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Piedmont Triad Regional Water Authority Water and Wastewater Utility Regionalization Study

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List of Acronyms

Abbreviation	Definition
AACE	Association for the Advancement of Cost Engineering
ADD	Average Daily Demand
AMWA	Association of Metropolitan Water Agencies
AOP	Advanced Oxidation Process
AWWA	American Water Works Association
CIWW	Central Iowa Water Works
C:N	Carbon to Nitrogen Ratio
CWA	Clean Water Act
CWSRF	Clean Water State Revolving Fund
DMMWRA	Des Moines Metropolitan Wastewater Reclamation Authority
DMR	Discharge Monitoring Report
DMWW	Des Moines Water Works
dtpd	Dry Tons per Day
DWI	Division of Water Infrastructure
DWR	Division of Water Resources
DWSRF	Drinking Water State Revolving Fund
ECHO	Enforcement and Compliance History Online
EMC	Environmental Management Commission
EPA	Environmental Protection Agency
EV	Electric Vehicle
FY	Fiscal Year
GAC	Granular Activated Carbon
GHP	Greensboro-High Point
gpcd	Gallons per Capita per Day
G.S.	General Statutes
HBWC	Health Based Water Concentrations

Abbreviation	Definition
HFPO-DA	Hexafluoropropylene Oxide Dimer Acid
HI	Hazard Index
HondaJet	Honda Aircraft Company
HUD	Housing and Urban Development
I&I	Inflow and Infiltration
IBT	Interbasin Transfer
ICA	Integrated Community Area
ILA	Interlocal Agreement
JFK-WTP	John Franklin Kime Water Treatment Plant
JGA	Joint Governmental Agreement
Kgal	Thousand Gallons
LWSP	Local Water Supply Plan
MCL	Maximum Contaminant Level
MDD	Maximum Day Demand
MGD	Millions of Gallons per Day
mg/L	Milligrams per Liter
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MSW	Municipal Solid Waste
NCAC	North Carolina Administrative Code
NC Commerce	North Carolina Department of Commerce
NCDEQ	North Carolina Department of Environmental Quality
NCDP	Nutrient Criteria Development Plan
NF	Nanofiltration
NPDES	National Pollutant Discharge Elimination System
NPS	Nonpoint Source
O&M	Operations & Maintenance

Abbreviation	Definition
OIG	Office of Inspector General
PART	Piedmont Authority of Regional Transportation
PFAS	Per- and Polyfluoroalkyl Substances
PFBS	Perfluorobutanesulfonic Acid
PFHxS	Perfluorohexane Sulfonic Acid
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic Acid
PFOS	Perfluorooctanesulfonic Acid
PTI	Piedmont Triad International Airport
PTRM	Piedmont Triad Regional Model
PTRWA	Piedmont Triad Regional Water Authority
RO	Reverse Osmosis
SOC	Special Order by Consent
SSD	Sedgefield Sanitary District
TAZ	Traffic Analysis Zone
TMDL	Total Maximum Daily Load
TN	Total Nitrogen
TP	Total Phosphorus
TREBIC	Triad Real Estate and Building Industry Coalition
TZO	T.Z. Osborne
UNC	University of North Carolina
UNCG	University of North Carolina at Greensboro
WRA	Wastewater Reclamation Authority
WRF	Water Reclamation Facility
WSACC	Water and Sewer Authority of Cabarrus County
WSFCU	Winston-Salem/Forsyth County Utilities
WTF	Water Treatment Facility

Abbreviation	Definition
WTP	Water Treatment Plant
wtpd	Wet Tons per Day
WWTF	Wastewater Treatment Facility
WWTP	Wastewater Treatment Plant

Executive Summary

Background and Study Purpose

The Piedmont Triad region is undergoing rapid economic and population growth, particularly in Guilford and Randolph Counties, which has placed significant strain on water and wastewater infrastructure. In addition to accommodating growth, utilities must comply with continually evolving regulatory standards including new Environmental Protection Agency (EPA) standards for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) in drinking water and anticipated nutrient reduction requirements for wastewater discharges in both the Haw and Deep River sub-basins of the Cape Fear River Basin. The current system of multiple independent service providers limits coordinated planning and investment, making regional collaboration essential for sustainable development and regulatory compliance. The need for enhanced regional collaboration in the area was identified by the NC Department of Environmental Quality (NCDEQ) who was directed by the General Assembly to evaluate the current infrastructure and utility needs along the US Hwy 421 Corridor in Session Law 2023-134. The Regional Water and Wastewater Infrastructure Concept Plan was a result of the General Assembly's expressed disinterest and fatigue of continued financial investment into utility infrastructure improvements of distressed utilities that were unable to maintain the investment, nor able to recover the costs in rates required to operate a viable and sustainable utility.

As a result of the NCDEQ US Hwy 421 Corridor Plan and the sustained economic development success in Guilford and Randolph Counties, the Piedmont Triad Regional Water Authority (PTRWA) Board of Directors adopted an updated mission and vision statement as part of a collective Strategic Planning initiative in 2024. PTRWA commissioned Hazen and Sawyer, Raftelis and The Wooten Company to complete the Piedmont Triad Regional Water Authority Water and Wastewater Regionalization Study (the "Study" or the "Regionalization Study") in December 2024 to understand the best path forward for the region. Through comprehensive analysis of the region's water and wastewater capacities, demands, forecasted development, capital investment plans and future construction costs, this Study will provide the PTRWA Board of Directors with solutions the organization can build consensus around to enable the region, its partners and the citizens of Guilford and Randolph Counties to most effectively manage the limited water and wastewater resources in the Upper Cape Fear River Basin..

