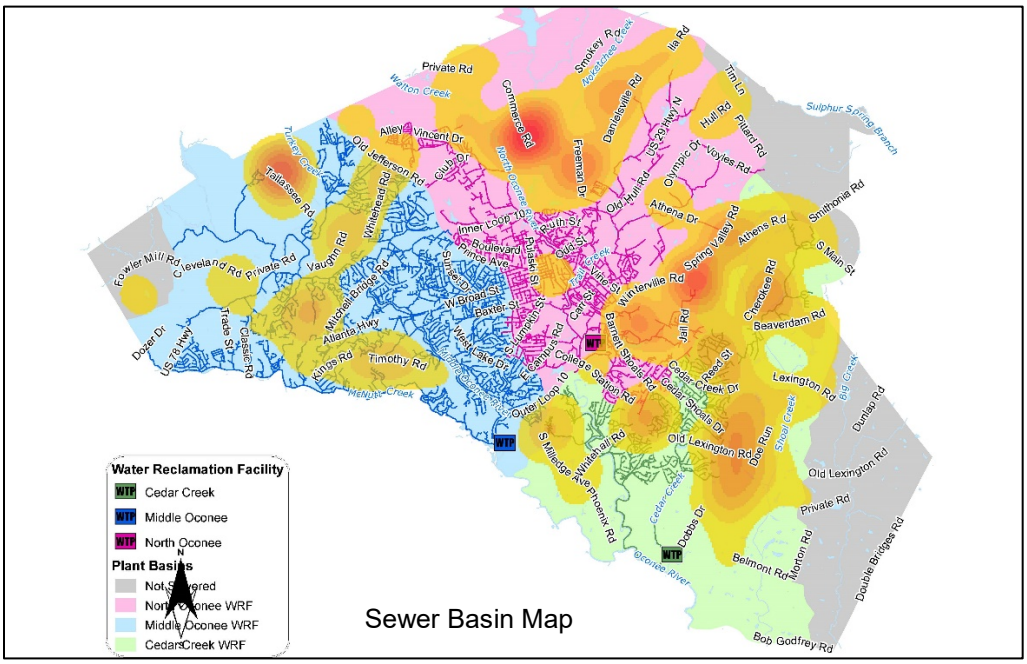
Project Name
Alternative Sewer Solutions

Project Category
Public Health Initiative

Project Cost
$5,000,000

Key Elements

1. Alternate sewer solutions for areas of the county that are served by septic tanks for wastewater treatment.
2. Tracking septic tank pumping manifests allows areas of potential septic tank failure to be identified.



Sewer Basin Map

Project Description

Providing design for alternatives to gravity sewer in areas that have failing septic tanks. Alternatives could include force main collection, onsite wastewater treatment options, neighborhood-based wastewater treatment and disposal, or other future concepts for wastewater treatment and disposal.

The Sewer Basin Map above shows the locations of pumped septic tanks from 2017-2019 as indicated in manifests at the Cedar Creek WRF septage receiving station.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-301

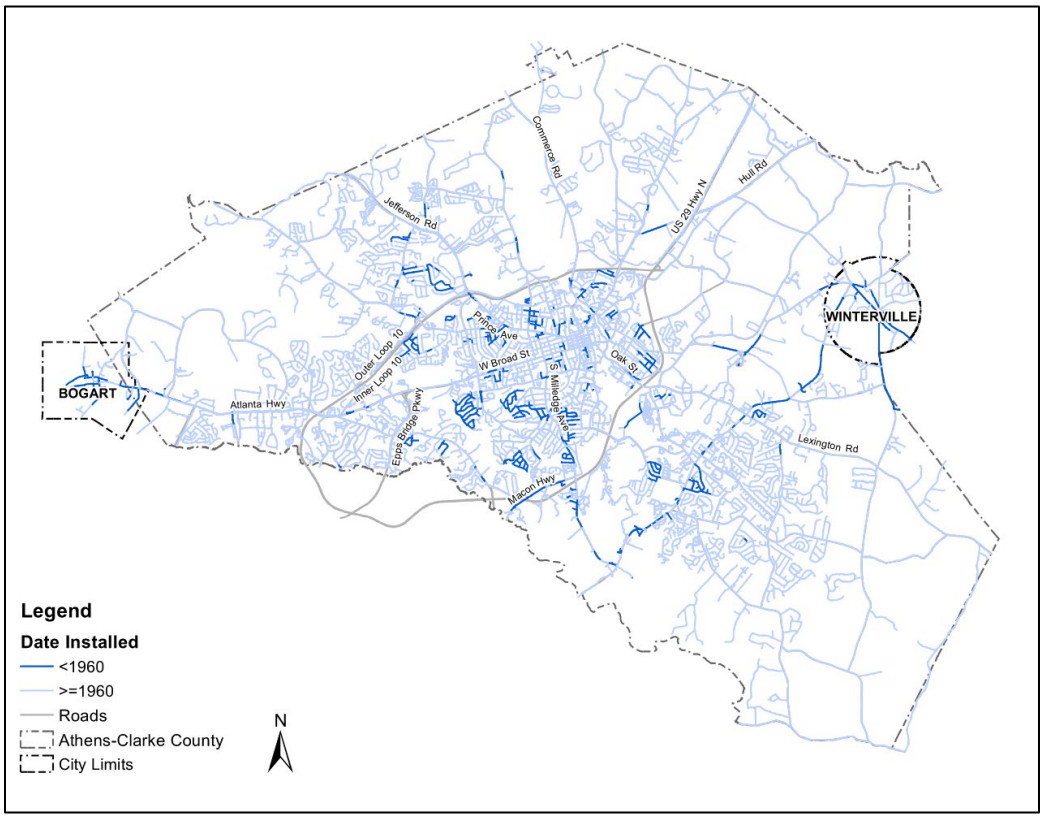
Project Name
Upgrade Aging Water Mains

Project Category
Rehabilitation and Replacement

Project Cost
$20,000,000

Key Elements

1. Replace aging water mains (cast-iron and unlined)
2. Improve water service reliability
3. Protect water quality
4. Reduce maintenance costs associated with failed aging pipes.



Project Description

Replacement of approximately 16 miles of unlined and lined cast-iron water mains installed prior to 1960. Cast iron pipes can become brittle or tuberculated with excessive age. These pipes are more prone to failure which could lead to service outages or boil water advisories.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-302

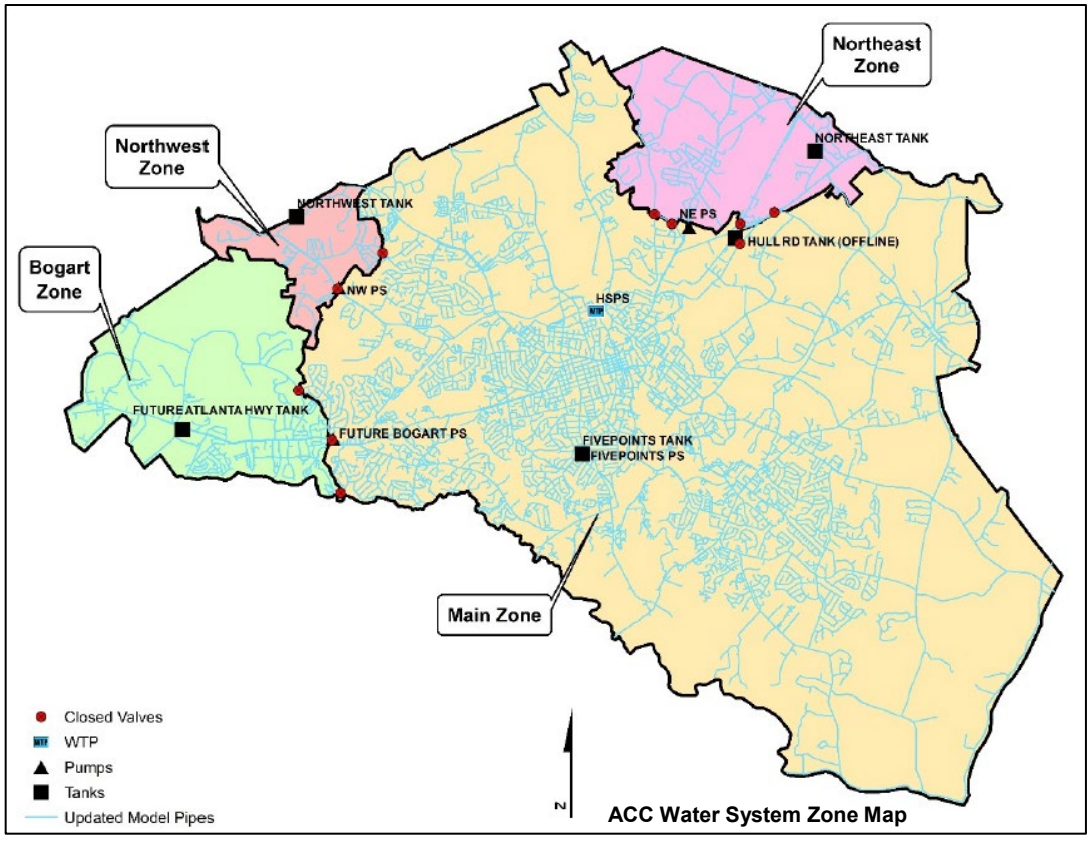
Project Name
Water Main Transmission Redundancy

Project Category
Rehabilitation and Replacement

Project Cost
$4,000,000

Key Elements

1. Improves reliability in water service by increasing redundancy in transmission mains.
2. Improve reliability for fire protection by maintaining looped and redundant pathways to provide water to the county.



ACC Water System Zone Map

Project Description

Identify transmission line additions that will provide redundancy in the water main transmission system Project includes design and construction of large diameter water mains to provide multiple paths for water transmission to all parts of the county. Multiple paths or redundancy allows for improved fire protection and backup sources in case of a water main failure.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-303

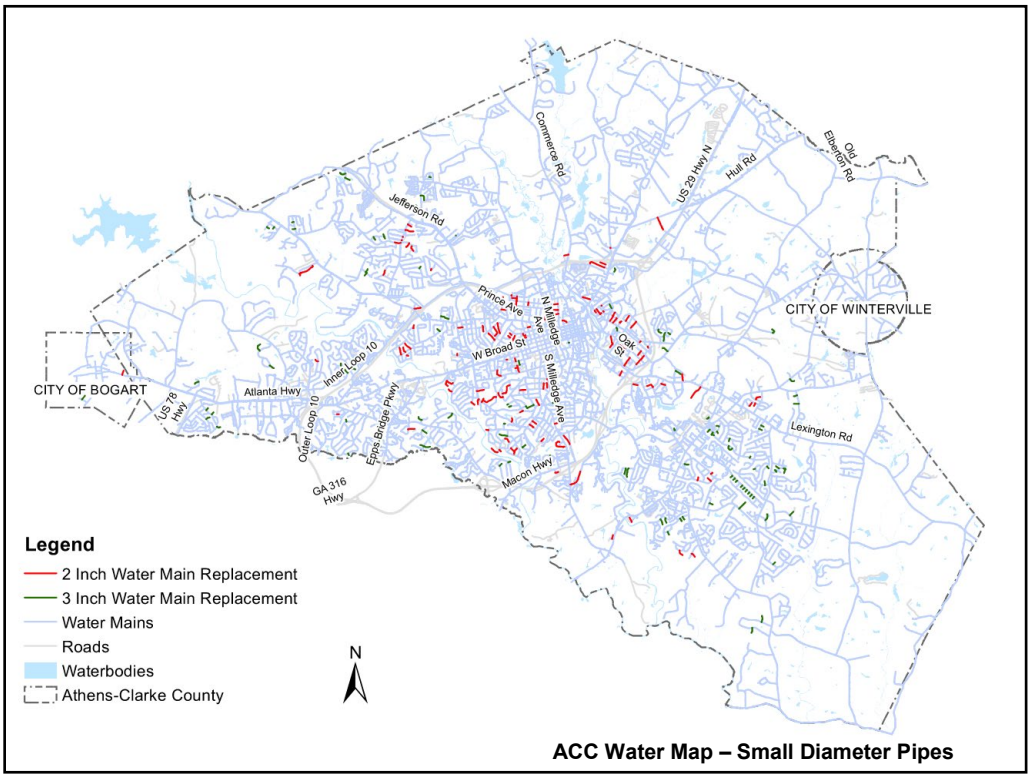
Project Name
Small Diameter Water Main Replacement

Project Category
Rehabilitation and Replacement

Project Cost
$15,000,000

Key Elements

1. Replace small diameter pipes (2 to 3 inch diameter)
2. Enhance fire protection and improve system reliability by providing large diameter pipes with the ability to provide enough water to fight a fire.



ACC Water Map – Small Diameter Pipes

Project Description

Replacement of small diameter (2 inch and 3 inch) water mains to enhance fire protection and improve system reliability. Replace the small diameter distribution pipes with 6 inch or 8-in diameter pipe. Fire hydrants will be added to the new pipe network improving fire-fighting capability for the area. The remaining length of small diameter pipe is approximately 14.4 miles (70,000 LF) of pipe.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-304

Project Name
Middle Oconee River Raw Water Pump Station

Project Category
Rehabilitation and Replacement

Project Cost
$460,000

Key Elements

1. Replace raw water pump and equipment
2. Ensures water supply reliability

Project Description

Replacement pumps and associated piping and equipment to replace the existing equipment at Middle Oconee Raw Water Pump Station.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-305

Project Name
North Oconee River Raw Water Pump Station

Project Category
Rehabilitation and Replacement

Project Cost
$800,000

Key Elements

1. Replace raw water pump and equipment
2. Ensures water supply reliability

Project Description

Replacement pumps and associated piping and equipment to replace the existing equipment at North Oconee Raw Water Pump Station.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-306

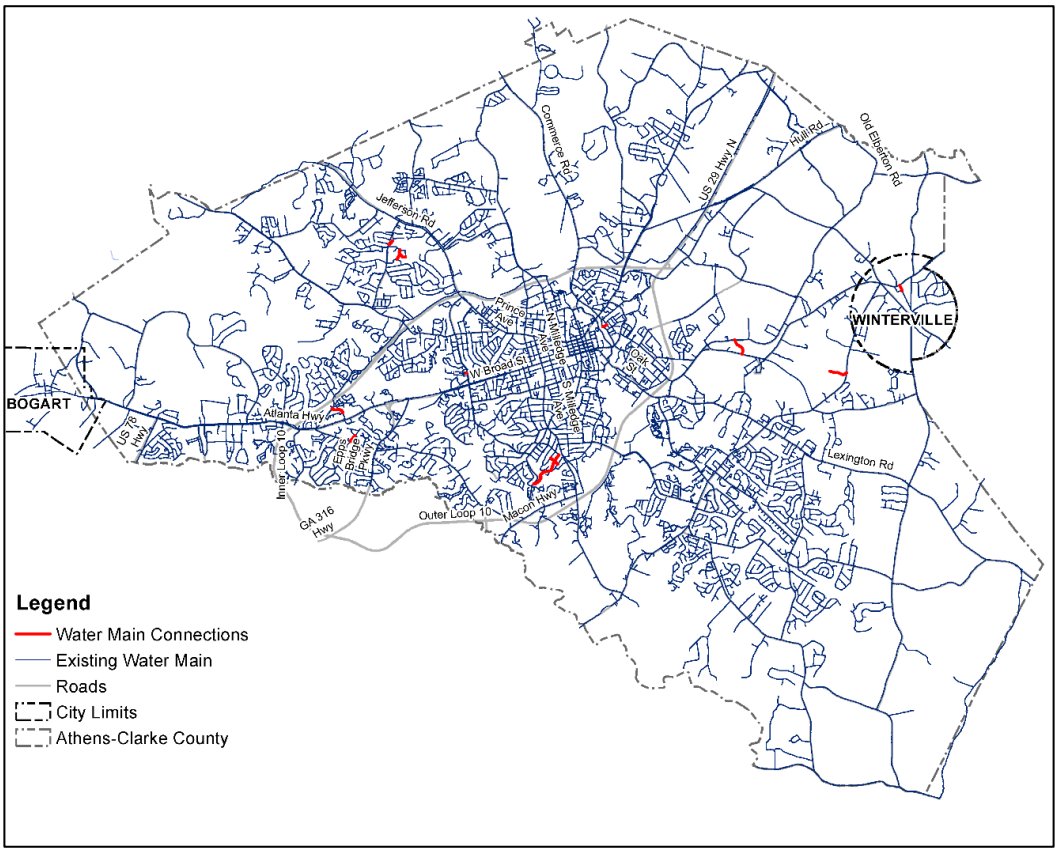
Project Name
Water Main Connection Reliability for Improved Water Quality and Fire Protection

Project Category
Rehabilitation and Replacement

Project Cost
$8,500,000

Key Elements

1. Install 30,000 LF of water lines
2. Connect existing service areas and eliminate dead ends to increase system redundancy, improve disinfection efficacy, water quality, and improve fire protection.