Historically, the Triad faced economic challenges following the decline of traditional industries such as textiles, furniture, and tobacco in the early 2000s. Globalization and the Great Recession caused job losses and stagnation, prompting a strategic pivot toward high-skill sectors. The region leveraged its geographic advantages and the Piedmont Triad International Airport (PTI) to attract advanced manufacturing, notably securing Honda Aircraft Company's (HondaJet's) headquarters and other aerotech manufacturing. Logistics and distribution also grew, supported by major shipping and supply industries along with healthcare and higher education institutions which provide stability and intellectual capital for future growth.

Looking ahead, the Triad is transforming into a hub for advanced manufacturing, aerospace, and logistics, driven by megaprojects such as Boom Supersonic's Overture, JetZero and Toyota's EV battery plant in Randolph County. These investments will create thousands of high-wage jobs and spur ancillary industries, while the region's strategic location strengthens its role as a logistics center. Anticipated urban revitalization and rising housing demand will reshape Greensboro, High Point, Asheboro, and the surrounding areas as the region seeks to balance economic gains with equitable growth that allows it to still maintain a rural character. With Randolph County's recognition as the "Heart of North Carolina" and the entire region being at the center of the Carolina Core, North Carolina's emerging economic corridor, the next two decades promise prosperity. To ensure the broadest distribution of benefits the entire region will need to work together to provide the level of infrastructure improvements required.

The Study will address the following items:

- Identifies the public water and wastewater providers in the two-county region and develops an understanding of water supply and water quality needs.
- Develops an estimate of the future demands due to population and industrial growth due to economic development and organic communal growth, working with the municipality leadership to understand the impact to governance and utility service.
- Evaluates the existing conditions, capacity and general treatment capabilities of the existing treatment facilities and provides a high-level assessment of their long-term viability.
- Identifies opportunities to serve future demands under a cost-effective, environmentally responsible regionalized approach.
- Develops alternatives to meet future demands and completes financial evaluations of the study area to identify theoretical impacts to the affordability of water and sewer.
- Identifies the public funding subsidy needed and cost sharing opportunities available to support a regional approach to water and sewer for a sustainable future for the entire two-county study area.

Study Area Definition and Stakeholders

The study area for this project includes the limits of Guilford and Randolph counties. In total, there are nineteen (19) incorporated municipalities in the two counties, of those, fourteen (14) currently provide water services, four (4) currently in planning to add water service availability for potable water and/or fire protection in the case of Summerfield and one (1) with no plans for infrastructure at this time (Staley).

There are eleven (11) utilities providing public sewer service, either through their own facilities or through Interlocal Agreements (ILAs) with nearby municipalities. For the purposes of this Study, we developed projections for the nineteen (19) municipalities in the region to account for future failures of private septic systems and to accommodate the need for more dense housing development in the suburban and rural areas of the two counties, with plans for future ILAs or participation in a regional solution.

The wastewater facilities for the utilities in the two counties discharge to the Cape Fear River Basin, specifically to either the Haw River sub-basin and are subject to the Jordan Lake Watershed rules or to the Deep River sub-basin. The water facilities include intake structures on one of these sub-basins apart from the City of Asheboro that sources their water supply from the Yadkin-Pee Dee River Basin, more specifically, the Uwharrie River sub-basin. Table ES - 1 below provides a summary of each incorporated municipality in the two-county study area.

The Sedgefield Sanitary District (SSD) operates in the southeast portion of Guilford County and discharges to the City of High Point sewer system. The SSD operates for a small established portion of the Sedgefield and Grandover neighborhoods and does not intend to expand demand. Therefore, this area was considered to be a part of the High Point growth and demand projections for both water and sewer.

Table ES - 1: Stakeholder Summary

Incorporated Municipality	Water Service Summary	Wastewater Service Summary
Archdale	Member in PTRWA (1.55 MGD) with interconnects to High Point and Davidson Water, Inc. PTRWA allocation will expand to 2.45 MGD with current WTP expansion project.	Owns 2.5 MGD of capacity at High Point's Eastside WWTP.
Asheboro	Operates the 12 MGD Asheboro WTP with a water supply on the Yadkin-Pee Dee River Basin. Grandfathered IBT limits the transfer of water to the Deep River sub-basin to 9.36 MGD.	Operates the 9 MGD Asheboro WWTP with discharge to Haskins Creek in the Deep River sub-basin.
Franklinville	Operates a water system through an interconnection and purchase agreement with Ramseur (0.25 MGD contract)	Operates a 0.1 MGD WWTP in the Deep River sub-basin
Gibsonville	Operates a water system through an interconnection and purchase agreement with Burlington	Conveys sewer to Burlington with a contractual limit of 1.55 MGD
Greensboro	Operates the 30 MGD, Townsend WTP, and the 24 MGD, Mitchell WTP, with three raw water reservoirs in the Haw River sub-basin. Is a member in PTRWA (7.836 MGD) and maintains interconnections with Burlington, Reidsville, Winston-Salem, High Point and Jamestown. PTRWA allocation will expand to 18.523 MGD with current WTP expansion project.	Operates the 56 MGD, T.Z. Osborne WRF, and discharges to the Haw River sub-basin. Receives flow from Burlington, and discharges flow to High Point and Jamestown
Guilford County	Does not operate a water system.	Does not operate a sewer system
High Point	Operates the 24 MGD, Frank L. Ward WTP, with two raw water reservoirs in the Deep River sub-basin. Is a member of PTRWA (2.28 MGD) and maintains interconnections with Davidson Water, Inc., Archdale, Jamestown and Greensboro.	Operates the 26 MGD, Eastside WWTP, and discharges to Randleman Lake in the Deep River sub-basin. High Point also operates the 10 MGD, Westside WWTP discharging to the Yadkin-Pee Dee River Basin. Facilities are subject to interbasin transfer certificate restrictions.
Jamestown	Member in PTRWA (0.78 MGD) and maintains interconnections with High Point and Greensboro. PTRWA allocation will expand to 1.2 MGD with current WTP expansion project.	Owns 2 MGD of capacity at High Point's Eastside WWTP
Liberty	Currently operates a 0.56 MGD well system but will transition to being partially or fully served through an interconnection with Greensboro, who may convey a portion of Randolph County's PTRWA allocation.	Currently operates a 0.55 MGD sprayfield WWTP but plans to decommission and interconnect with Greensboro
Oak Ridge	Does not currently operate a water system but is in the process of implementing a small service to the town center through an interconnection with WSFCU.	Does not operate a sewer system
Pleasant Garden	Does not currently operate a water system but has executed an ILA with Greensboro to provide water to industrial and commercial customers.	Does not operate a sewer system but is partially served by Greensboro