Project Description

Install approximately 30,000 LF of new water lines in order to connect existing service areas, eliminate dead ends within the system, and increase system redundancies by creating loops to improve water quality and fire protection.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-307

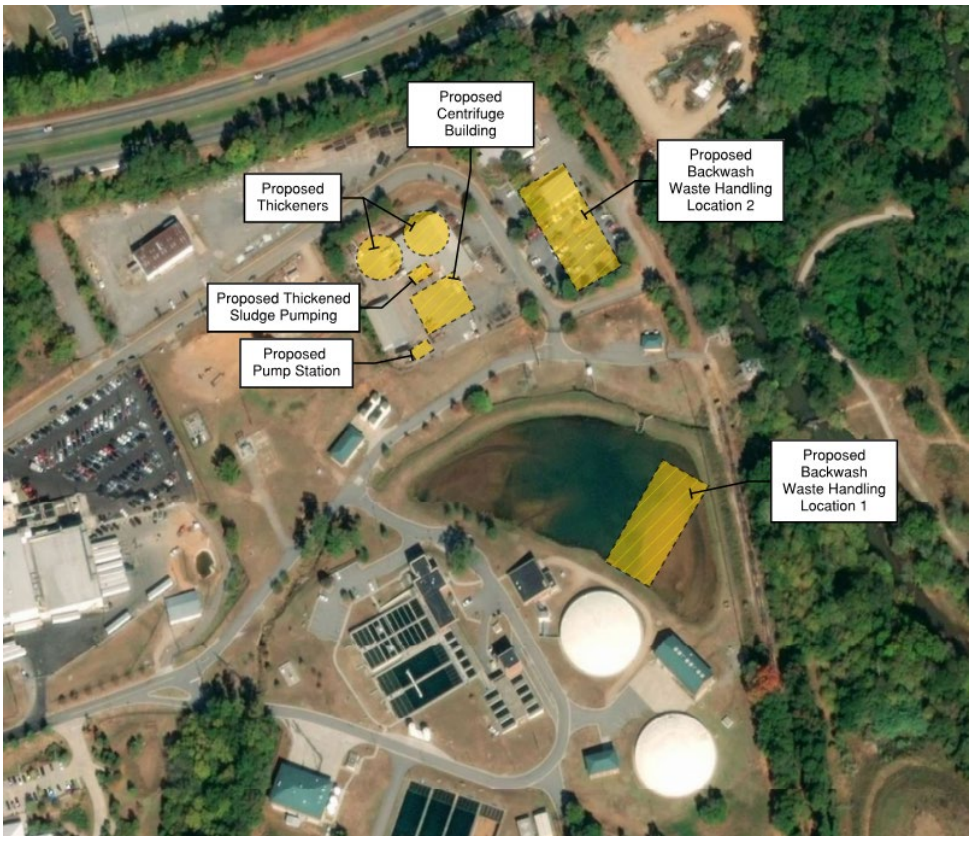
Project Name
J. G. Beacham Water Treatment Plant Solids Handling

Project Category
Rehabilitation and Replacement

Project Cost
$20,000,000

Key Elements

1. Minimize solids to meet NPDES discharge permit
2. Backwash and drain water recovery and solids thickening /dewatering
3. Recover backwater water to augment water supply as needed



Project Description

Construct facilities to handle backwash and drain water recovery with the latest innovative technology. There will be a need for treating biosolids as the facility reaches capacity. The processes selected would replace the pond as a main means for solids handling.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 3-308

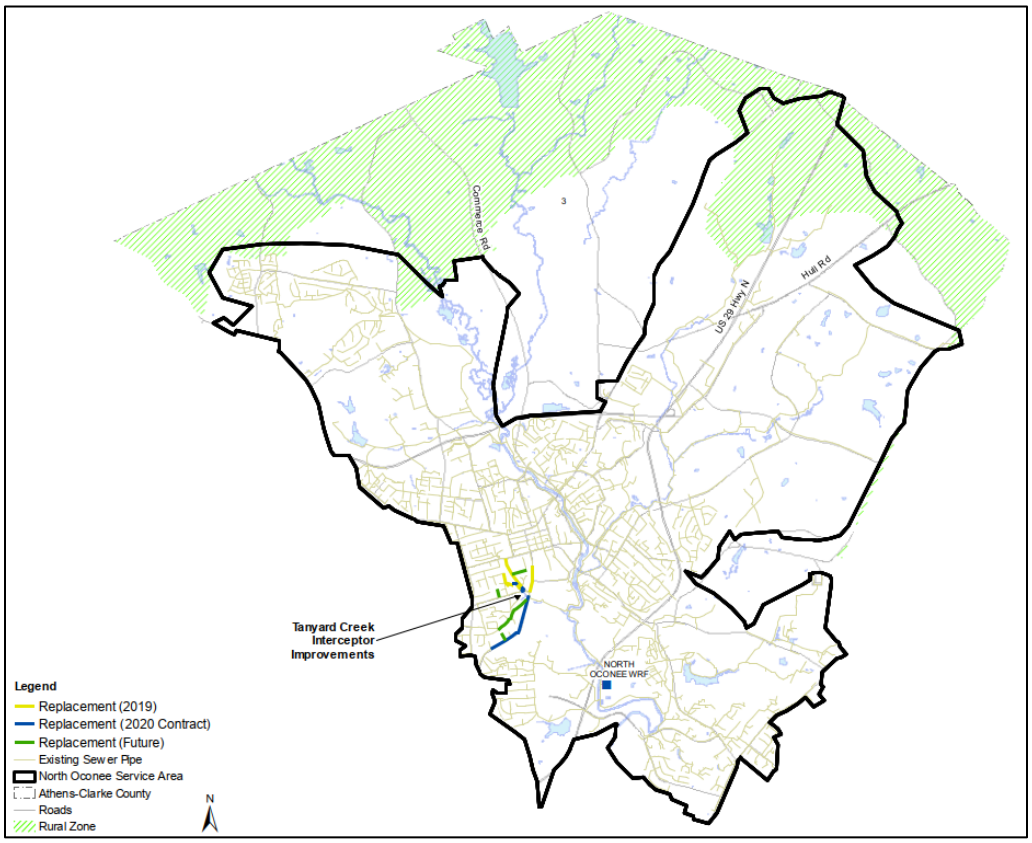
Project Name
Tanyard Branch Interceptor Improvements

Project Category
Rehabilitation and Replacement

Project Cost
Total Cost: $10,300,000
2020 Contract: $8,400,000

Key Elements

1. Replace 12,812 LF of existing sewer
2. Replaces, and in most cases expands sewers to improve service and reduce Inflow and infiltration.



Project Description

The Tanyard Creek Interceptor is located in and around the UGA campus. This is an ongoing sewer upgrade project. Work has to be coordinated with UGA to minimize impact to the campus community. Construction underway and recent replacements include:

2019 Construction Completed
- 2,983 LF of 8” Pipe
- 1,855 LF of 18” Pipe

2020 Under Construction
- 3,672 LF of 8” Pipe
- 213 LF of 18” Pipe

Future work will include the sewer upgrade under Sanford Stadium and the Cloverhurst sewer line.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-309

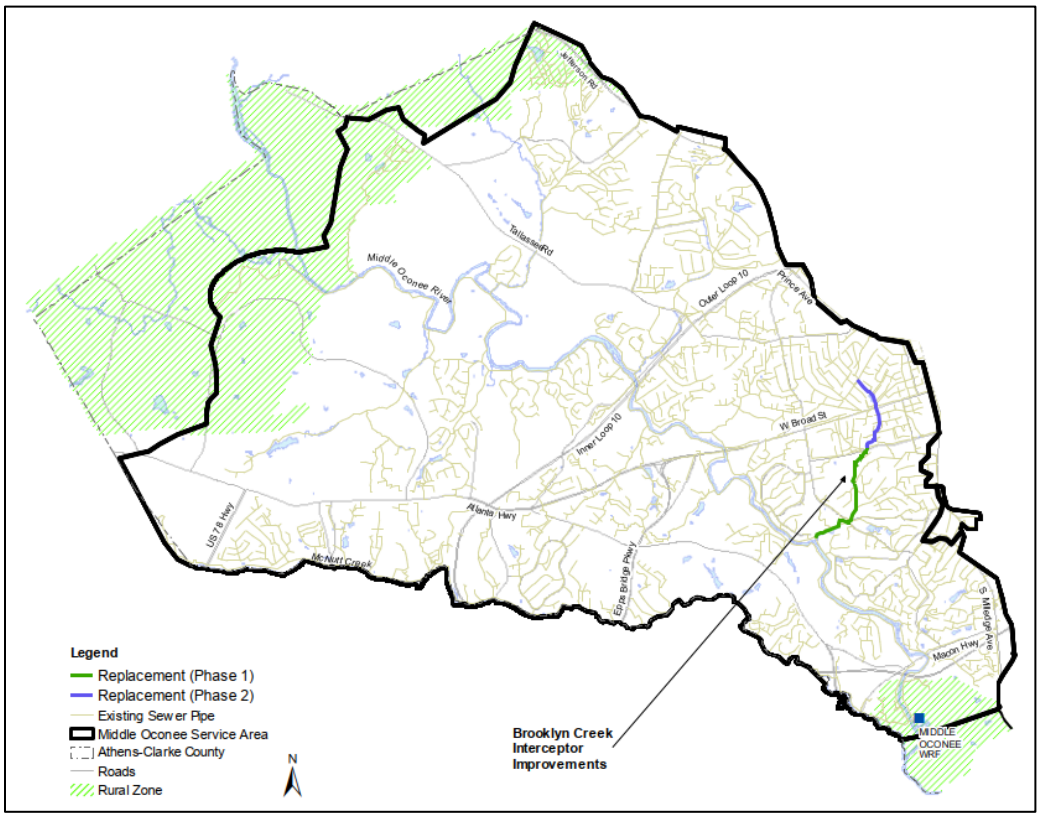
Project Name
Brooklyn Creek Interceptor Improvements

Project Category
Rehabilitation and Replacement

Project Cost
$11,600,000

Key Elements

1. Replace 11,457 LF of existing sewer
2. Replaces, and in most cases expands, sewer pipes to improve service and reduce inflow and infiltration.



Project Description

This project will upgrade the Brooklyn Creek Interceptor Sewer by upsizing the pipe and adjusting the grade to eliminate as many aerial crossing as possible. 11,457 LF of interceptor sewer will undergo replacement and upsizing. Breakdown of pipe upgrade includes:

Phase 1:
- 504 LF of 8” Pipe
- 2,817 LF of 24” Pipe
- 4,100 LF of 30” Pipe

Phase 2:
- 276 LF of 8” Pipe
- 3,242 LF of 18” Pipe
- 518 LF of 24” Pipe

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-310

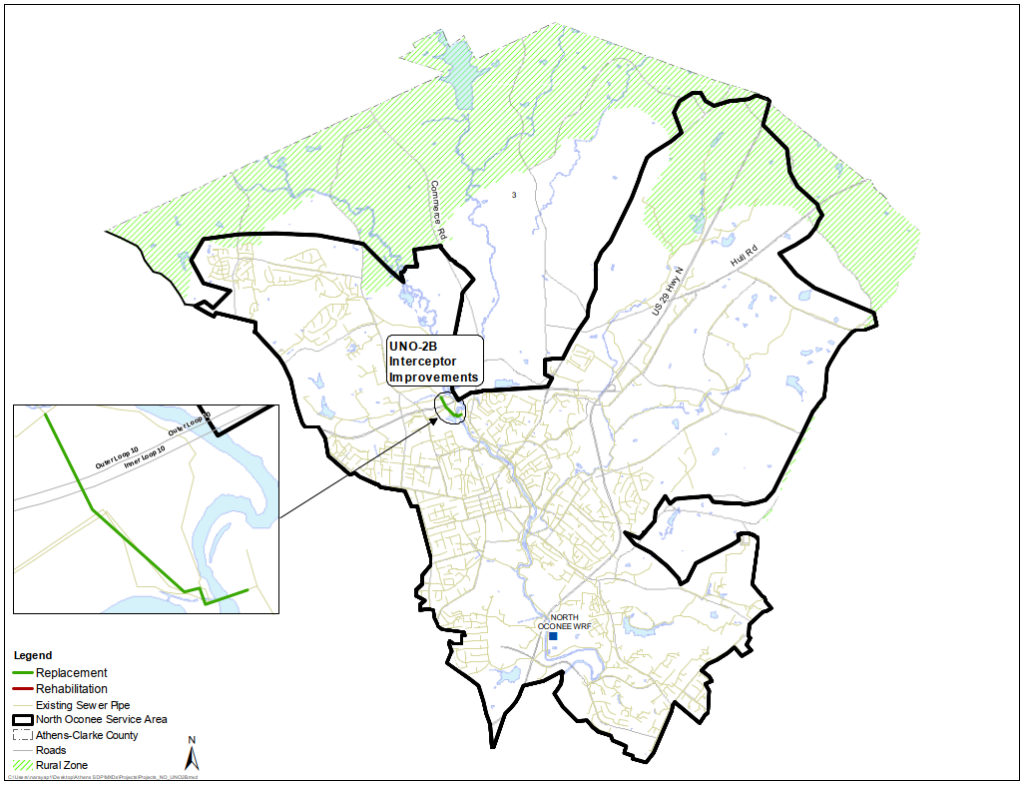
Project Name
Upper North Oconee Interceptor - Phase 2B

Project Category
Rehabilitation and Replacement

Project Cost
$11,500,000

Key Elements

1. Replace 1,835 LF of existing sewer
2. Microtunnel for 1,370 LF of 36-inch pipeline
3. Improve flow by providing larger pipe diameter
4. Eliminate aerial portion of sewer adjacent to the North Oconee River



Project Description

This project is ongoing with a completion date anticipated in 2021. There are 1,835 LF of sewer being replaced within the North Oconee WRF sewer basin. 1,370 LF of 36-inch sewer will be relocated within a 60-inch diameter steel casing pipe tunnel under the Loop. The project also included the removal of the aerial pipe adjacent to the North Oconee River that is currently under the Loop bridge over the river. Breakdown of pipe replacement incudes:

- Installation of 1,370 LF of 36-inch diameter ductile iron restrained joint gravity sewer pipe located in a 72-inch diameter grout-filled tunnel.
- Installation of ductile iron restrained joint gravity sewer pipe installed by open-cut methods.
- Demolition and removal of above-ground sewer pipe and concrete pier pipe supports and manholes; plug and abandon buried sewer pipe; removal of buried sewer pipe.
- Installation of 42-inch RCP storm sewer by trenchless methods. This sewer passes underneath the Athens Line Railroad and includes installation of 30-inch and 18-inch HDPE storm sewer by open cut.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-311

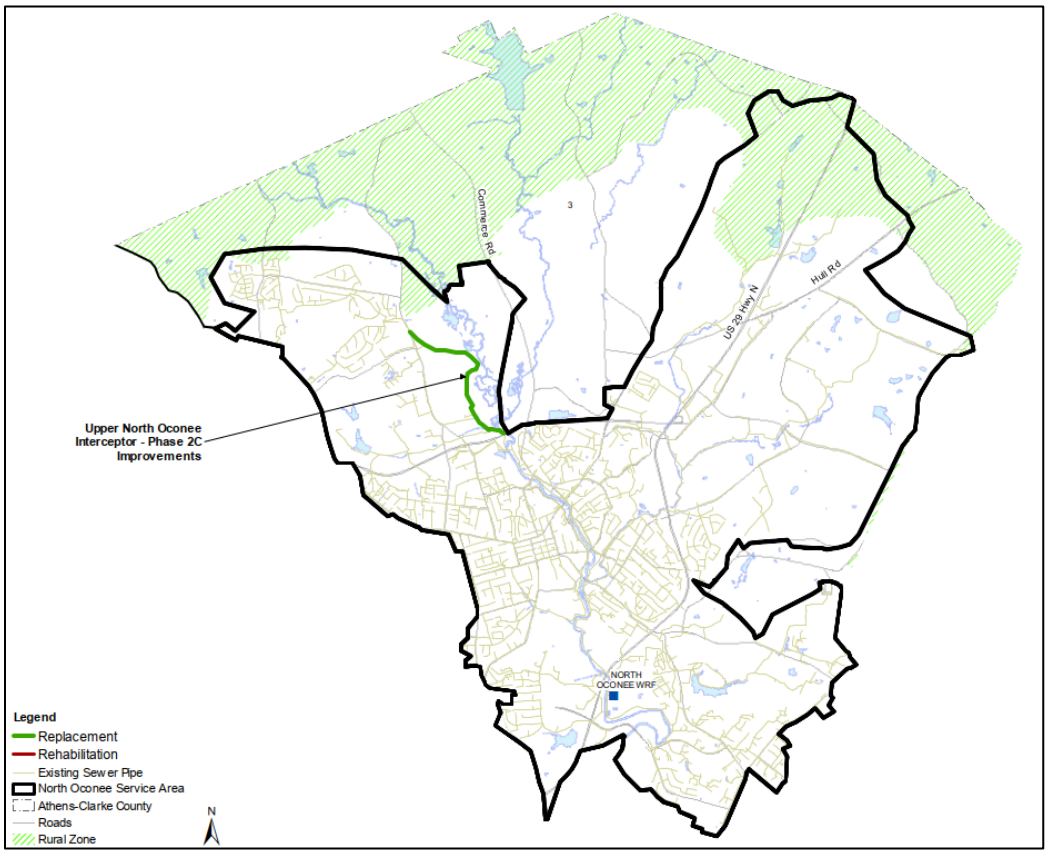
Project Name
Upper North Oconee Interceptor - Phase 2C

Project Category
Rehabilitation and Replacement

Project Cost
$8,400,000

Key Elements

1. Replacement of 9,000 LF of sewer pipe
2. Realignment of sewer to eliminate as many aerial sections from the existing pipeline as possible
3. Upgrade pipe size to improve wastewater flow.