Incorporated Municipality	Water Service Summary	Wastewater Service Summary
PTRWA	Operates a 14.7 MGD facility in Randolph County with one reservoir in the Deep River sub-basin and provides water as a wholesaler to Greensboro, High Point, Archdale, Jamestown, Randleman and Randolph County. It is currently expanding to 26.7 MGD through a capital improvement project and installing an interconnection with Asheboro that may allow Randolph County to transmit water through Asheboro's system.	Does not currently operate a sewer system
Ramseur	Operates the 1.5 MGD, Ramseur WTP with one raw water reservoir in the Deep River sub-basin, and maintains an interconnection with Franklinville	Operates the 0.48 MGD, Ramseur WWTP discharging to the Deep River sub-basin
Randleman	Member in PTRWA (1.0 MGD) and maintains an interconnection with Asheboro	Operates the 1.745 MGD, Randleman WWTP discharging to the Deep River sub-basin
Randolph County	Member in PTRWA (1.25 MGD) but does not operate a water system.	Does not operate a sewer system
Seagrove	Operates a water system through an interconnection and purchase agreement with Asheboro (0.5 MGD contract)	Currently operates a 0.03 MGD facility, but will be replacing the facility with a 0.09 MGD package plant.
Sedalia	Does not operate a water system but recently entered into an ILA with Greensboro to provide water to residents in the near future.	Does not operate a sewer system but recently entered into an ILA with Greensboro to provide sewer services to residents in the near future.
Staley	Does not operate a water system and has expressed no desire to provide these services at this time	Does not operate a sewer system
Stokesdale	Operates a water system through an interconnection and purchase agreement with WSFCU (0.5 MGD contract)	Does not operate a sewer system
Summerfield	Does not operate a water system but is in the process of implementing a small system supplied by ground water wells for fire protection to the Town.	Does not operate a sewer system
Trinity	Water system is owned and operated by Davidson Water, Inc.	Operates a sewer system with an interconnection with Thomasville and transitioning to an interconnection with High Point Westside WWTP, both in the Yadkin-Pee Dee River Basin
Whitsett	Operates a small water system through an interconnection to the City of Burlington.	Does not operate a sewer system

General Condition of the Existing Infrastructure

The study area has an array of facilities varying in size, condition, treatment capabilities and long-term viability. Wastewater facilities in Greensboro and High Point have implemented the projects required to meet nutrient reduction requirements and have met those standards regularly.

While anticipated, the nutrient reduction criteria in the Deep River sub-basin is not certain, thus, the Randolph County wastewater facilities are not currently subject to Total Nitrogen (TN) and Total Phosphorus (TP) reduction limits and therefore have not undertaken the required upgrades. The Study found that maintenance on many of the facilities in Randolph County, along with the buried infrastructure, has been deferred and many are in need of major upgrade projects.

The utilities of Franklinville, Liberty and Ramseur have been designated as distressed under NCDEQ's viable utilities program, defined in Session Law 2020-79, "a distressed unit is a public water system or wastewater system operated by a local government unit exhibiting signs of failure to identify or address those financial or operating needs necessary to enable that system to become or to remain a local government unit generating sufficient revenues to adequately fund management and operations, personnel, appropriate levels of maintenance, and reinvestment that facilitate the provision of reliable water or wastewater services." These utilities have historically, heavily relied upon public funding, in terms of grants, earmarks and low interest loans to complete infrastructure upgrades through the years due to insufficient funding to complete required capital improvements to maintain their facilities. The State Legislature has expressed fatigue in funding capital projects for the distressed communities in this manner, realizing the investment can be short term, and should this discontinue in the future, it places utilities relying on this funding at significant risk of failure. It is anticipated that improvements to the water treatment facilities required by the EPA's recent Maximum Contaminant Level (MCL) mandates for PFOS/PFOA standards will require public funding for these facilities to comply as well leading to increased need for public funding support for water and wastewater systems.

Guilford County wastewater facilities in Greensboro and High Point are experiencing a need for additional capacity, potential nutrient reductions due to pending Jordan Lake rule readoption, pressure for advanced treatment for contaminants of emerging concern and the EPA's PFOS/PFOA standards at the water treatment facilities. All projects will require expensive upgrades to their facilities funded by bonds which will require repayment through rate increases.

Additionally, as evidenced by high inflow and infiltration (I&I) rates when reviewing peaking factors at the wastewater treatment facilities, all utilities in the study area need to continue monitoring and repairing areas of the buried infrastructure that are compromised. Those utilities that chronically defer their maintenance are experiencing heavier impacts from this need, exacerbating the need for additional wastewater capacity at the treatment facilities.

Summary of Water Demands and Wastewater Flows through 2050

The Study defines the water and wastewater requirements within Guilford and Randolph Counties through planning year 2050 including additional estimates for industrial and commercial growth representative of the anticipated growth that was indicated in our stakeholder discussion meetings that wouldn't have been captured by other means. Table ES - 2 and Table ES - 3 show the 2022 demand and the 2050 demand for each municipality and the growth that was projected for each utility in those planning years. Subsequent sections will include additional detail on the projections.