Project Description

This project is currently in design and will be bid in FY 2021. The project includes replacement of 8,700 LF of 24-inch pipe and 300 LF of 12-inch pipe within the North Oconee WRF sewer basin (sub-basin: UNO-6, UNO-7). This project will connect directly to the UNO 2B project currently in construction.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 3-312

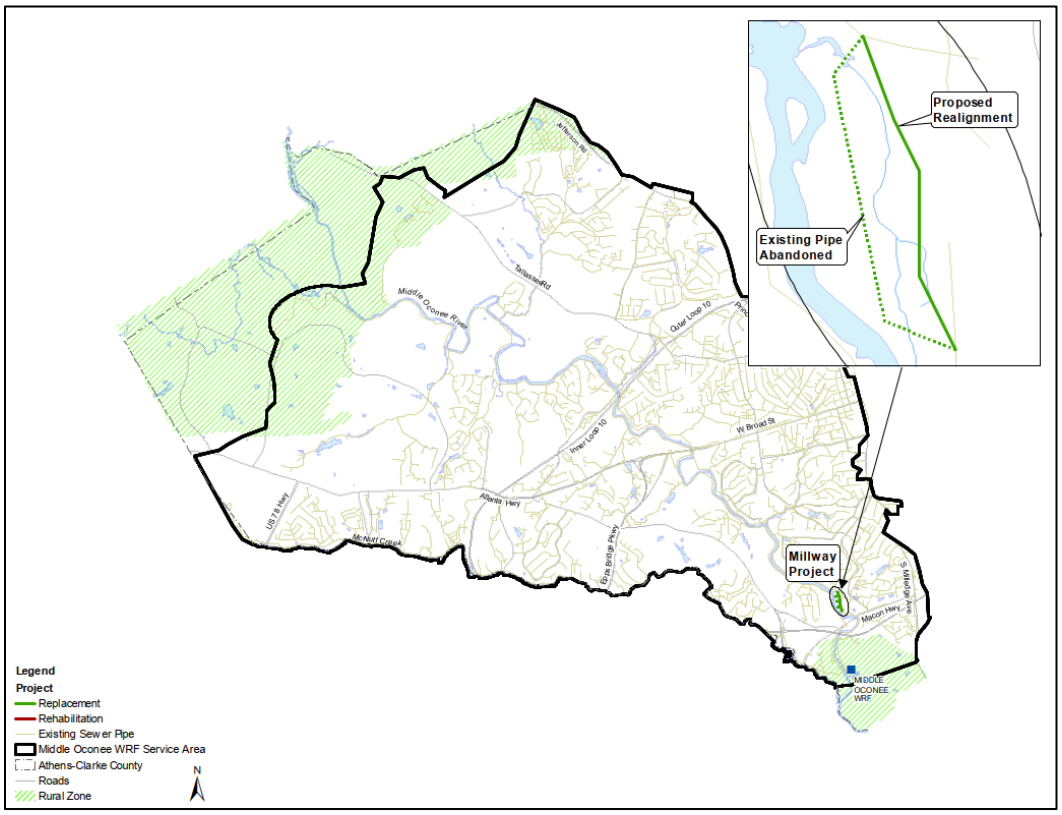
Project Name
Middle Oconee East Mill Run Sewer Replacement

Project Category
Rehabilitation and Replacement

Project Cost
$1,000,000

Key Elements

1. Replace and relocate 1,000 LF of sewer pipe away from stream bank.
2. Reduce risk of catastrophic failure due to bank erosion.
3. Eliminate 2 aerial crossings



Project Description

This project will relocate the sewer line away from the old Mill Run off of the Oconee River. This will relocate 1,000 LF of sewer pipe away from the stream bank within the Middle Oconee East sewer basin Phase 1. The two existing aerial crossings of the Mill Run portion of the river will be eliminated.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 3-313

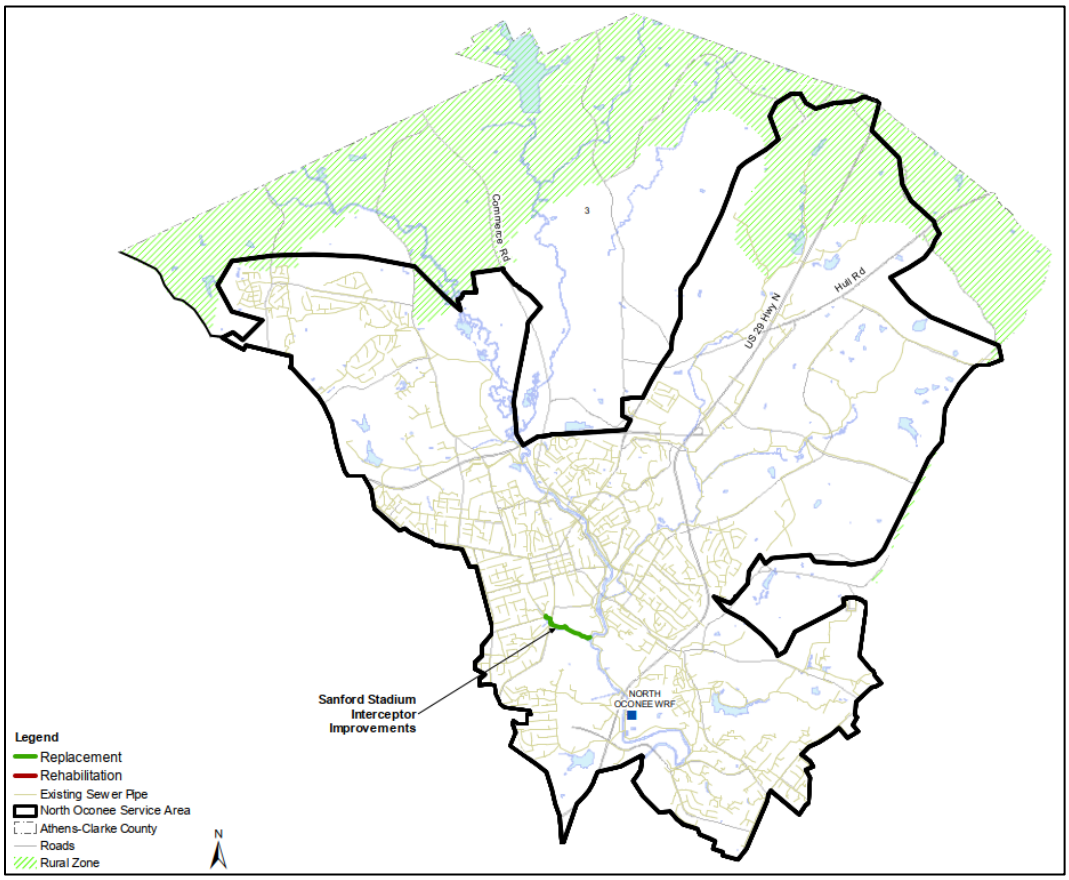
Project Name
Sanford Stadium Sanitary Sewer Interceptor Improvements Phase 1

Project Category
Rehabilitation and Replacement

Project Cost
Phase 1:
$5,800,000

Key Elements

1. Replacement of 2,800 LF of sewer pipe currently located in the Tanyard Creek culvert located under the stadium
2. Increase the pipe size to improve sewer flow.



Project Description

This project will upgrade the sewer located in the culvert under Sanford Stadium The project will be coordinated with UGA. The increased pipe size will improve the sewer flow in the interceptor.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 3-314

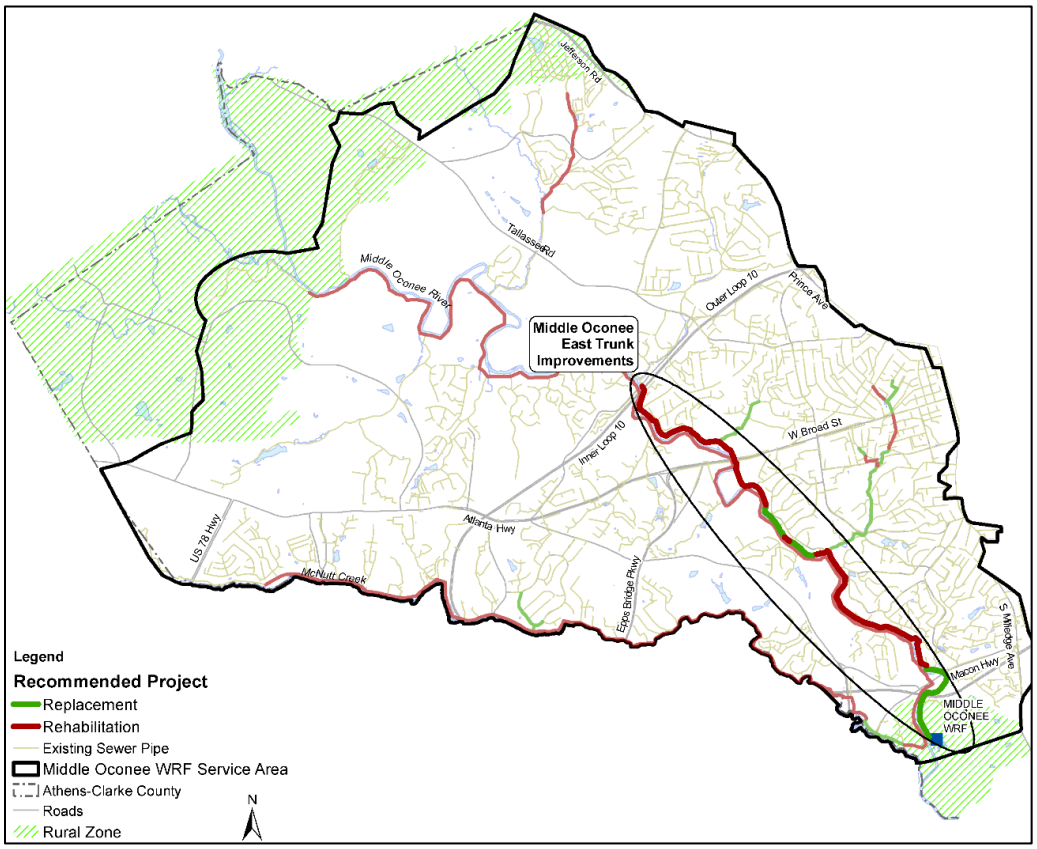
Project Name
Middle Oconee East Trunk Improvements Phase 1

Project Category
Rehabilitation and Replacement

Project Cost
Phase 1:
$13,000,000

Key Elements

1. Replacement and realignment of 8,700 LF of sewer pipe
2. The pipe size will be increased to provide additional sewer flow capacity.
3. The project will realign portions to avoid sensitive environmental areas.



Project Description

This project will upgrade and realign 8,700 LF of sewer trunk within the Middle Oconee East WRF sewer basin. This is phase 1 of the project. Breakdown of pipe replacement for Middle Oconee East Trunk Improvements includes:

- Replace 10,900 LF of 30-inch sewer
- Replace 4,000 LF of 36-inch sewer
- Replace 13,700 LF of 48-inch sewer

Phase 1 pipeline replacement includes 8,700 LF of 48-inch sewer.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-315

Project Name
North Oconee WRF Aeration Basins

Project Category
Rehabilitation and Replacement

Project Cost
$800,000

Key Elements

1. Valve actuator and DO probe installation
2. Better process control
3. Reduce energy costs

Project Description

Install and integrate new automated valves and D.O. probes to have better process control and reduce energy cost.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 3-316

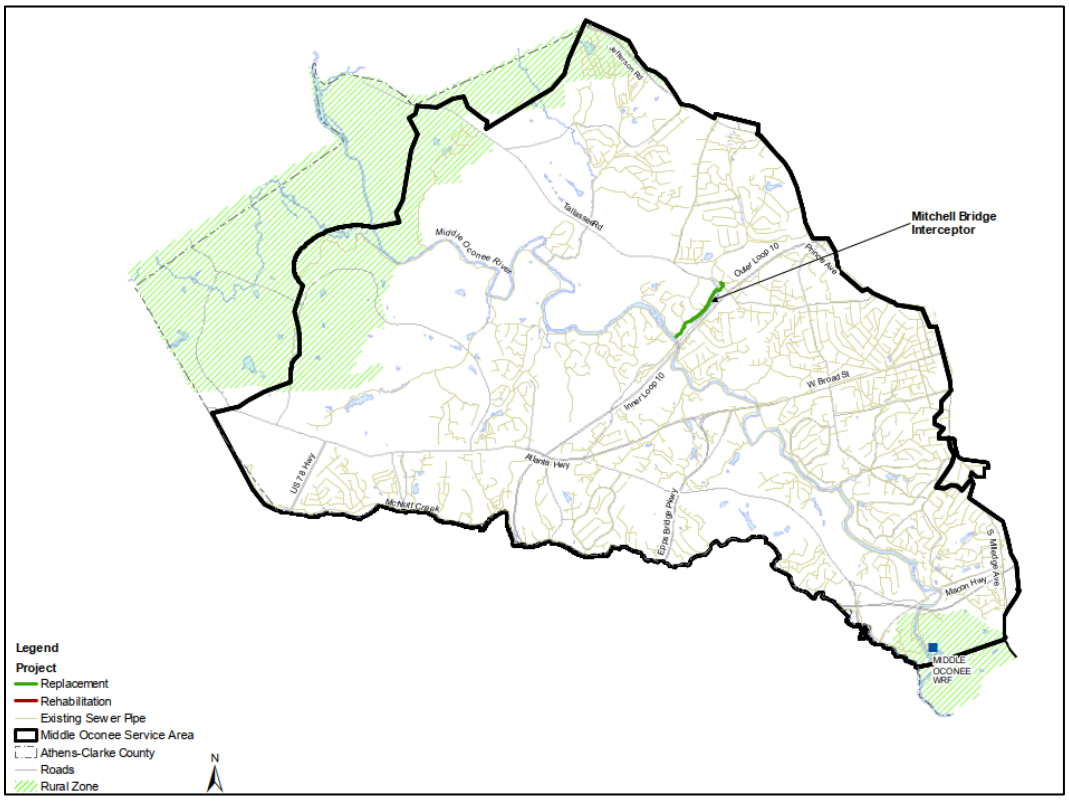
Project Name
Mitchell Bridge Sewer Interceptor Improvements

Project Category
Rehabilitation and Replacement

Project Cost
$6,000,000

Key Elements

1. Replacement of 6,000-LF of sewer pipe
2. Elimination of aerial crossings
3. Upsize of sewer pipe to improve sewer capacity



Project Description

This sewer project will Replace 6,000 LF of sewer interceptor within the Middle Oconee East WRF sewer basin. The project will resize and realign the current sewer to increase flow capacity and remove several aerial crossings. Breakdown of pipe replacement includes:

•Replace 1,100 LF of 8-inch pipe
•Replace 500 LF of 12-inch pipe
•Replace 200 LF of 15-inch pipe
•Replace 4,200 LF of 24-inch pipe

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 3-317

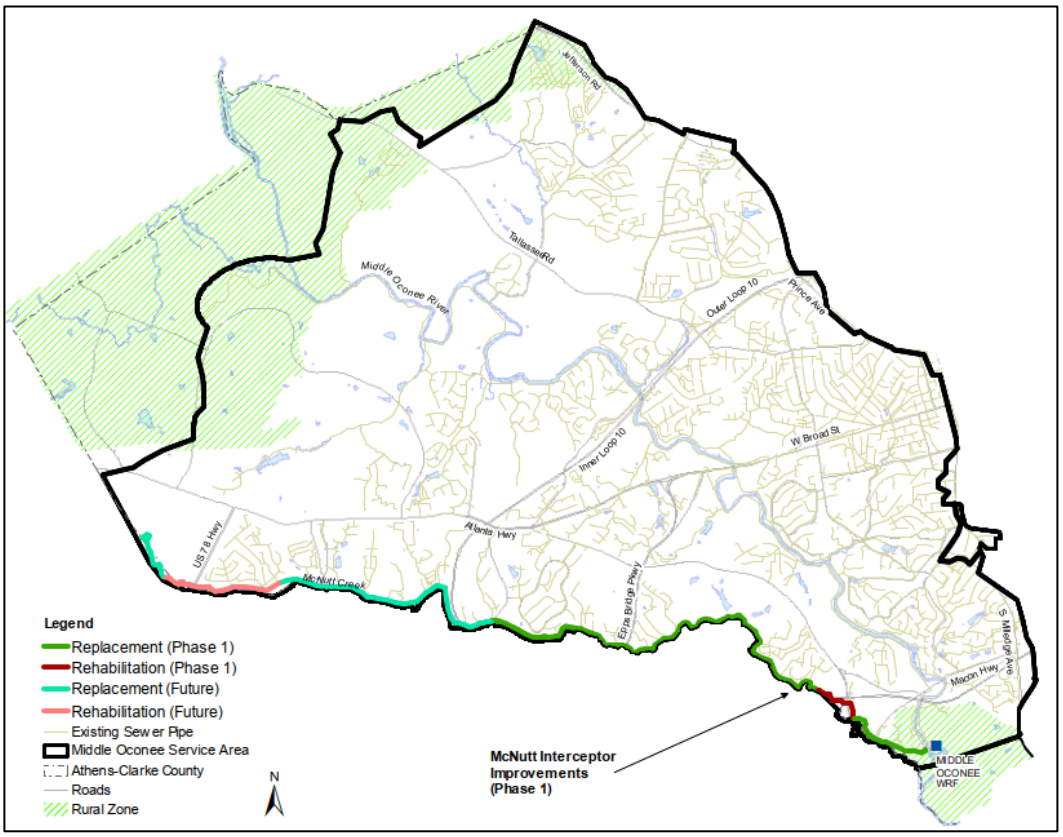
Project Name
McNutt Creek Sewer Interceptor Improvements Phase 1

Project Category
Rehabilitation and Replacement

Project Cost
Phase 1:
$14,000,000

Key Elements

1. Replacement and upsizing of 25,000-LF of sewer pipe
2. Rehabilitation of 2,500 LF of sewer pipe.
3. Improve sewer capacity with increased flow capacity



Project Description

This project will improve sewer flow capacity for the McNutt Creek Sewer Interceptor by Replacement of the sewer pipeline in the Middle Oconee WRF sewer basin. Breakdown of pipe rehabilitation and replacement for the entire interceptor includes:

- Replace 4,300 LF with 36-inch pipeline
- Rehabilitation of 2,500 LF of 36-inch pipeline
- Replace 20,700 LF with 30-inch pipeline
- Replace 8,100 LF with 24-inch pipeline
- Replace 7,700 LF with 18-inch pipeline
- Replace 2,500 LF with 12-inch pipeline

Phase 1 pipe rehabilitation and replacement includes:

- Replace 4,300 LF with 36-inch pipeline
- Rehabilitation of 2,500 LF of 36-inch pipeline
- Replace 20,700 LF with 30-inch pipeline

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-318

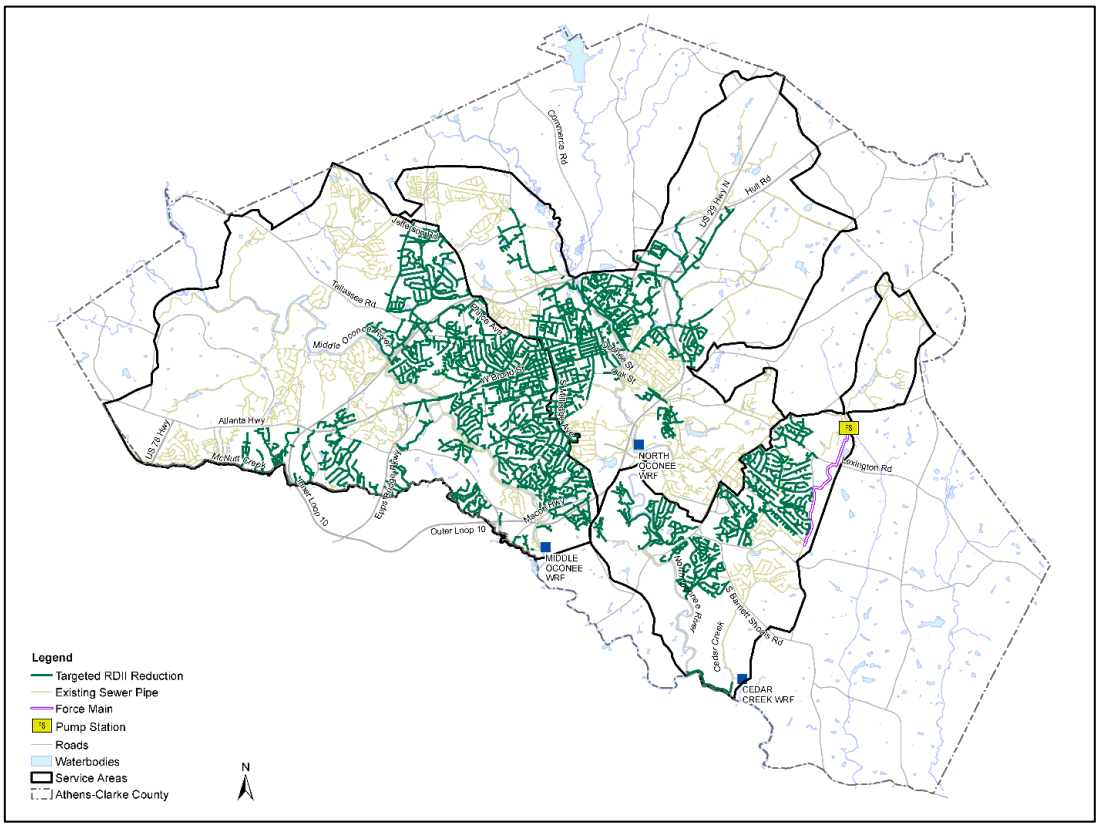
Project Name
Prioritized Sewer Rehabilitation and Replacement

Project Category
Rehabilitation and Replacement

Project Cost
$8,000,000

Key Elements

1. Replacement and rehabilitation of the existing sewer (where needed)
2. Reduce sanitary sewer overflows.
3. Reduce ongoing maintenance and repair costs of failing sewers.
4. Reduce extraneous infiltration/inflow of surface water and groundwater. Thus improving sewer service reliability, accommodating future growth, reducing cost of WRF operations and treatment compliance.



Project Description

PUD identified the top trouble areas within the existing sanitary sewer network. These segments of the sewer system require the main share of the maintenance budget year to year. By focusing replacement and rehabilitation (where needed) on these sewer pipe segments, PUD will save future maintenance funds, improve the capacity of the sewer collection system, and protect the environment.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-319

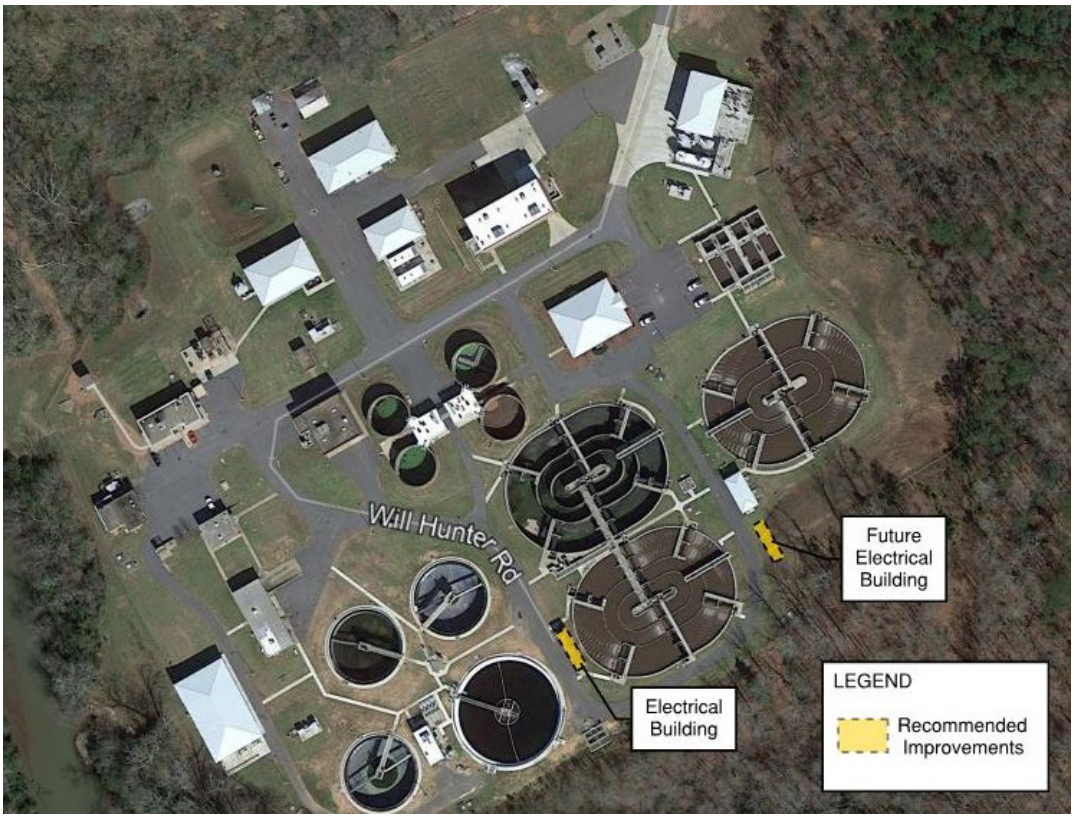
Project Name
Middle Oconee WRF Electrical Building

Project Category
Rehabilitation and Replacement

Project Cost
$6,200,000

Key Elements

1. Replace electrical building



Project Description

Design and Construct the following:

- New electrical building to replace electrical building, which is experiencing settling.
- Relocate or replace existing MCCs and electrical equipment in existing Electrical Building #1 into new electrical building.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-320

Project Name
North Oconee WRF
Thermal Dryer

Project Category
Rehabilitation and Replacement

Project Cost
$12,000,000

Key Elements

1. Construct thermal dryer building and install thermal dryer
2. Operational cost saving by reducing mass of residual solids
3. Upgraded biosolids treatment to increase options for beneficial reuse

Project Description

Construction of a thermal dryer facility at the North Oconee WRF.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-321

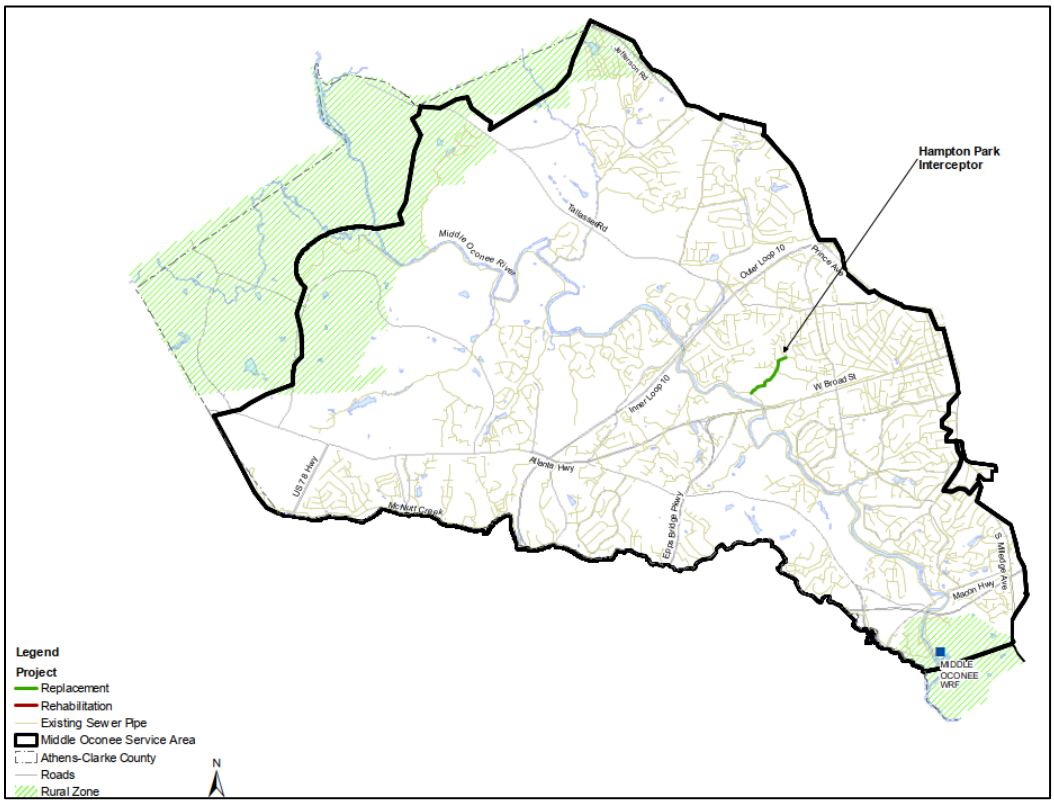
Project Name
Hampton Park Gravity Sewer Interceptor

Project Category
Rehabilitation and Replacement

Project Cost
$1,500,000

Key Elements

1. Replacement of 3,000-LF of sewer pipe
2. Improved sewer flow and reduced maintenance
3. Improved sewer flow capacity



Project Description

This project is the replacement of 3,000 LF of sanitary sewer to address capacity issues within the Middle Oconee WRF sewer basin (sub-basin: LMO-4), including:

- Replace 1,200 LF of 8-inch sewer with 10-inch sewer
- Replace 900 LF of 12-inch sewer with 15-inch sewer
- Replace 900 LF of 12-inch sewer for slope improvements

Improved flow capacity will result from the increased pipeline size.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-322

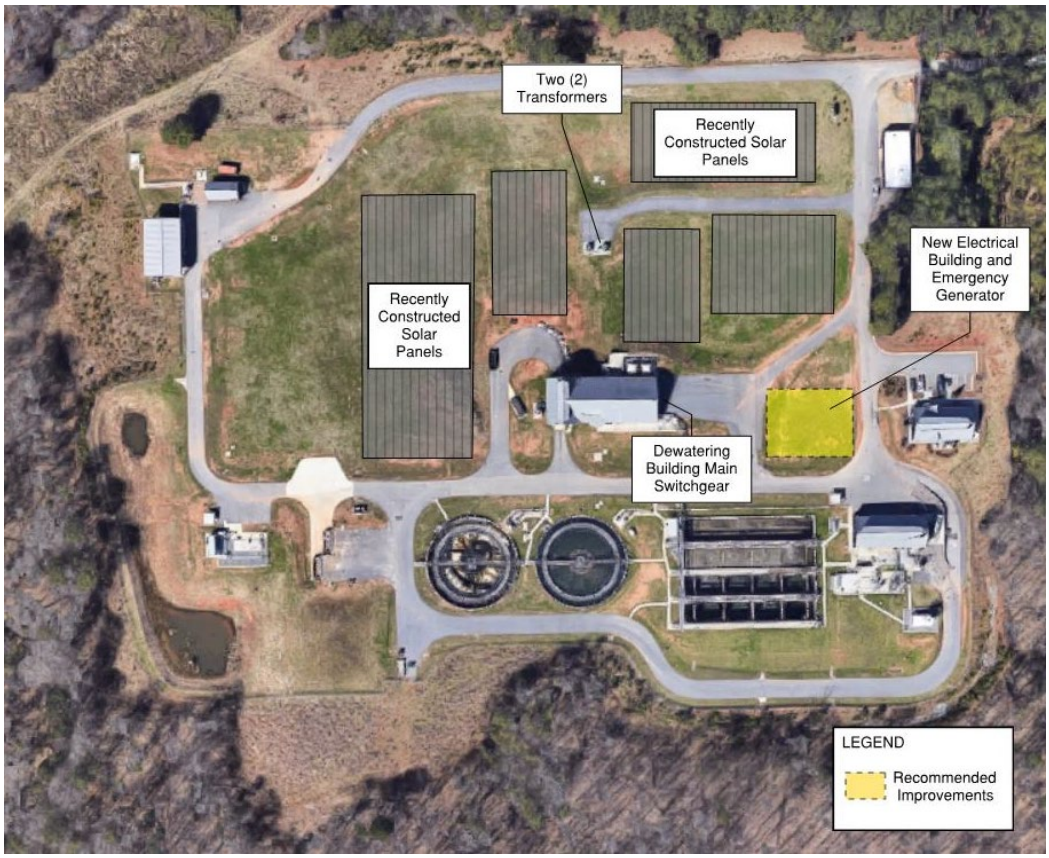
Project Name
Cedar Creek WRF Emergency Generator

Project Category
Rehabilitation and Replacement

Project Cost
$6,000,000

Key Elements

1. Installation of emergency generator
2. Construction of new electrical building
3. Improve reliability of continuous operation with redundant power source



Project Description

Install emergency power generator at Cedar Creek WRF to operate facility in the event of power loss.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 3-323

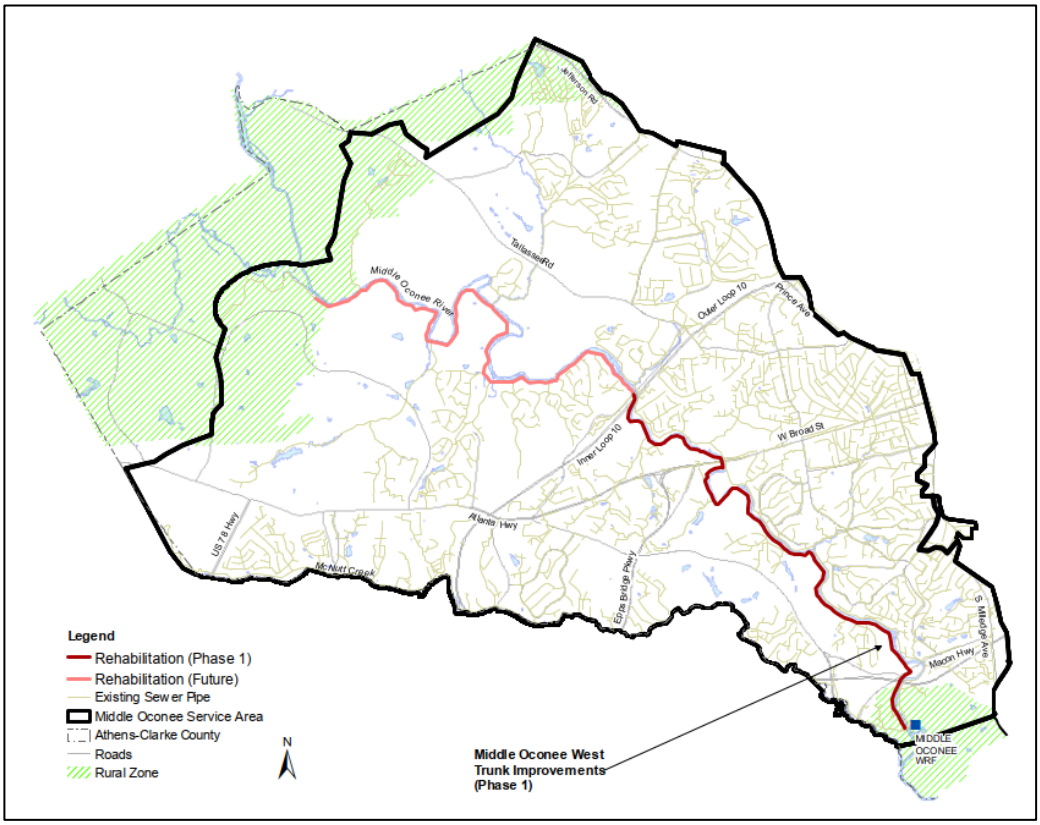
Project Name
Middle Oconee West Trunk Improvements Phase 1

Project Category
Rehabilitation and Replacement

Project Cost
Phase 1: $12,500,000

Key Elements

1. Rehabilitation of 29,800-LF of sewer pipe
2. Elimination of aerial sewer sections
3. Improved sewer flow capacity due to upsized pipelines



Project Description

This project includes 57,800 LF of sanitary sewer Trunk Line in the Middle Oconee West within the Middle Oconee WRF sewer basin. Sewer capacity will be increased due to upsized pipeline. Aerial crossings will be eliminated when possible.