Table ES - 2: Summary of Water Demand Projections per Municipality

Water Demand Projections by Area	2022 Avg Day Water Demand (MGD)	2050 Avg Day Water Demand (MGD)	Difference Average Day Demand (MGD)	2022 Max Day Water Demand (MGD)	2050 Max Day Water Demand (MGD)	Difference Maximum Day Water Demand (MGD)
Archdale	0.89	2.28	+1.39	1.81	4.57	+2.76
Asheboro	4.97	7.55	+2.58	7.02	11.32	+4.30
Franklinville	0.11	0.13	+0.02	0.12	0.19	+0.07
Gibsonville	0.61	1.98	+1.37	0.73	2.97	+2.24
Greensboro	34.79	55.36	+20.57	48.31	83.04	+34.73
Guilford County	-	1.09	+1.09	-	1.64	+1.64
High Point	13.32	19.24	+5.92	15.00	28.86	+13.86
Jamestown	0.46	1.49	+1.03	0.54	2.24	+1.70
Liberty	0.26	0.66	+0.40	0.31	0.99	+0.68
Oak Ridge	-	0.63	+0.63	-	0.94	+0.94
Pleasant Garden	-	0.55	+0.55	-	0.83	+0.83
Ramseur	0.50	0.87	+0.37	1.51	2.40	+0.89
Randleman	0.55	1.54	+0.99	1.04	3.08	+2.04
Randolph County	-	1.18	+1.18	-	1.77	+1.77
Seagrove	0.18	0.22	+0.04	0.21	0.32	+0.11
Sedalia	-	0.13	+0.13	-	0.20	+0.20
Staley	-	-	-	-	-	-
Stokesdale	0.15	0.50	+0.35	0.26	0.85	+0.59
Summerfield	-	0.67	+0.67	-	1.00	+1.00
Trinity	1.57	1.95	+0.38	2.36	2.93	+0.57
Whitsett	0.0025	0.01	+0.0075	0.003	0.018	0.015
Total	**58.36**	**98.02**	**+39.67**	**79.22**	**150.15**	**+70.95**

Table ES - 3: Summary of Wastewater Flow Projections per Municipality

Wastewater Flow Projections by Area	2022 Annual Avg WW Flow (MGD)	2050 Annual Avg WW Flow (MGD)	Difference in Annual Avg WW Flow (MGD)	2022 Max Month WW Flows (MGD)	2050 Max Month WW Flows (MGD)	Difference in Max Month WW Flows (MGD)
Archdale[1]	1.00	2.41	+1.41	1.20	2.89	+1.69
Asheboro	3.54	6.85	+3.31	4.61	8.91	+4.30
Franklinville	0.04	0.08	+0.04	0.05	0.09	+0.04
Gibsonville	0.67	2.29	+1.62	0.91	3.09	+2.18
Greensboro	33.18	50.48	+17.30	36.61	55.52	+18.91
Guilford County	-	1.36	+1.36	-	1.63	+1.63
High Point	11.17	17.36	+6.19	16.91	26.04	+9.13
Jamestown	0.63	1.57	+0.94	1.22	2.35	+1.13
Liberty	0.32	0.90	+0.57	0.51	1.35	+0.84
Oak Ridge	-	0.09	+0.09	-	0.11	+0.11
Pleasant Garden	-	0.11	+0.11	-	0.14	+0.14
Ramseur	0.18	0.59	+0.41	0.28	0.89	+0.61
Randleman	0.51	1.41	+0.90	0.77	1.70	+0.93
Randolph County	-	0.94	+0.94	-	1.13	+1.13
Seagrove	0.02	0.09	+0.07	0.03	0.13	+0.10
Sedalia	-	0.07	+0.07	-	0.08	+0.08
Staley[2]	-	-	-	-	-	-
Stokesdale	-	0.03	+0.03	-	0.04	+0.04
Summerfield	-	0.53	+0.53	-	0.64	+0.64
Trinity	-	0.99	+0.99	-	1.19	+1.19
Whitsett[3]	-	-	-	-	-	-
Total	**51.26**	**88.15**	**+36.89**	**63.09**	**107.91**	**+44.82**

1 The City of Archdale experiences higher wastewater flow than water flow. We believe this is due to higher-than-average inflow and infiltration rates and potentially some issues with metering at their interconnects.
2 The Town of Staley has indicated they are not interested in providing water and sewer services.
3 The Town of Whitsett provides sewer services via the City of Greensboro. Projections for Whitsett have been included in the Greensboro projections.

Water demands and wastewater flow projections were projected using the 2022, 2023, and 2024 Local Water Supply Plans (LWSP), recent and ongoing studies, interviews with the stakeholder utilities, and knowledge of ongoing and anticipated economic development initiatives and corresponding growth.

As shown in the tables above, the projected demand for water and wastewater increases substantially over the next 25 years and will require notable infrastructure improvements and coordination to meet this need in the area. For quick reference, the available safe yield, available future treatment capacity and potential wastewater treatment capacity for each utility with a treatment facility are included in Table ES - 4 below. However, this table doesn't tell the story regarding the ILAs and reliance on the facilities in Greensboro and High Point for the others with no available treatment capacity. While it appears these facilities with minimal upgrades could handle the flow through 2050, the analysis in this Study reveals that they will be significantly constrained by available wastewater capacity in the near future as further discussed in Section 5. Additionally, the municipalities of Gibsonville, Whitsett, Oak Ridge, Stokesdale and Trinity are reliant on utilities outside of the study area. This table details the vital need for collaboration and regionalization to meet the future wastewater projections.