- 29,800 LF of 30-inch sewer
- 13,700 LF of 24-inch sewer
- 14,300 LF of 21-inch sewer

Phase 1 construction includes rehabilitation of 29,800 LF of 30-inch sewer.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 3-324

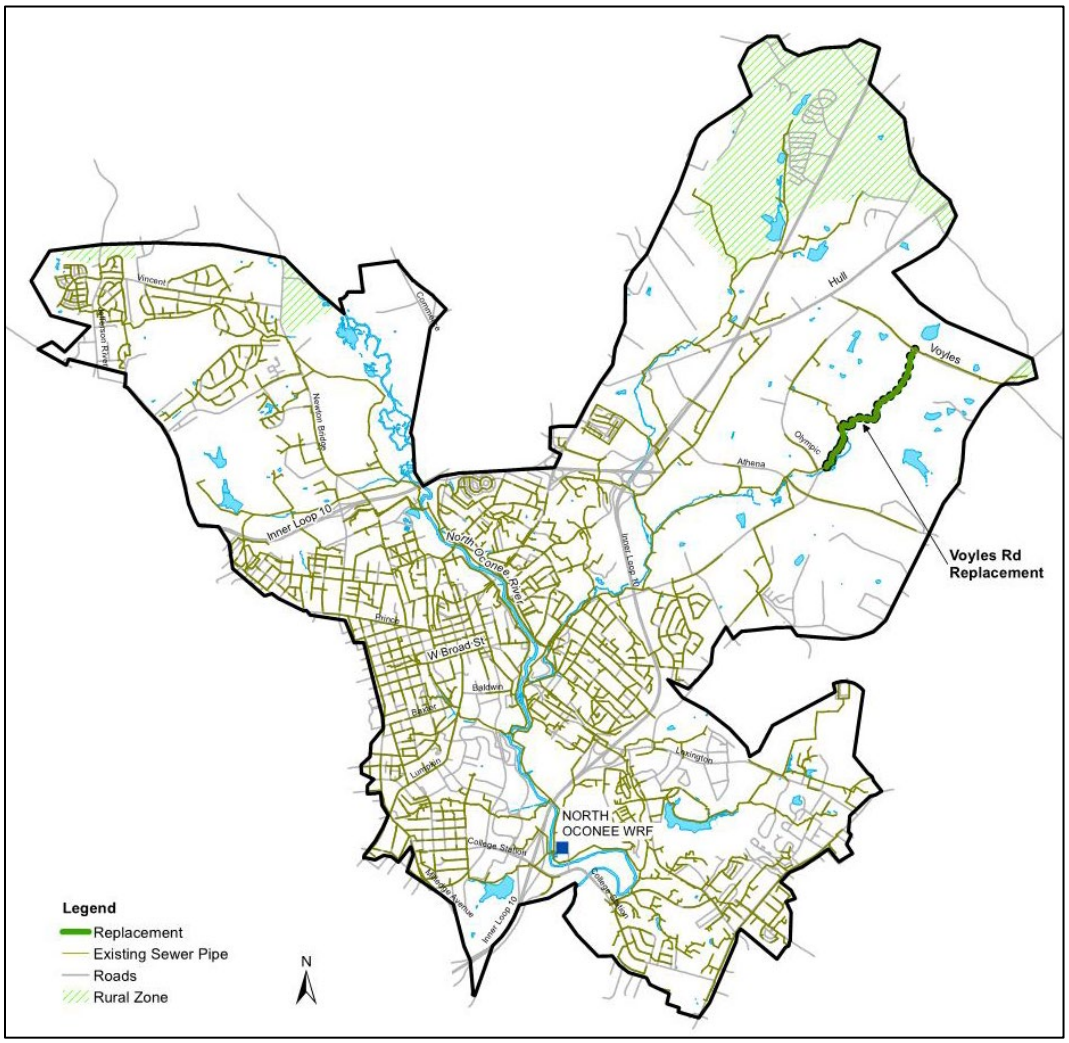
Project Name
Voyles Road Sanitary Sewer Upgrade

Project Category
Rehabilitation and Replacement

Project Cost
$3,900,000

Key Elements

1. Replacement of 7,000-LF of sewer pipe
2. Improve conveyance capacity for industrial site development



Project Description

Replace sewer lines in Trail Creek East (TCE-4 sub-basin) near Athena Industrial Park.
• Replace 7,000 LF of 15-inch pipe

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-325

Project Name
Targeted Sanitary Sewer Flow Monitoring

Project Category
Rehabilitation and Replacement

Project Cost
$500,000

Key Elements

1. Comprehensive sewer flow monitoring study
2. Maintain long term flow data at 7 permanent locations
3. Create sub-sewershed flow studies with 7 portable flow monitors
4. Prioritizes future sewer replacement projects
5. Reduces sanitary sewer overflows
6. Calibrate Sewer Models for increased accuracy and dependability

Project Description

Conduct sewer flow monitoring and analyze groundwater infiltration (GWI) and rainfall inflow and infiltration (RDII) by:

- Continuation of long term, permanent flow monitors
- Targeted sub-sewershed monitoring with 7 portable flow meters
- Sanitary Sewer Modeling Calibration
- Evaluation of AMI water meter data in conjunction with sewer flow data to determine I/I within a sub sewershed

Cost includes the contract for the flow monitoring and site selection for each study.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 3-326

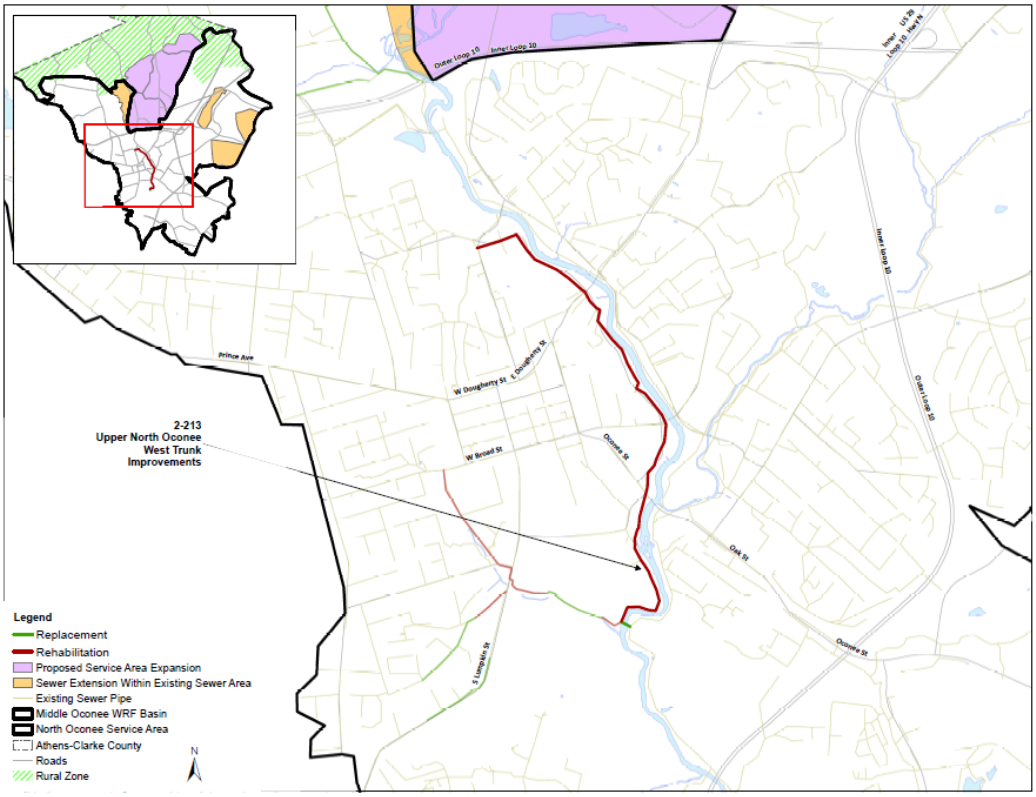
Project Name
Upper North Oconee West Trunk Improvements

Project Category
Rehabilitation and Replacement

Project Cost
$2,900,000

Key Elements

1. Rehabilitation and replacement of 10,500 LF of sewer pipe
2. Improved sewer flow capacity due to upsized pipelines



Project Description

Rehabilitation and replacement of the Upper North Oconee West trunk within the North Oconee WRF sewer basin. Breakdown of improvements includes:

- 7,500 LF of 12-inch sewer
- 500 LF of 15-inch sewer
- 50 LF of 18-inch sewer
- 2,390 LF of 21-inch sewer

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-327

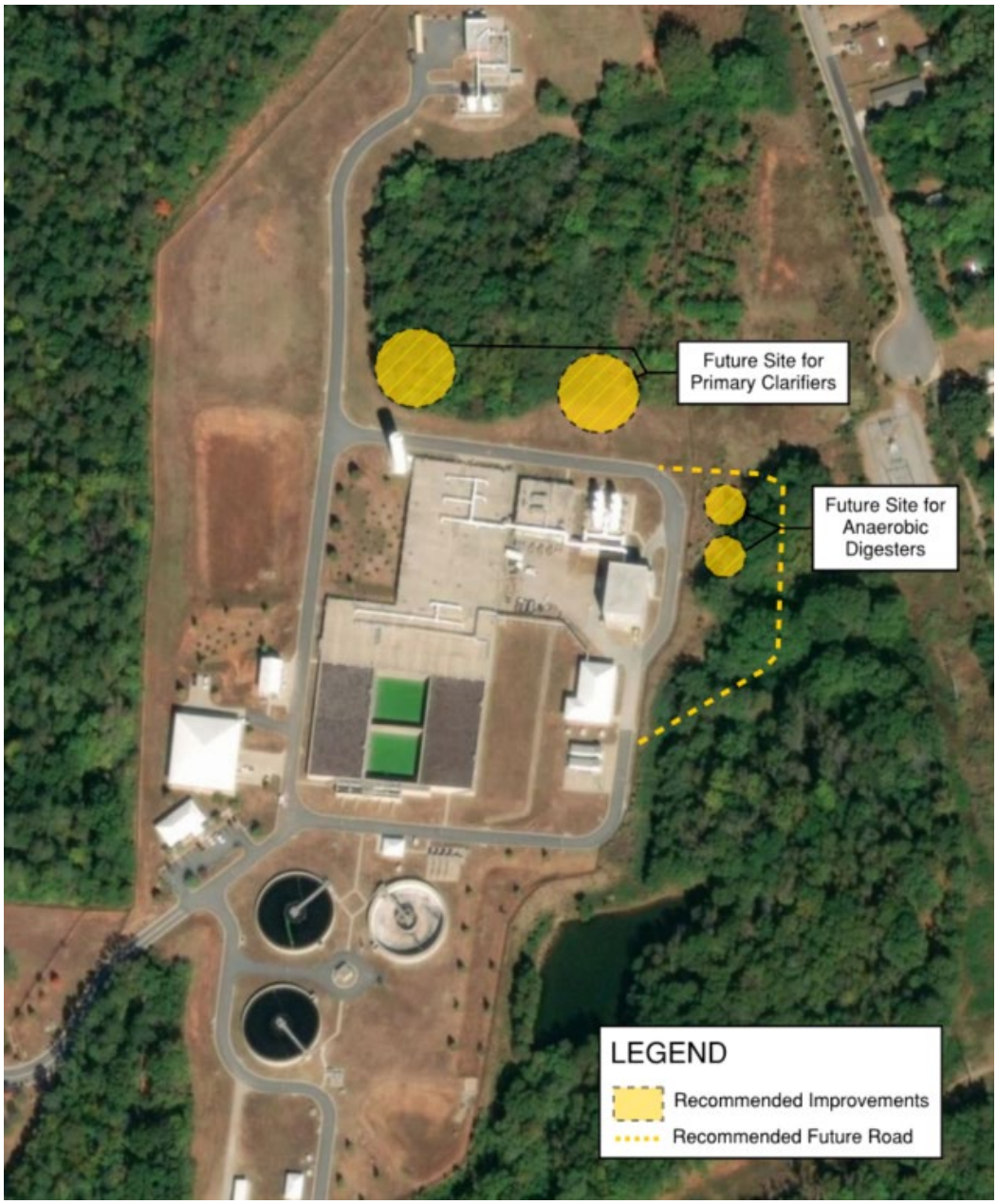
Project Name
North Oconee WRF
Biosolids Upgrades

Project Category
Rehabilitation and
Replacement

Project Cost
$35,000,000

Key Elements

1. Primary removal of solids
2. Anaerobic digesters and associated treatment processes.



Project Description

Construct solids handling facilities to assist in the reduction of volume and mass of biosolids. Utilize the latest technology to accomplish beneficial reuse of biosolids.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-328

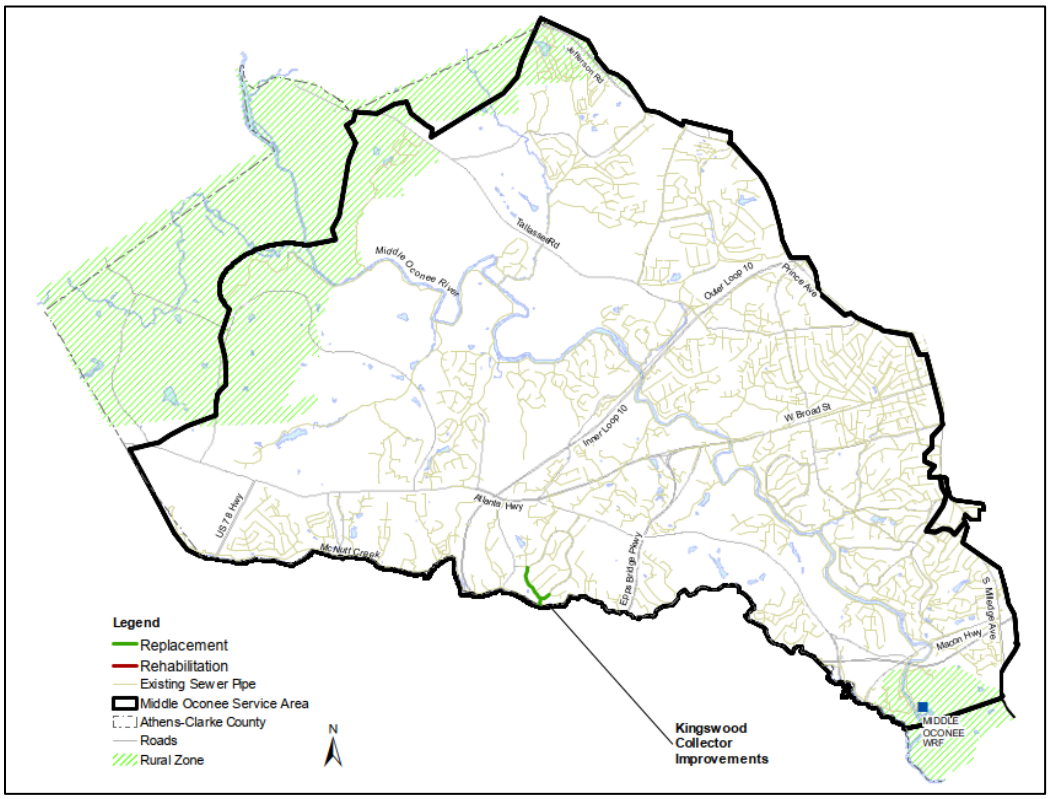
Project Name
Kingswood Subdivision Gravity Sewer Collector Improvements

Project Category
Rehabilitation and Replacement

Project Cost
$1,100,000

Key Elements

1. Replacement of 2,200-LF of sewer pipe
2. Improved sewer capacity by upsizing and realignment of the existing sewer



Project Description

Replacement of 2,200 LF of 8-inch sewer within the Middle Oconee WRF sewer basin (drainage sub-basin: MN-2).

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-329

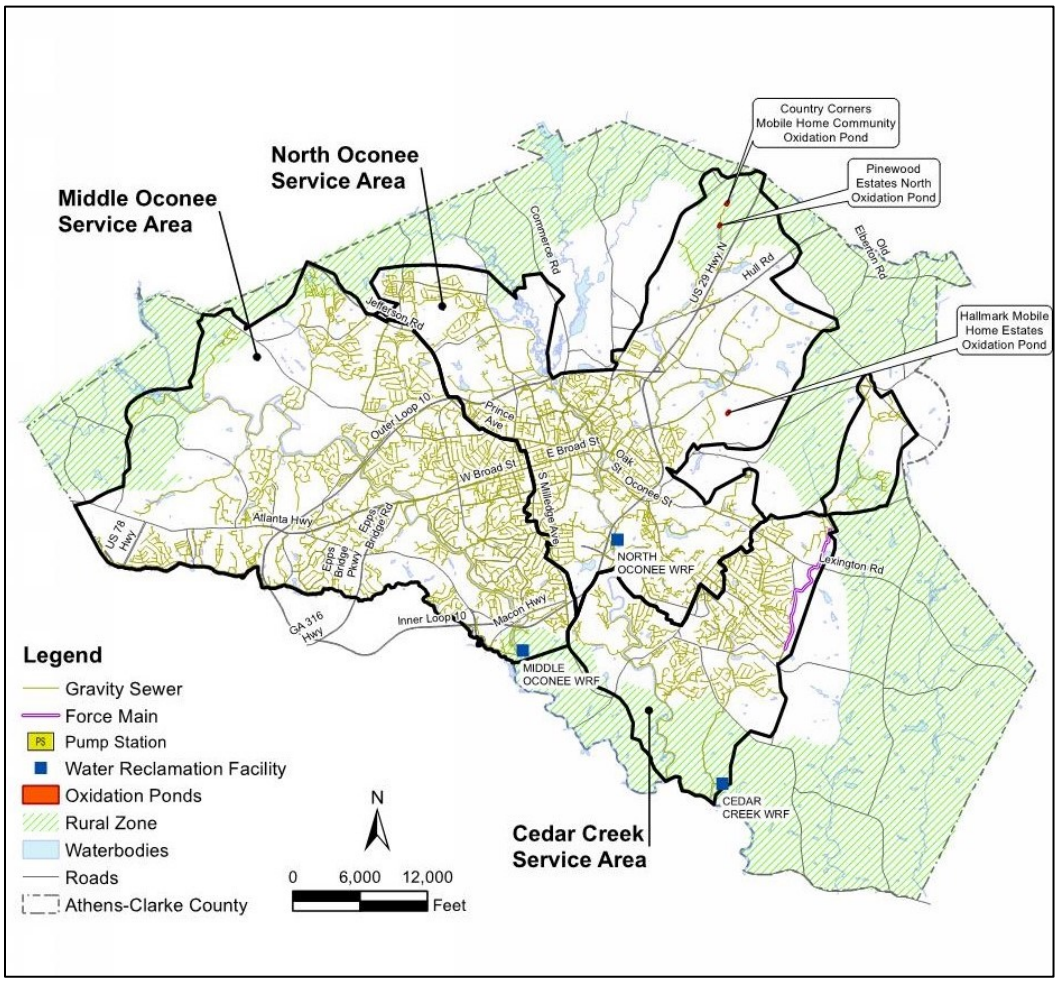
Project Name
Long-Term Sanitary Sewer Evaluation Survey (SSES) and Rehabilitation Program

Project Category
Rehabilitation and Replacement

Project Cost
$500,000

Key Elements

1. Future targeted SSES and rehabilitation on selected pipelines



Project Description

Perform targeted SSES and rehabilitation on selected pipeline as determined in the future.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-330

Project Name
North Oconee WRF Aeration Basins Small Blower

Project Category
Rehabilitation and Replacement

Project Cost
$1,100,000

Key Elements

1. Small blower installation

Project Description

Construct a smaller blower for lower air demands for aeration basins.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-331

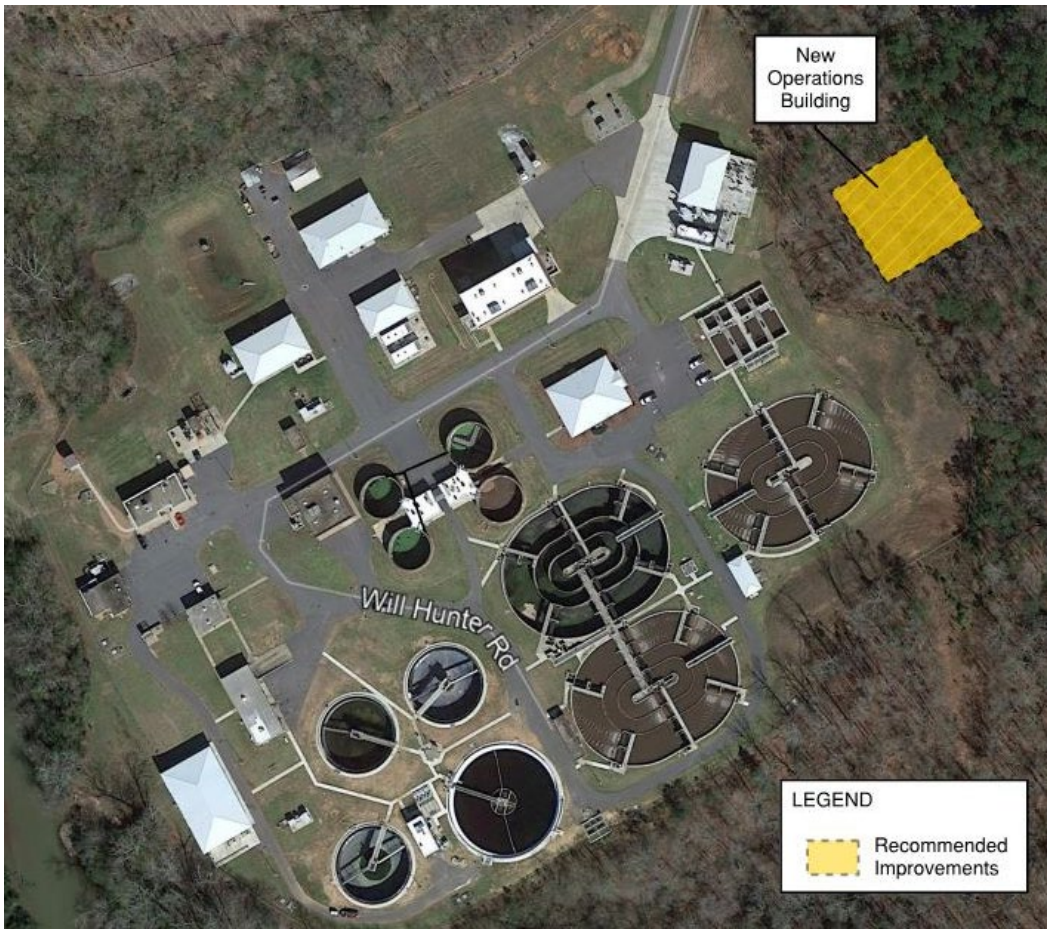
Project Name
Middle Oconee WRF Operations Building

Project Category
Rehabilitation and Replacement

Project Cost
$2,000,000

Key Elements

1. Construction of new Operations Building



Project Description

Design and construction of new one-story Operations Building at Middle Oconee WRF.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-332

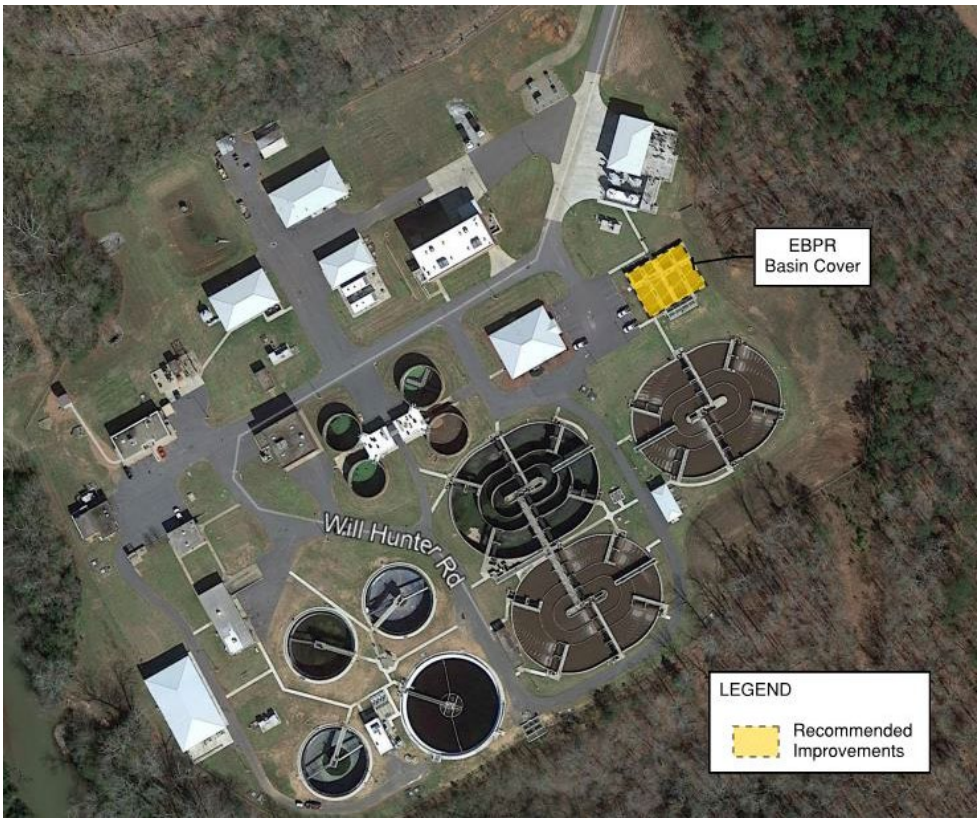
Project Name
Middle Oconee WRF Enhanced Biological Phosphorus Removal Basin Cover

Project Category
Rehabilitation and Replacement

Project Cost
$800,000

Key Elements

1. Install covers on EBPR basin
2. Odor control system



Project Description

Install covers on EBPR basin to prevent odors. Install appropriate odor control system for air removal and treatment.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-333

Project Name
Middle Oconee WRF Influent Pumps

Project Category
Rehabilitation and Replacement

Project Cost
$2,200,000

Key Elements

1. Installation of new influent pumps to replace existing pumps

Project Description

Installation of six (6) new influent pumps (5 duty and 1 standby) complete with VFDs.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-334

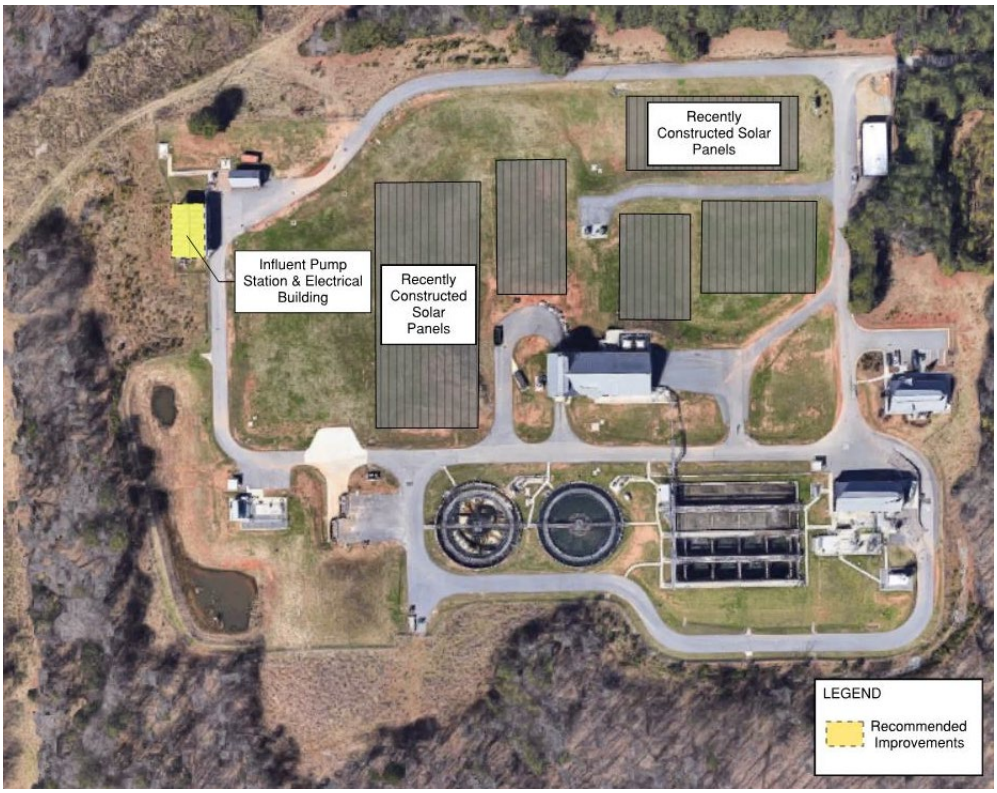
Project Name
Cedar Creek WRF Influent Pumps

Project Category
Rehabilitation and Replacement

Project Cost
$1,200,000

Key Elements

1. Installation of influent pumps to replace existing pumps



Project Description

- Installation of four (4) influent pumps.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-335

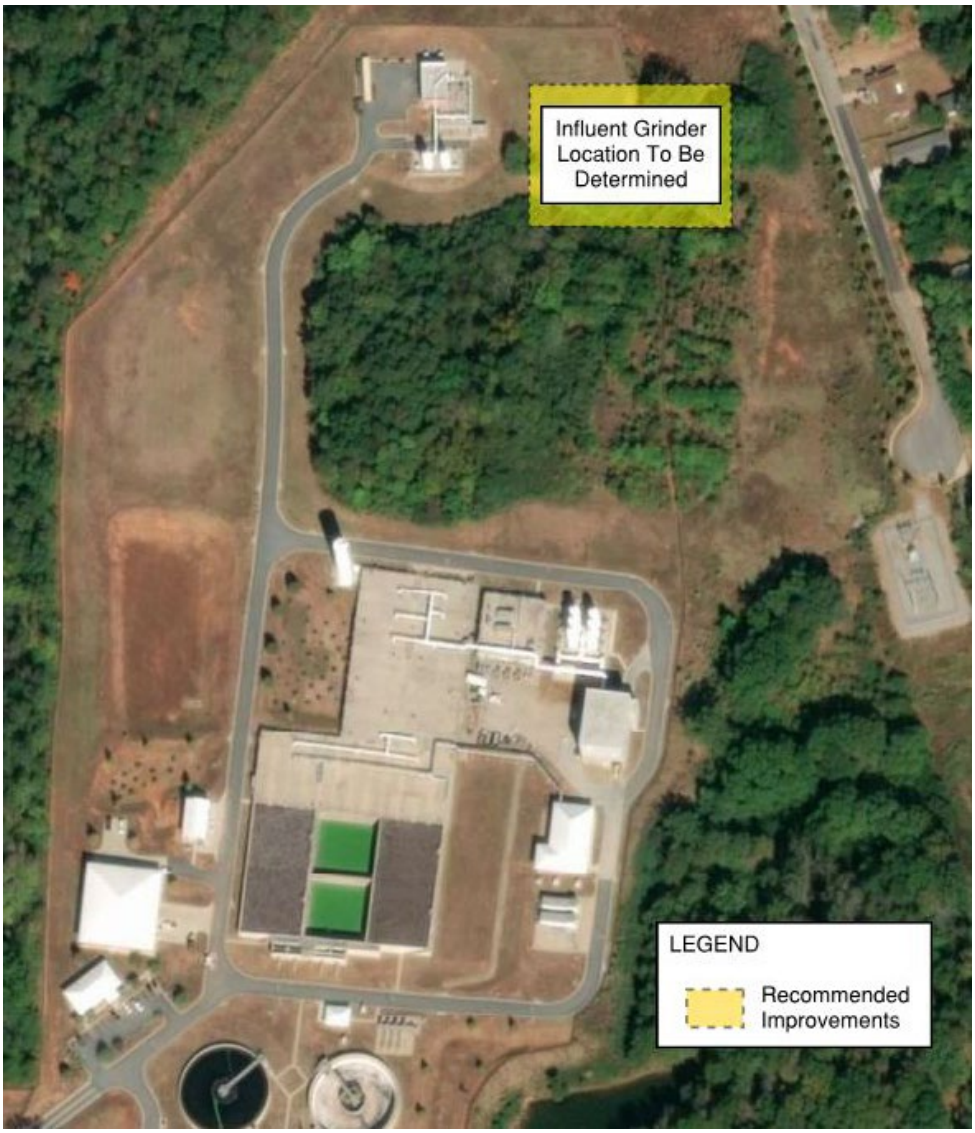
Project Name
North Oconee WRF Preliminary Treatment

Project Category
Rehabilitation and Replacement

Project Cost
$1,200,000

Key Elements

1. Influent grinder installation and grit removal and screening as needed.



Project Description

Install grinders at the North Oconee WRF and improvements for grit removal and screening as needed. The grinders will:

- Minimize blockages from larger items on the influent band screens to improve flow throughput
- Reduce clogging and re-ragging in the screenings washer/compactor to improve flow throughput and reduce maintenance

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 3-336

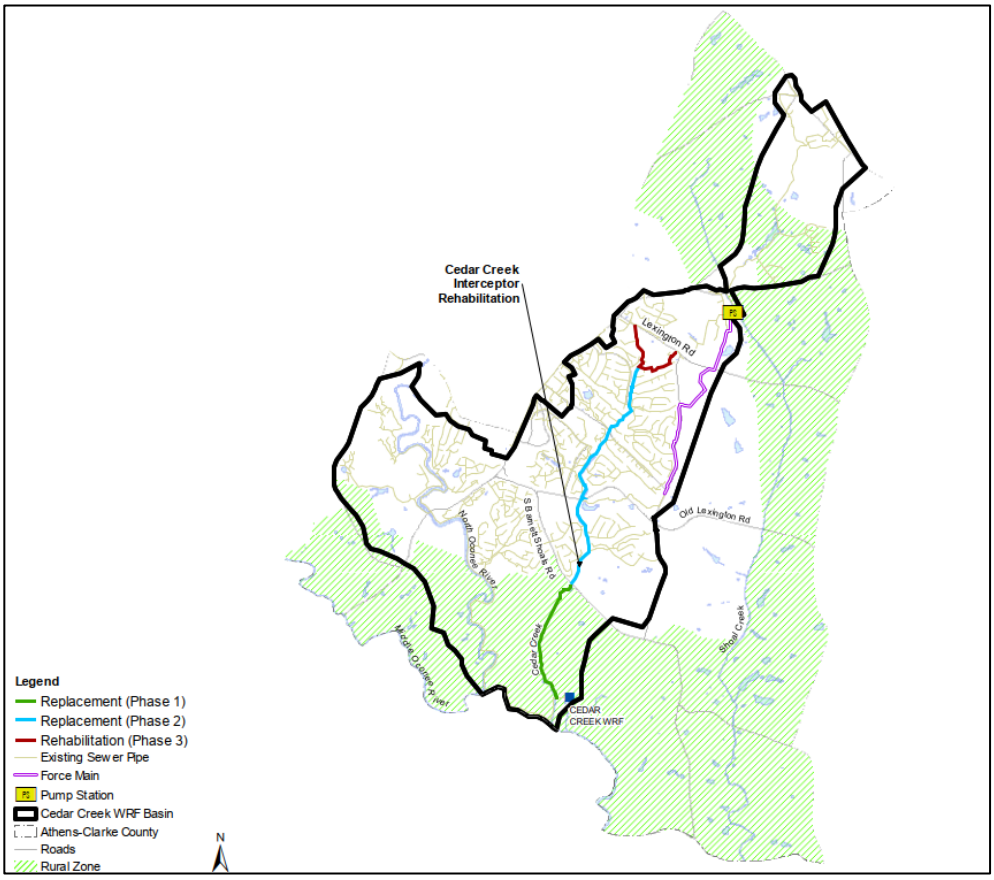
Project Name
Cedar Creek Interceptor Improvements Phase 1

Project Category
Rehabilitation and Replacement

Project Cost
Phase 1:
$2,500,000

Key Elements

1. Replace 7,800 LF with 30-inch sewer pipe.
2. Eliminate aerial crossings where possible
3. Improve sewer capacity by upsizing pipeline



Project Description

Replacement and rehabilitation of 28,500 LF of sewer interceptor in Cedar Creek WRF sewer basin. Drainage Sub-basins include CC-2, CC-3, CC-4 and CC-5. Breakdown of pipe replacement for the entire interceptor includes

- Rehabilitate 5,700 LF 8-inch sewer
- Replace 2,700 LF 12-inch sewer
- Replace 4,900 LF 18-inch sewer
- Replace 7,400 LF 24-inch sewer
- Replace 7,800 LF 30-inch sewer

Phase 1 breakdown of pipe replacement includes replacement of 7,800 LF with 30-inch sewer pipeline.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-337

Project Name
Middle Oconee WRF Preliminary Treatment

Project Category
Rehabilitation and Replacement

Project Cost
$500,000

Key Elements

1. Installation of influent grinders
2. Grit removal and screening as needed

Project Description

Install grinders at the influent pump station wet well and improvements for grit removal and screening as needed. The grinders will:

- Protect the pumps from ragging to ensure efficient operation and reduce maintenance
- Minimize blockages from larger items on the influent band screens to improve flow throughput
- Reduce clogging and re-ragging in the screenings washer/compactor to improve flow throughput and reduce maintenance

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-338

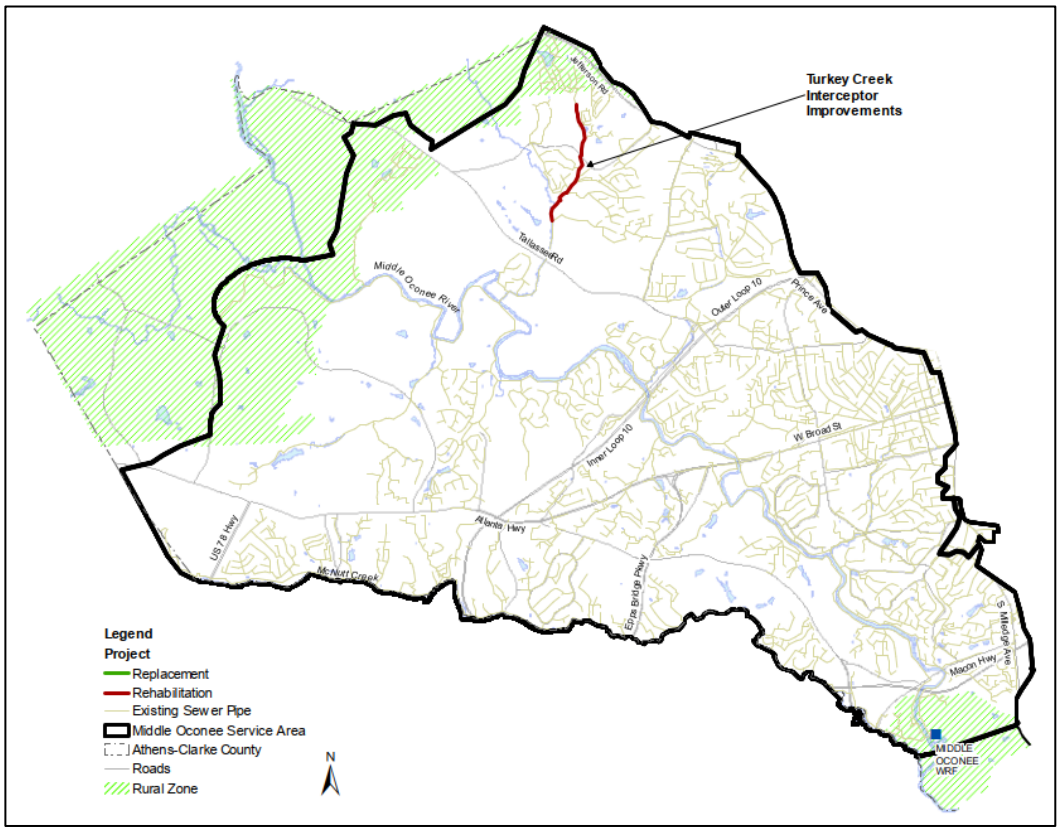
Project Name
Turkey Creek Interceptor Improvements