Table ES - 4: Snapshot of Available Water and WW Capacity per Facility

Owner – Facility	Total Reservoir Safe Yield (MG)	Future Water Treatment Capacity (MGD)	Potential Future WW Treatment Capacity (MGD)
Asheboro - Asheboro WTP	9.36[2]	9.36	-
Asheboro - Asheboro WWTP	-	-	9.0
Franklinville - Franklinville WWTP	-	-	0.10
Greensboro - Mitchell WTP, Townsend WTP	40.0	54.0	-
Greensboro - T.Z. Osborne WRF	-	-	60.0
High Point - Ward WTP	21.44	24.0	-
High Point - Eastside WWTP	-	-	32.0
Liberty - Liberty WTP	0.56[3]	0.56	-
Liberty - Liberty WWTP	-	-	0.55
PTRWA[1]	54.0	48.0	-
Ramseur - Ramseur WTP	6.6	3.0	-
Ramseur - Ramseur WWTP	-	-	3.0
Randleman - Randleman WWTP	-	-	1.75
Seagrove - Seagrove-Ulah MWD	-	-	0.03

[1] PTRWA is operated as an Authority with ownership interest by Archdale, Greensboro, High Point, Jamestown, Randleman, and Randolph County
[2] Asheboro's reservoir is in the Yadkin River Basin and has a safe yield of 26.5 MG available, however, IBT rules limit the available capacity of their 12 MGD WTP to 9.36 MGD.
[3] Liberty safe yield is limited by groundwater well capacity.

Water and Wastewater Treatment Requirements and Environmental Considerations

Building on the assumptions of the NCDEQ US Hwy 421 Corridor Concept Plan, this Study assumes that the Cape Fear River basin would be subject to nutrient removal criteria by 2050 due to nutrient impaired waters. Each facility in the Haw River sub-basin would remain at its current allocation, while all other facilities would operate with no net increase or a "hold the load" strategy, defined as the annual average discharged nutrient, TN and TP load over calendar years 2021-2024 as reported by the facility.

The Study recognizes an effort by the Nonpoint Source (NPS) planning division of NCDEQ to implement the Phase 2 Jordan Lake Nutrient Strategy rules designed to restore water quality in Jordan Lake by further reducing the mass of TN and TP by approximately 30% from upstream point sources. Recognizing this effort is not complete with NCDEQ and the result will likely change multiple variables such as transport factors and ultimate pollutant discharge load targets, a decision was made to move forward with the current allocations for the facilities discharging to the Haw River in this analysis.

This average load was then assigned to the facility as their Total Maximum Daily Load (TMDL) moving forward. In cases where the total discharged load was below the Limits of Conventional Treatment Technology, the TMDL was assumed to be a mass load allocation equivalent to the TN concentration of

3.0 milligrams per liter (mg/L) and a TP concentration of 0.5 mg/L. This situation occurred when the average effluent flow was significantly less than the permitted capacity of the facility.

For new facilities and expansions, the nutrient allocation was assumed to be reduced to a TN of 3.0 mg/L and a TP of 0.18 mg/L in the Haw River sub-basin. While all other facilities in sub-basins other than the Haw River sub-basin were assumed to be assigned a mass nutrient allocation equivalent to a TN concentration of 3.0 mg/L and a TP concentration of 0.5 mg/L. The difference in basins is due to the nutrient related impairments in the Haw River reach of the Jordan Lake watershed.

Regional efforts offer solutions to achieving the water and wastewater capacity required for continued economic success while also addressing environmental and health issues in the greater Cape Fear River basin. An overall improvement to the basin's ecosystem could be achieved if significant upgrades can be limited to the proposed regionalized facility thereby allowing the closure of aging and ineffective treatment systems. The alternatives recommended in this evaluation have accounted for an overall balance of the discharge of nutrients today with the capacity requirements of the future.

The Cape Fear River basin is currently being modeled by the EPA. This model integrates data and knowledge of hydrological systems, nutrients, and other factors throughout the basin. This Study is not informed by these results, as the modeling is not yet complete. Upon completion, the Study recommends that this EPA Plan be reviewed to ensure that the modeling results do not negatively impact the recommendations in this Study.

Per- and polyfluoroalkyl substances (PFAS) and 1,4-Dioxane are currently the primary contaminants of emerging concern in the Cape Fear River basin due to their impact on human health in drinking water. The presence of these contaminants has been documented through sampling by the NC Collaboratory, public water and wastewater utility providers, and other local and state entities. North Carolina ranked as the fourth highest state with the greatest number of drinking water systems identified with detectable levels of 1,4-Dioxane and third highest concentrations nationwide. The cost implications of advanced treatment to remove 1,4-Dioxane and PFAS from the wastewater discharges have been included in the models created for this Study and are a factor in the recommended regionalization alternatives.

During the execution of this Study, the North Carolina General Assembly proposed House Bill 694, ratified and enacted as Session Law 2025-77, to remove the sub-basin designations of 2-1, Haw River, and 2-2, Deep River, and modify 2-3 to "Cape Fear River, which includes Haw River (2-1) and Deep River (2-2)." This modification to the interbasin transfer (IBT) rules may provide the flexibility needed in Guilford and Randolph counties to ensure their water security for years to come, allowing the region's utilities to work together to shift water and wastewater between the basins as needed to meet the anticipated growth. However, we did not interpret this bill to impact the existing National Pollutant Discharge Elimination System (NPDES) permits contributing to the Jordan Lake watershed and the nutrient reduction requirements these facilities include in their permits. We do recognize the potential positive IBT implications this change will have in transferring wastewater flows from the utilities in the Haw River to a regional facility located on the Deep River.

Financial Review of Stakeholders

The current fragmentation of water and sewer utility services across small, divided communities presents significant, interconnected financial challenges that threaten the long-term affordability and sustainability of these essential services. These challenges are particularly acute in systems that lack the economies of scale necessary to effectively manage modern infrastructure demands and regulatory compliance. Several of the most significant challenges facing the communities in Guilford and Randolph County are:

1. **Cycle of Deferred Maintenance and Financial Strain:** One of the most pervasive financial challenges facing small utilities is the deferral of necessary capital improvement and renewal and replacement projects. While this strategy allows utilities to avoid rate increases in the short-term, it guarantees exponentially higher repair costs, exposes systems to failures, and emergency fixes in the long run, leading to spikes in operational spending.

2. **Constraints on Sustainable Growth and Resource Capacity:** Modern utility management must navigate the reality that water and wastewater resources are finite, and the ability to expand services is constrained by regulatory, environmental, and technical limitations

3. **Inefficient Financial Structure or Borrowing Limitations:** Small and segmented utilities are financially disadvantaged when seeking capital for necessary improvements and face a higher per capita cost for providing the same level of utility service.

Regionalization initiatives like the ones devised in this PTRWA Regionalization Study seek to overcome these fundamental challenges by leveraging economies of scale, professionalizing financial management, and establishing a unified platform for strategic infrastructure investment and regulatory compliance.

As a part of the Regionalization Study, the project team was tasked with evaluating the cost impacts to residents serviced by the nine utilities evaluated in the Study. To ensure equitable comparison a standardized monthly water and wastewater bill with 5,000 gallons of usage was utilized as a benchmark. This is a benchmark recognized by the EPA, AWWA, and the NC Environmental Finance Center as a representative consumption standard for assessing service affordability and utility financial capability. Standardizing usage at this level allows for an accurate assessment of how rate adjustments impact the typical household. Notably, utilities with higher existing rates are more sensitive to rising costs; because increases are often applied as percentages, these providers experience larger absolute dollar impacts for every adjustment.

Figure ES - 1 exhibits the existing Fiscal Year (FY) 2026 cost to the customer for water and wastewater for each utility based on 5,000 gallons.

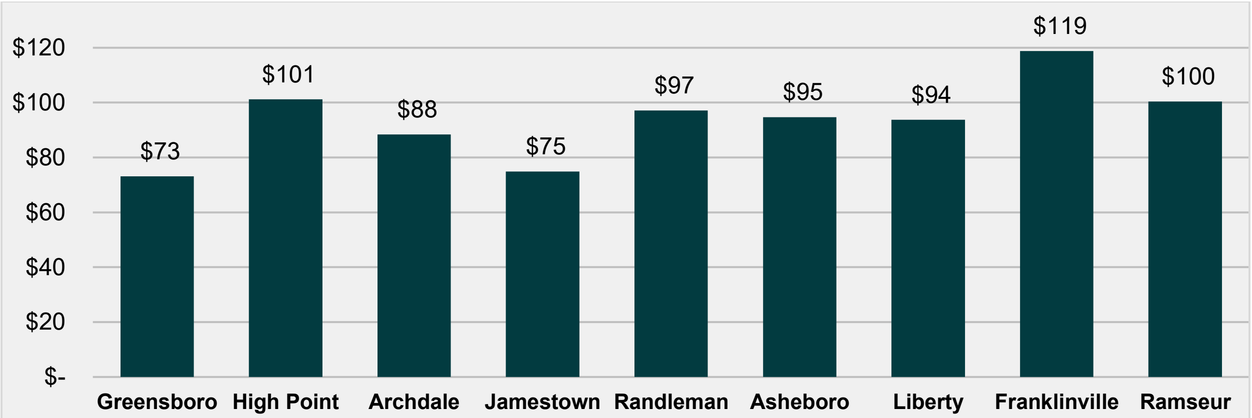


Figure ES - 1: Combined Current FY26 Residential Monthly W & WW Bill Comparison (5 kgal)

Summary of Recommendations

The Regionalization Study will present a collection of viable alternatives that are based on their effectiveness to provide more resilient water and wastewater capacity to the region while maintaining focus around feasible alternatives driven by the stakeholders willing to participate in the regional solution. Further, the Study will present alternatives evaluated using multiple criteria such as technical feasibility, reliability, resiliency, regulatory compliance and financial implications on the rate payers in the region. Maintaining affordability for the region was a primary driver for the selected alternatives when considering the need for additional capacity in the larger urban areas versus the limited financial resources of the smaller rural towns for maintaining utility infrastructure. The general factors and recommendations for the selected alternatives were:

- Smaller utilities in the study area are facing financial challenges to maintain affordable water and sewer rates without financial assistance from State funding sources to maintain the aging utility infrastructure, preparing for EPA PFAS drinking water standards, and designing improvements to meet the future nutrient reduction requirements at existing wastewater treatment facilities.
- Large utilities are facing capacity limitations with limited opportunity for expansion at the existing facilities creating urgency for alternate regional facilities.
- Biosolids management is quickly becoming a driver for a regional solution given regulatory uncertainty that may impact current management practices in and around the study area.
- Reuse practices will become an important strategy to allow the region to grow while minimizing wastewater discharges and maximizing the available raw water capacity.
- Outreach and communication to the stakeholders in the region is critical to maximizing participation in the regional solution thereby achieving long-term sustainability and maximum cost sharing opportunities.
- Continue updating the financial cost model for the region to optimize the public funding needed to maintain affordable water and sewer rates.

Summary of Alternatives

The Regionalization Study is intended to serve as a guide and a resource for the public water and wastewater providers and stakeholders in the study area, as well as for decision-makers who provide oversight and funding for water and wastewater infrastructure projects. The Study was completed with an objective regional perspective to define alternatives considered potentially feasible. While the Study does reflect the interests and preferences of some, moving forward on any alternative will require give and take from all parties to ensure that a mutually beneficial solution is achieved for all parties. The intent for the Study is to provide the starting point for regional governance discussions for the regional authority in the area and to kickoff in-depth engineering studies for the conveyance and treatment facilities recommended in the report.

The conditions and circumstances in the study area are dynamic and may change over time, and the alternatives and recommendations may need to be revisited and revised accordingly. Therefore, the Study also suggests a process for periodic review and update of the Study to ensure its relevance and usefulness.