Project Category
Rehabilitation and Replacement

Project Cost
$1,500,000

Key Elements

1. Rehabilitation (where necessary) of 6,400-LF of sewer pipe
2. Improve sewer capacity by upsizing as required
3. Reduce possible sewer blocks by improving flow



Project Description

6,400 LF of 10-inch sewer to undergo rehabilitation within the Middle Oconee WRF sewer basin. Drainage sub-basins include TC-1 and TC-3.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-339

Project Name
Cedar Creek WRF Ultraviolet Disinfection

Project Category
Rehabilitation and Replacement

Project Cost
$600,000

Key Elements

1. Installation of second ultraviolet disinfection unit.

Project Description

Install second ultraviolet disinfection unit in existing channel with associated electrical and mechanical work.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
3-340

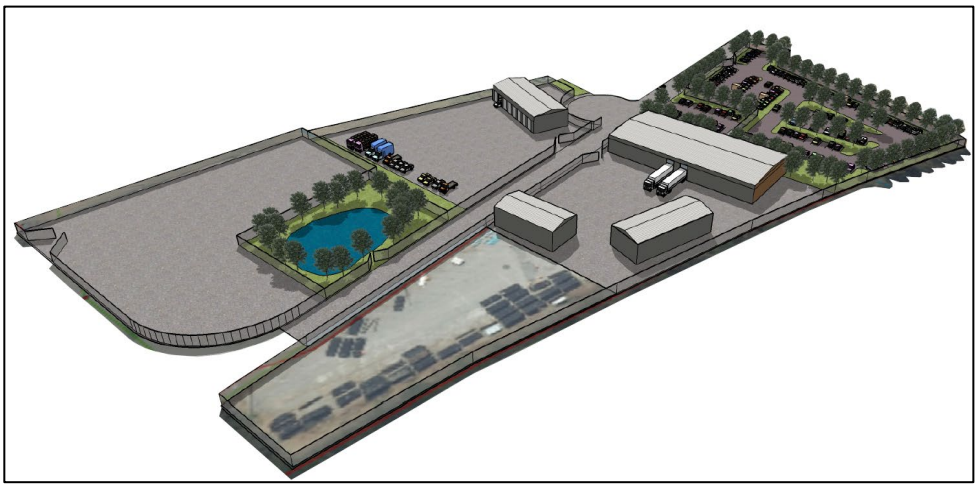
Project Name
Combined Meter Management/Water and Sewer Facility

Project Category
Rehabilitation and Replacement

Project Cost
$9,000,000

Key Elements

1. Property acquisition for a new Municipal Campus to house Meter Management and Water and Sewer Divisions
2. Construction of new meter management and water and sewer facility, warehouse, and equipment housing.



Project Description

Property acquisition of 30 or more acres, design and construction of W&S/MM/CC Building. Current facilities on Alexander Road are decrepit and need complete reconstruction. There is insufficient area for current fleet, yard storage for pipes, manholes, etc, and employee parking. Relocation of these facilities will also allow for needed expansion at the water treatment plant.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
4-301

Project Name
Additional Storage

Project Category
System Expansion

Project Cost
$15,000,000

Key Elements

1. Raw water storage facility acquisition

Project Description

Acquisition of a location as part of a new raw water storage facility. Project cost is anticipated net expenditure over the SDP planning horizon.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
4-302

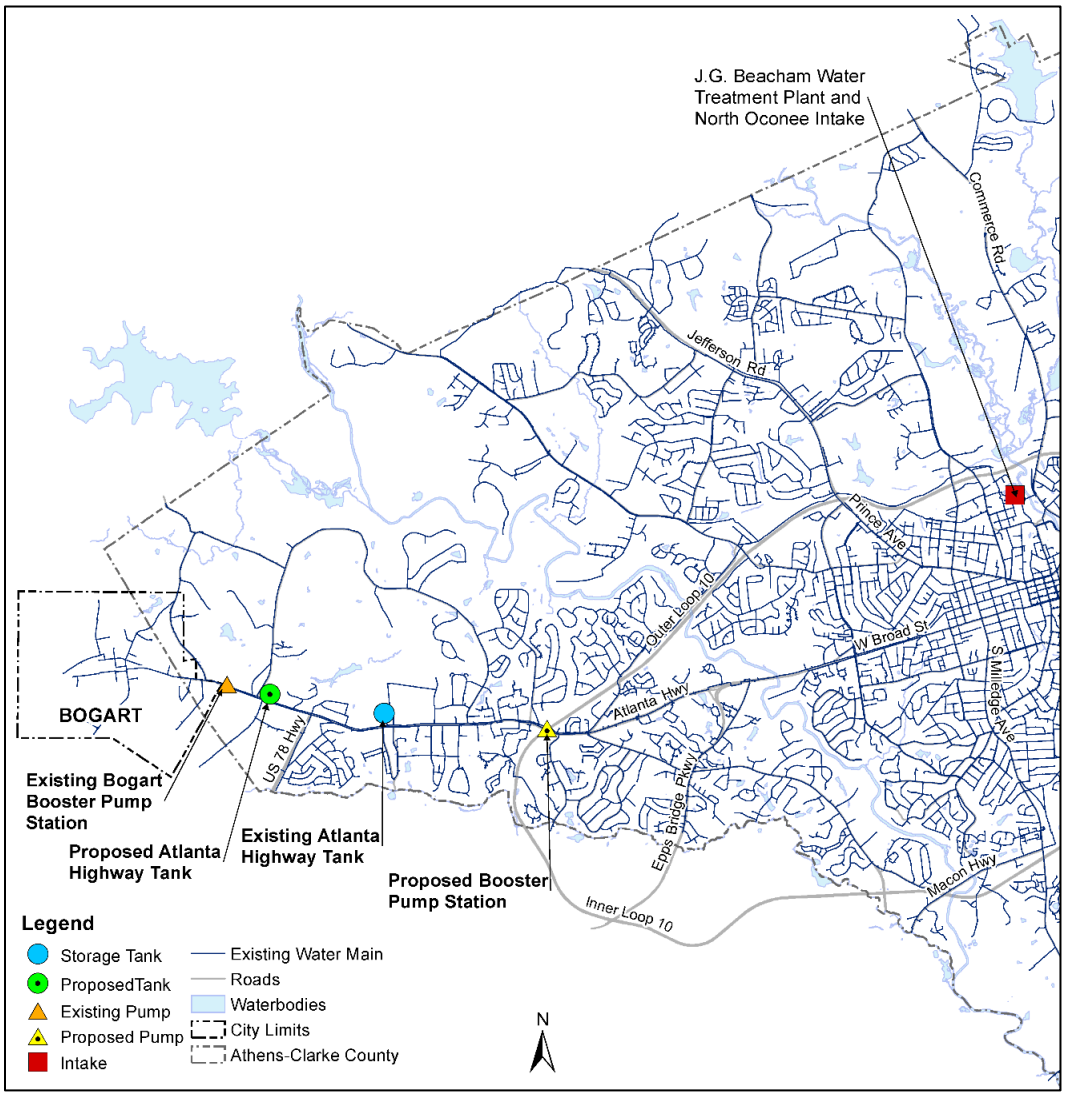
Project Name
Atlanta Highway Elevated Storage Tank and Booster Pump Station

Project Category
System Expansion

Project Cost
$8,000,000

Key Elements

1. Replace existing elevated storage tank and booster pump station



Project Description

Demolish the existing 500,000-gallon elevated storage tank and booster pump station and replace with a larger elevated storage tank and a booster pump station to develop a high pressure zone in the western portion of Athens-Clarke County.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
4-303

Project Name
Water Supply Resiliency and Reliability

Project Category
System Expansion

Project Cost
$45,000,000

Key Elements

1. Raw water modeling
2. Storage facility intake design
3. Pump stations
4. Transmission piping
5. Ensure resilience and reliability of water supplies by connecting new storage facility to the J.G. Beacham Water Treatment Plant

Project Description

For future water storage facility, studies, design, construction, and services during construction as follows:

- Raw water modeling,
- Storage facility intake design,
- Pump station and raw water transmission from raw water sources to storage facility,
- Pump station and raw water transmission from raw water storage facility to J. G. Beacham WTP,
- Associated planning and permitting, and
- Land acquisition, including easements and fee simple purchase,

Raw water supply from Bear Creek Reservoir, Middle Oconee River, and North Oconee River will be evaluated as operational scenarios for PUD's raw water supply and storage.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
5-301

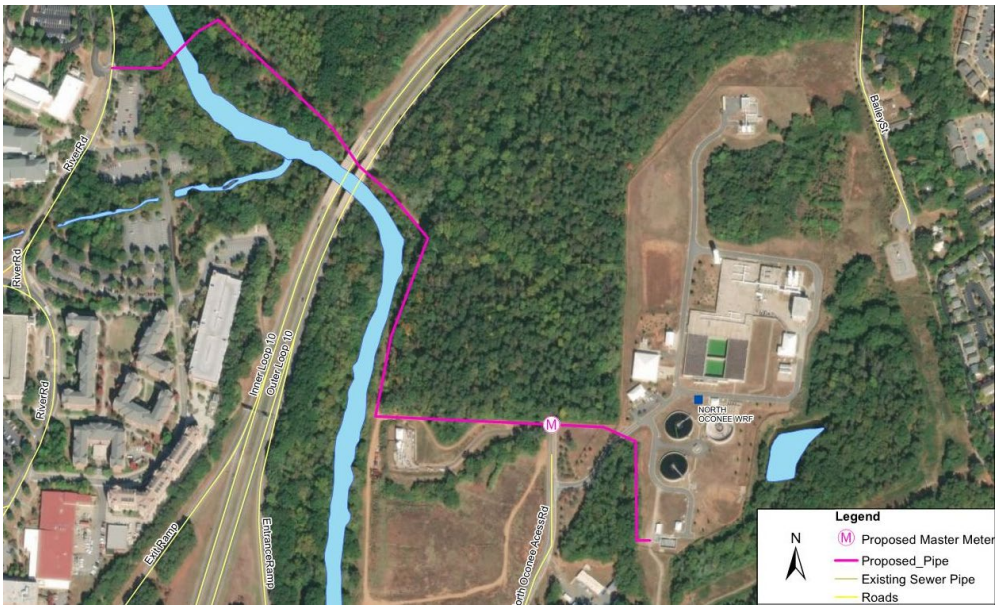
Project Name
UGA Recycled Water Reuse Transmission Line

Project Category
System Extension

Project Cost
$1,600,000

Key Elements

1. Recycled water transmission line from North Oconee WRF to UGA
2. Increases water supply and reduces potable water demand
3. Improves drought resiliency



Project Description

Recycled water reuse transmission line originating from North Oconee Water Reclamation Facility and ending at UGA.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
5-302

Project Name
North Oconee WRF Recycled Water Facility

Project Category
System Extension

Project Cost
$3,400,000

Key Elements

1. Recycled Water Pump Station
2. Sodium chloride storage and pumping
3. Increases water supply and reduces potable water demand
4. Improves drought resiliency

Project Description

Design and construction of the following:

- Recycled water pump station
- Sodium hypochlorite (NaOCl) storage and pumping system

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
5-303

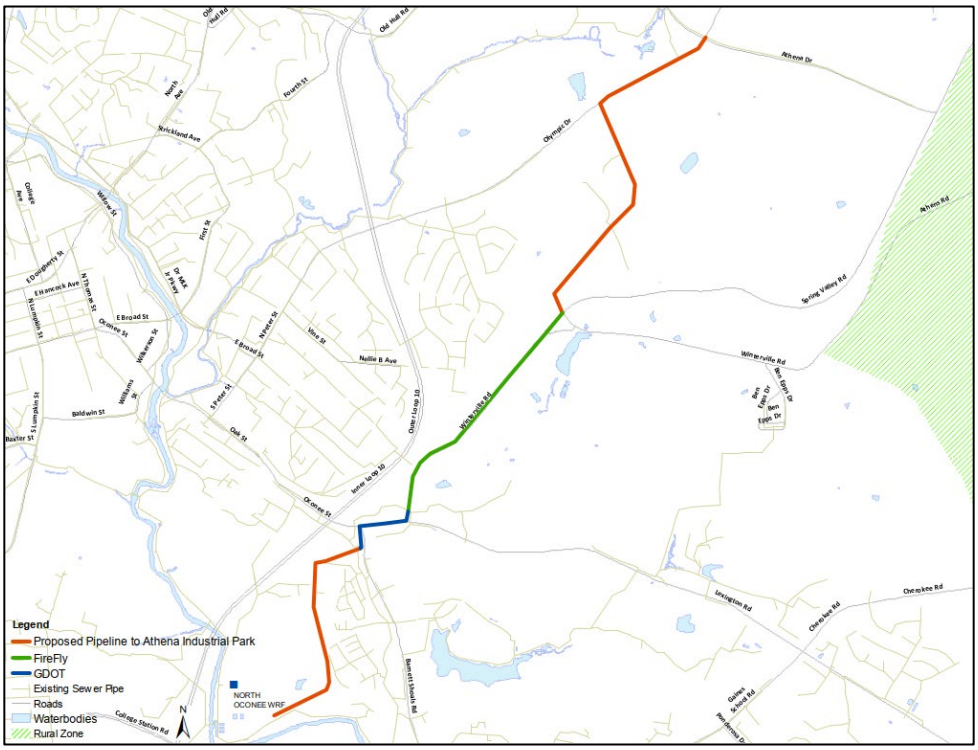
Project Name
Athena Industrial Park Recycled Water Transmission Line

Project Category
System Extension

Project Cost
$14,000,000

Key Elements

1. Recycled water transmission pipeline from North Oconee WRF to Athena Industrial Park
2. Increases water supply and reduces potable water demand
3. Improves drought resiliency



Project Description

Recycled water reuse transmission line originating from North Oconee Water Reclamation Facility and ending in Athena Industrial Park on Voyles Road.

Piping identified as Firefly will be installed with the construction of the Firefly Trail. Piping identified as GDOT will be installed when GDOT improvements are made. The remainder of the pipeline will be installed in later phases.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
5-304

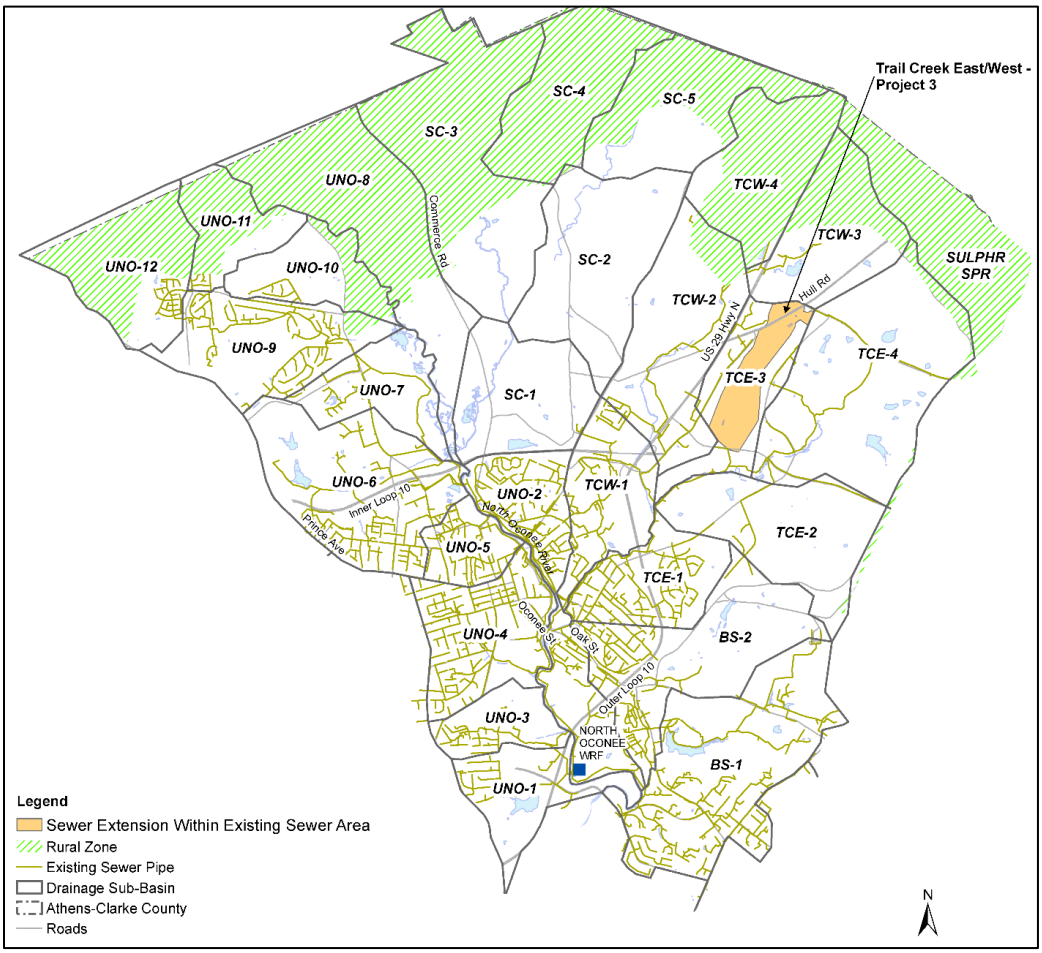
Project Name
Trail Creek East/West Extension – Project 3 (TCE-3)