A regional solution already exists to meet the projected future water demand of the study area; therefore, only one recommended plan was developed for the water supply and water treatment projects through the planning period. A summary of those projects is presented below:

- Advanced treatment upgrades at the six existing Water Treatment Plants (WTP) in the study area: PTRWA John Franklin Kime Water Treatment Plant (JFK-WTP), Asheboro WTP, Greensboro Townsend WTP and Mitchell WTP, High Point Ward WTP, and Ramseur WTP.
- Three expansions at PTRWA over the 25-year planning period (Existing 14.7 million gallons per day (MGD) to 26.7 MGD, to 36 MGD, and to 48 MGD).
- Ramseur WTP expansion from 1.5 MGD to 3 MGD.
- Various new pump stations and water lines that are defined in Section 6.1.

While there is some on-going cooperation amongst individual entities, there is not currently a clear regional solution that exists to meet the projected future wastewater needs of the study area. The wastewater alternatives summarized below are all feasible to meet the capacity related concerns of the areas facing immediate need, however, the recommended alternative, Alternative 4, maximizes participation in the two-county area and provides significant benefits including, an increase in operational efficiency, environmental protection, cost control for smaller utilities, sustainable governance and support of future economic development.

"Go-it-Alone" Alternative

- Each individual municipality in the region performs their own capital infrastructure projects to address localized growth demands, facility rehabilitation, and anticipated regulatory requirements.
- Six utilities require treatment plant expansions within the 25-year planning period to address capacity shortfalls: Greensboro, High Point, Randleman, Asheboro, Ramseur, and Seagrove.
- It is projected that both Greensboro and High Point will reach their wastewater capacity limit by 2042 and will not be able to continue to grow. While the timeline may vary based on growth, if this is the alternative that is pursued these utilities will reach a point where moratoriums on connections will need to be implemented.

Alternative 1

- Construction of a new Regional Wastewater Reclamation Facility (WRF) located in Randleman by 2034, with Greensboro, High Point and Randleman participating.
- Greensboro expands T.Z. Osborne (TZO) WRF from 56 MGD to 60 MGD.
- Asheboro, Ramseur, and Franklinville would not participate in the Regional WRF and would continue to operate and expand their localized systems as detailed in the "Go-it-Alone" scenario.
- Construction of a 0.09 MGD package Wastewater Treatment Plant (WWTP) in Seagrove to replace existing 0.03 MGD facility.

Alternative 2

- Construction of a new Regional WRF located in Randleman by 2042, with Greensboro, High Point and Randleman participating.
- Greensboro to expand TZO WRF from 56 MGD to 60 MGD.
- High Point to expand Eastside WWTP from 26 MGD to 32 MGD.
- Randleman required to perform a minimal upgrade project at its existing WWTP to be able to continue operating facility until the Regional WRF comes online in 2042.
- Asheboro, Ramseur, and Franklinville would not participate in the Regional WRF and would continue to operate and expand their localized systems as detailed in the "Go-it-Alone" scenario.
- Construction of a 0.09 MGD package WWTP in Seagrove to replace existing 0.03 MGD facility.

Alternative 3

- Construction of a new Regional WRF located in Asheboro by 2034, with Greensboro, High Point, Asheboro and Randleman participating.
- Ramseur and Franklinville would not participate in the new Regional WRF, however Franklinville's existing WWTP would be decommissioned, and their wastewater would be pumped to Ramseur WWTP. The existing Ramseur WWTP would be rehabilitated and expanded from 0.46 MGD to 1.25 MGD by 2034.
- Construction of a 0.09 MGD package WWTP in Seagrove to replace existing 0.03 MGD facility.

Alternative 4

- Construction of a new Regional WRF located in Asheboro by 2034, with Greensboro, High Point, Asheboro, Ramseur, Franklinville and Randleman participating.
- Randleman, Ramseur, and Franklinville facilities would be decommissioned strategically, and all flow would be pumped to the Regional WRF.
- Construction of a 0.09 MGD package WWTP in Seagrove to replace existing 0.03 MGD facility.

Table ES - 5 presents a comparative summary of the total project costs, the added wastewater capacity in the region, and the projected year the region will reach 90% of its available wastewater capacity for the "Go-it-Alone" Alternative and the four regionalization alternatives. When a wastewater system reaches 90 percent capacity, DEQ can implement a moratorium on sewer expansions and restrict new connections if permits, plans, specifications and a schedule for expansion are not in place.

Table ES - 5: Summary of Regional Alternatives

Alternatives	Added Wastewater Capacity	Regional Sewer Related Capital Cost Through 2050	90% of Wastewater Capacity Reached with Planned Expansions	Regional Water Related Capital Cost Through 2050
"Go-it-Alone": • No Regional Facility • Individual Utility Expansions	**14 MGD** 4 MGD –Greensboro 0.52 MGD - Ramseur 6 MGD – High Point 3 MGD – Asheboro 0.06 MGD - Seagrove	**$1.6 B**	**2042**	**$1.5 B**
Alternative 1: • Regional Facility Greensboro (Expansion at TZO) High Point Randleman	**31 MGD** 25 MGD – Regional 0.52 MGD - Ramseur 4 MGD – Greensboro 3 MGD – Asheboro 0.06 MGD Seagrove *(Replaces 1.75 MGD at Randleman)*	**$2.6 B**	**2050 +**	**$1.5 B**
Alternative 2: • Regional Facility Greensboro (Expansion at TZO) High Point (Expansion at Eastside) Randleman	**30 MGD** 18.5 MGD –Regional 0.52 MGD - Ramseur 4 MGD – Greensboro 3 MGD – Asheboro 6 MGD – High Point 0.06 MGD - Seagrove *(Replaces 1.75 MGD at Randleman)*	**$2.8 B**	**2050 +**	**$1.5 B**
Alternative 3: • Regional Facility Greensboro High Point Randleman Asheboro	**33 MGD** 43 MGD – Regional 0.77 MGD – Ramseur 0.06 MGD - Seagrove *(Replaces 1.75 MGD at Randleman)* *(Replaces 9 MGD at Asheboro)* *(Replaces 0.1 MGD at Franklinville)*	**$3.1 B**	**2050 +**	**$1.5 B**
Alternative 4: • Regional Facility Greensboro High Point Randleman Asheboro Ramseur Franklinville	**33 MGD** 44 MGD – Regional, 0.06 MGD - Seagrove *(Replaces 1.75 MGD at Randleman)* *(Replaces 9 MGD at Asheboro)* *(Replaces 0.1 MGD at Franklinville)* *(Replaces 0.48 MGD at Ramseur)*	**$3.1 B**	**2050 +**	**$1.5 B**