Project Category
System Extension

Project Cost
$1,200,000

Key Elements

1. Extend gravity sewer service
2. Provide sewer to eliminate septic tank areas



Project Description

Extend sewer service to 300 acres within the TCE-3 sub-basin in the Trail Creek East drainage basin.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 5-305

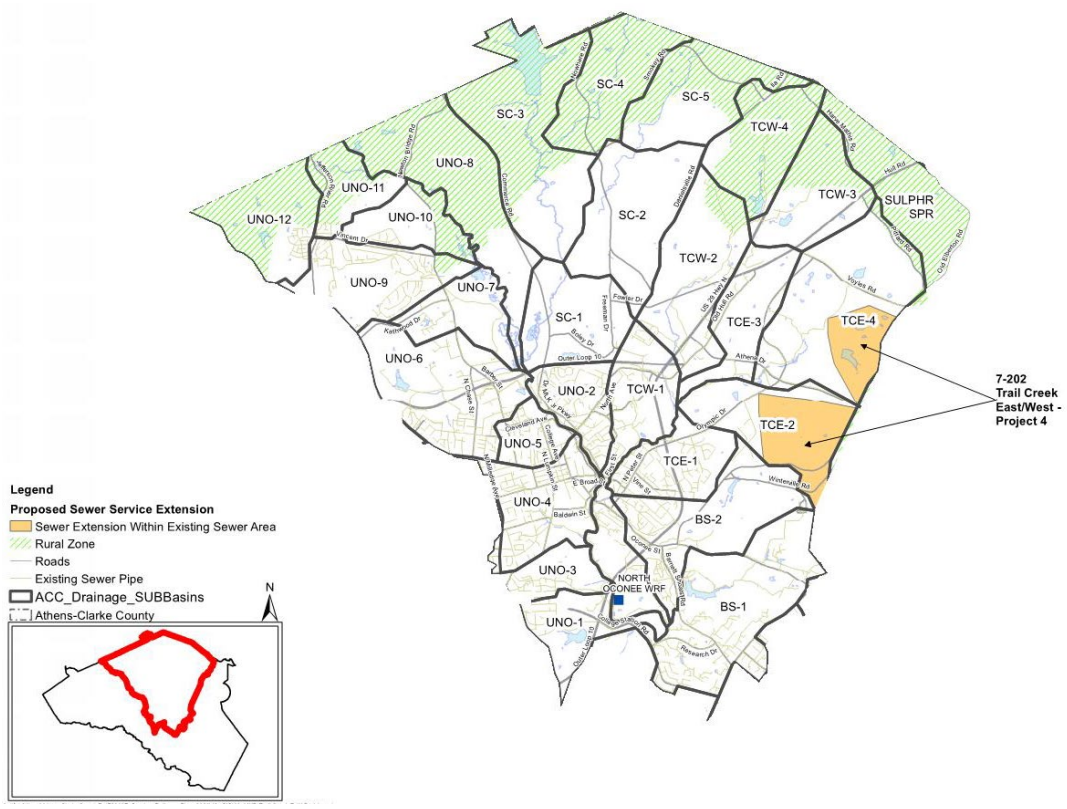
Project Name
Trail Creek East/West Extension – Project 4 (TCE-2, TCE-4)

Project Category
Rehabilitation and Replacement

Project Cost
$1,400,000

Key Elements

1. Extend gravity sewer service
2. Provide sewer service to existing mobile home park that is on an oxidation pond with permitted discharge
3. Provide gravity sewer service to area currently on septic tank.



Project Description

This project will provide sewer service to Hallmark Mobile Home Park and eliminate the currently permitted oxidation pond currently treating the wastewater from the development. This will also extend sewer service to 1,000 acres within the TCE-2 and TCE-4 sub-basins in the Trail Creek East drainage basin allowing for the removal of septic tanks.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
5-306

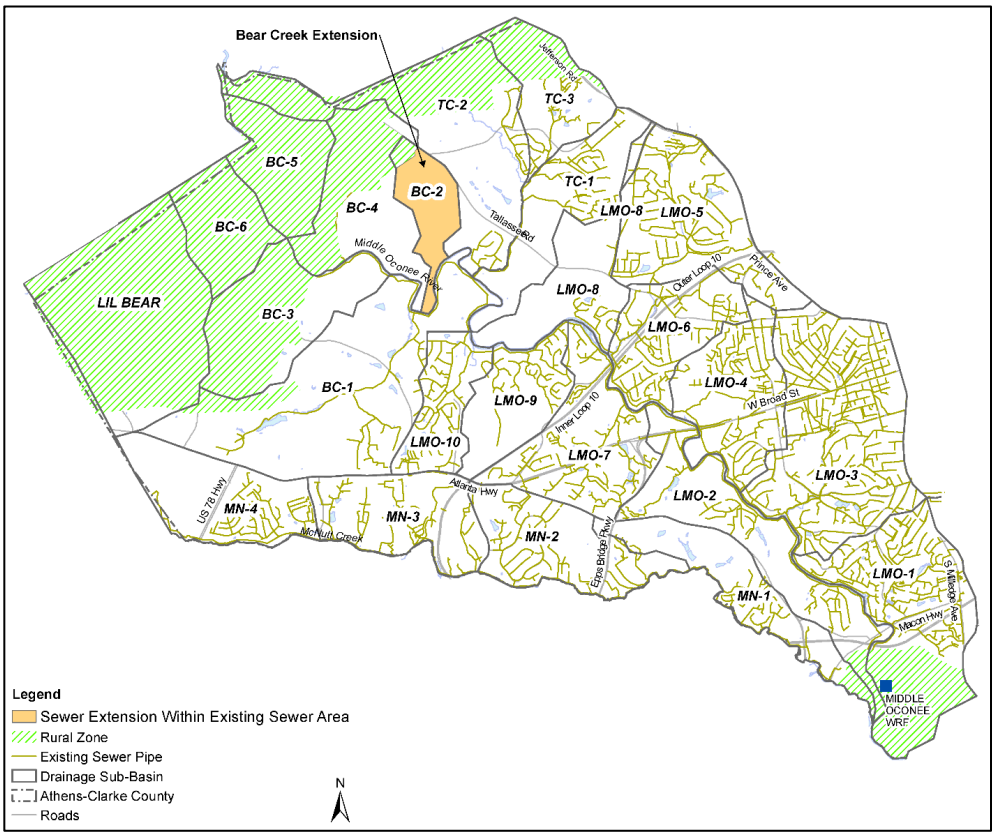
Project Name
Bear Creek Gravity Sewer Extension (BC-2)

Project Category
System Extension

Project Cost
$1,500,000

Key Elements

1. Extend gravity sewer service into area currently served by septic tanks.
2. Make gravity sewer available for connection



Project Description

Extend gravity sewer service to 300 acres within the BC-2 drainage sub-basin in the Bear Creek drainage basin.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
5-307

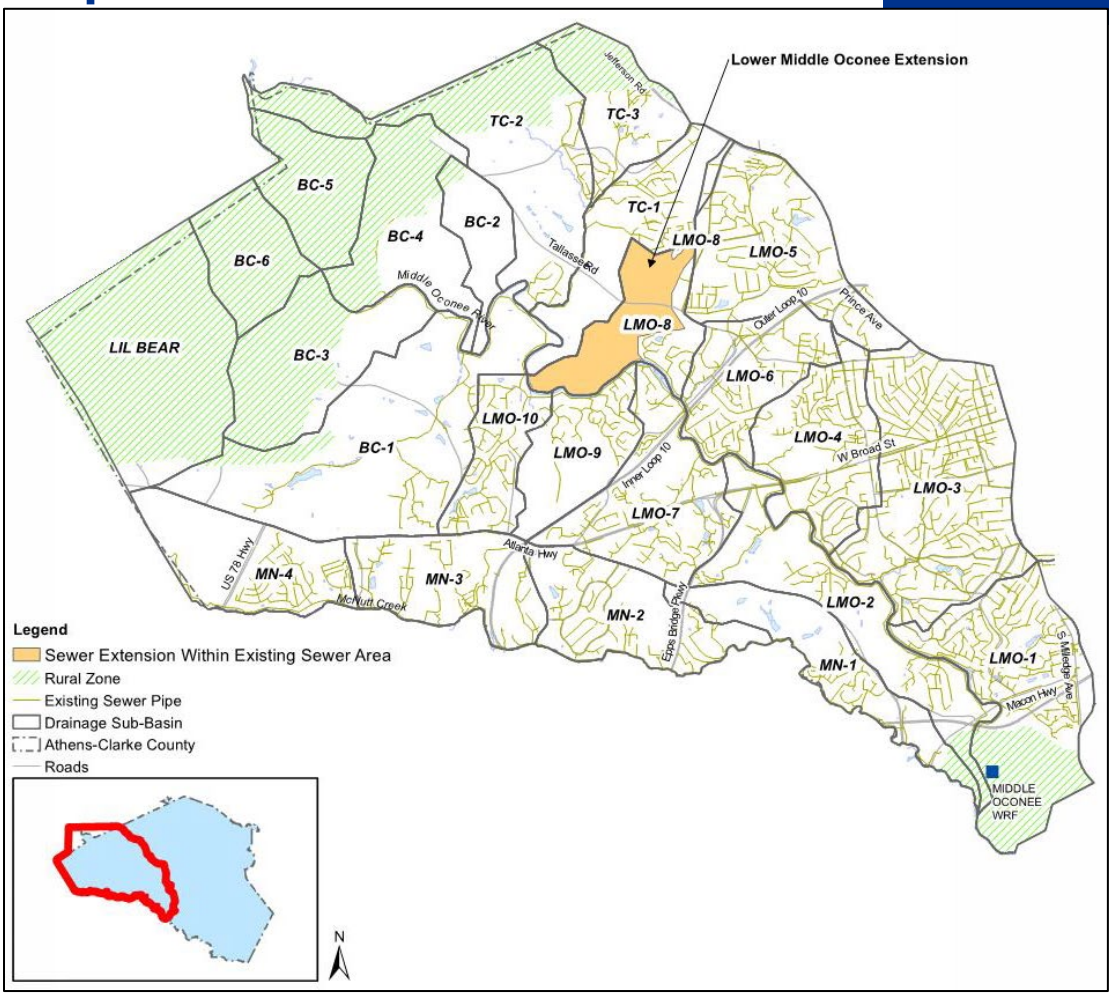
Project Name
Lower Middle Oconee Gravity Sewer Extension (LMO-8)

Project Category
System Extension

Project Cost
$2,000,000

Key Elements

1. Extend sewer service into unsewered area
2. Make gravity sewer available to area currently served by septic tanks



Project Description

Extend gravity sewer service to 500 acres within the LMO-8 drainage sub-basin of the Middle Oconee WRF sewer basin.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
5-308

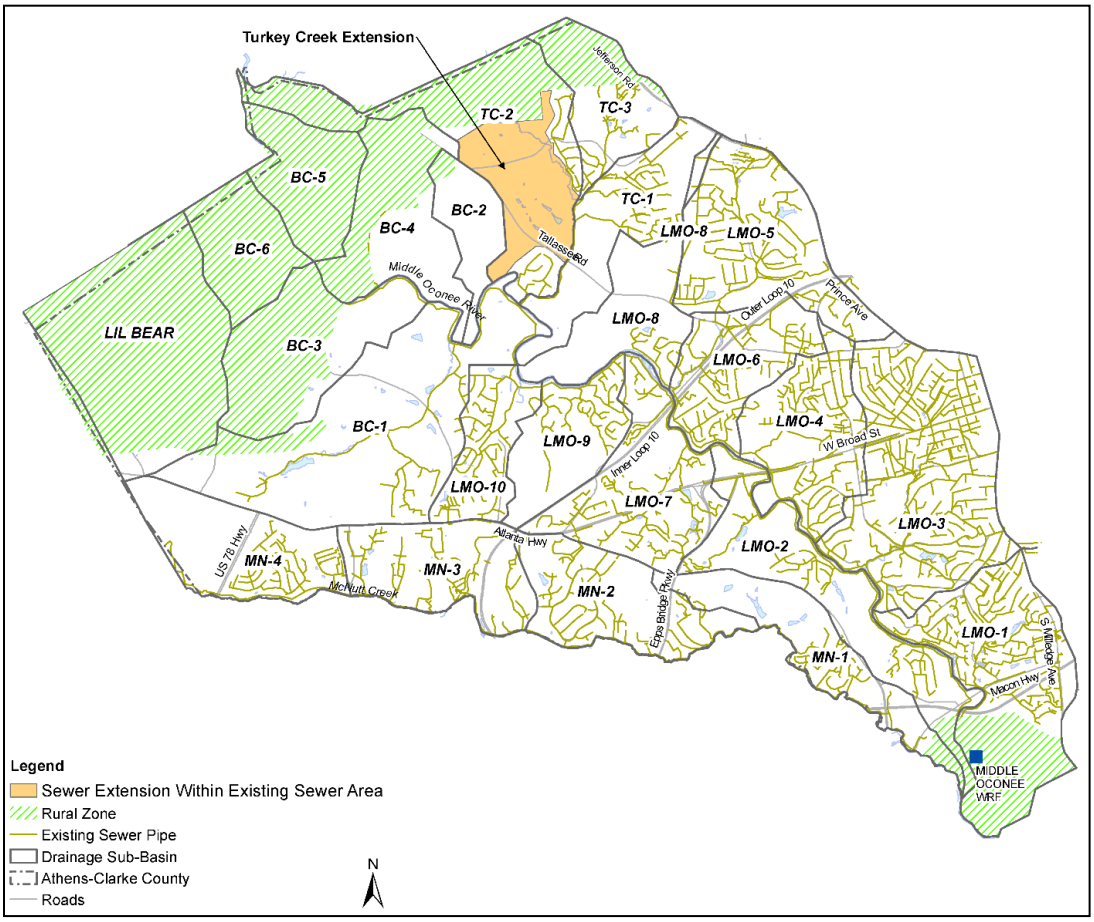
Project Name
Turkey Creek Gravity Sewer Extension

Project Category
Rehabilitation and Replacement

Project Cost
$1,700,000

Key Elements

1. Extension of gravity sewer service
2. Available sewer connection to area served by septic tanks.



Project Description

Extend gravity sewer service to 600 acres of previously unsewered area within the TC-2 drainage sub-basin in the Turkey Creek drainage basin.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project 5-309

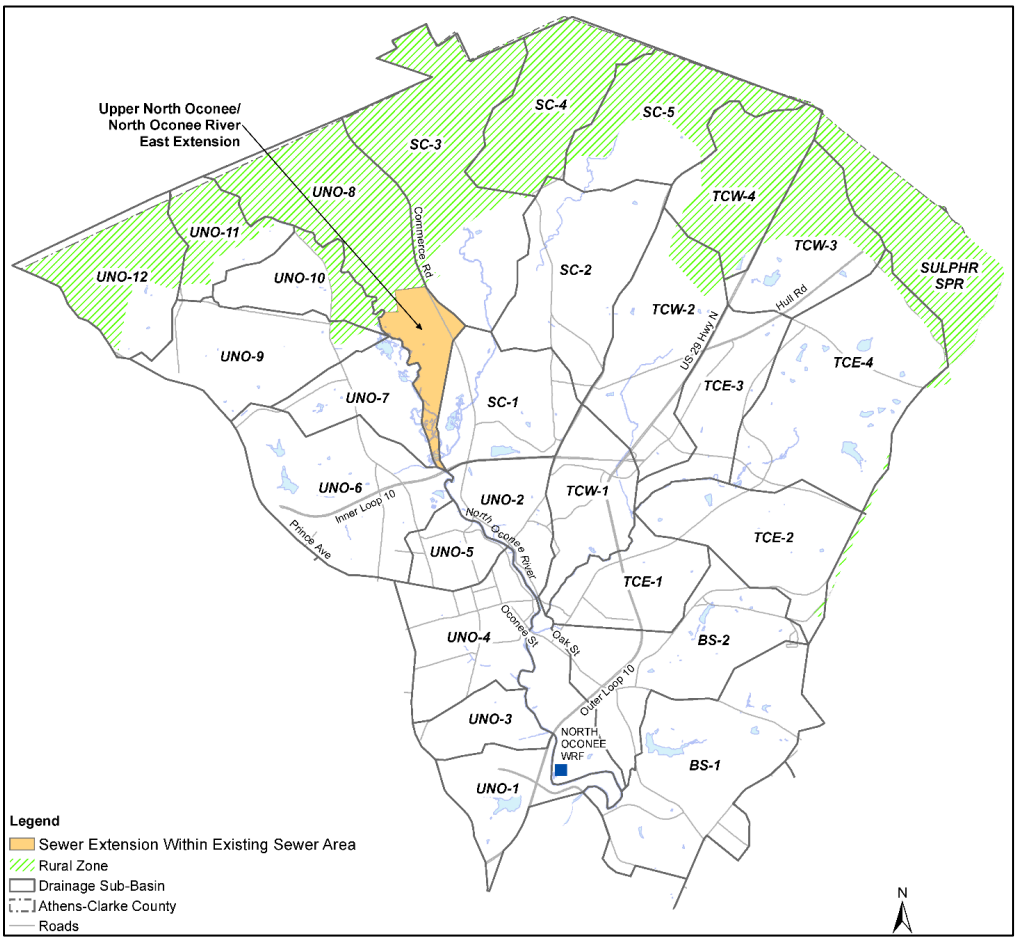
Project Name
Upper North Oconee/North Oconee River East Extension (UNO-8)

Project Category
System Extension

Project Cost
$750,000

Key Elements

1. Extend sewer service in the upper North Oconee sewer basin into previously unsewered areas.
2. Provide gravity sewer service to areas currently served by septic tanks.



Project Description

Extend sewer service to 350 acres within the UNO-8 drainage sub-basin.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
6-301

Project Name
Billing System Project

Project Category
M&C Strategic Commitments
Key Performance Indicators

Project Cost
$400,000

Key Elements

1. Evaluate and procure new billing software for the Water Business Office

Project Description

- Evaluation and purchase of financial software be used by ACCGov Public Utilities Department water business office for billing.
- Engage billing software consultant to marshal the procurement and installation.

Athens-Clarke County Public Utilities Department

2020 Capital Improvements Element

Project
6-302

Project Name
Alternate Energy

Project Category
Combined Utility Services

Project Cost
$2,790,000

Key Elements

1. Evaluate alternative energy sources
2. Implementation of selected projects

Project Description

Evaluation of potential alternative energy sources and implementation of alternate energy projects that could be used by ACC Public Utilities Department.