Financial Model and Implications of Regionalization

As a part of the Study, Raftelis was engaged to develop a methodology to evaluate the impact of capital investment associated with four regionalization alternatives on water and wastewater rates for nine utilities in Guilford and Randolph County through 2050. The utilities evaluated as part of this analysis included Archdale, Asheboro, Franklinville, Greensboro, High Point, Jamestown, Liberty, Ramseur, and Randleman. To evaluate the impact on water and wastewater rates, Raftelis developed a unit cost analysis model which provides a detailed review of the escalating total annual costs for each utility system in relation to the growing customer demand for services. The unit cost in the analysis is expressed as the total projected annual system cost per thousand gallons (kgal) of water or wastewater demand. The annual percent change in the water or wastewater unit cost represents the necessary increase in revenues, and therefore user rates, required to meet the total annual water or wastewater system cost. The unit cost analysis assumed that utilities existing FY2026 user rates were sufficient to recover total annual system costs in FY2026. To equitably compare the impact of rate increases amongst utilities, Raftelis utilized the industry standard "typical" monthly residential bill for water and wastewater services of 5,000 gallons.

Using the existing monthly bills (based on a 5,000 gal/month usage) as a baseline, Raftelis applied future costs associated with each utilities revenue requirements which include existing operating expenses, debt service, and funding of capital improvement projects. Figure ES - 2 shows the projected water and wastewater combined 5,000-gallon monthly bills in FY2050 if the utilities do not participate in any of the regionalization alternatives. This scenario is also referred to as the "Go-it-Alone" scenario and assumes all system revenue requirement costs are executed and funded with user rate charges. It should also be noted that the "Go-it-Alone" scenario does not provide a full solution for wastewater demand where all nine (9) utilities would have adequate capacity through FY2050. Both Greensboro and High Point would become limited by wastewater capacity before FY2050 without one of the four regionalization alternatives being implemented. While water and wastewater rates should be expected to increase significantly over the next 25 years due to increases in operating and capital investment costs, several of the forecasted utility bills shown in Figure ES - 2 are forecasted to need to increase over 6% on average annually through 2050 in a "Go-it-Alone" scenario. Because many of the capital project costs are projected to be incurred over the next 10 years, several of the immediate forecasted rate increases are much higher than 6%.

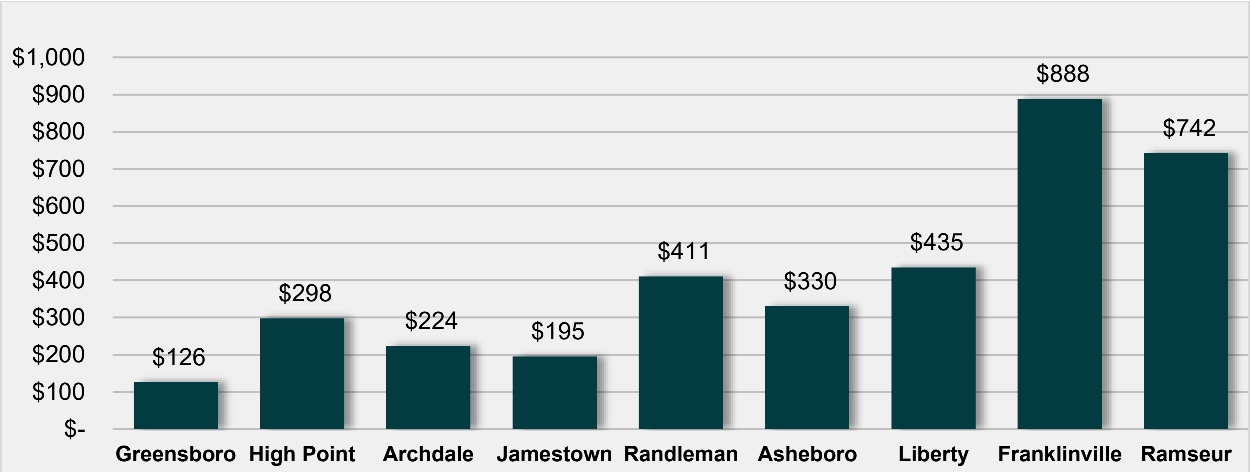


Figure ES - 2: Projected FY50 Residential Monthly W & WW Bills “Go-it-Alone” (5 kgal)

To determine the impacts associated with each of the alternatives, Raftelis computed the estimated rate impacts of adding the capital and operational cost of each regional alternative to the “Go-it-Alone” scenario, removing any existing (“Go-it-Alone”) project costs which were eliminated due to a particular regionalization alternative. The capital expense associated with replacing existing treatment capacity at brand-new, regional facilities is projected to be significantly more expensive than simply executing incremental upgrades and improvements at the current, existing utility plants. Due to these comprehensive capital cost assumptions embedded within the alternatives, the total financial impact on utility rates for each utility is generally projected to be the same or higher in the regional alternatives compared to the "Go-it-Alone" solution, unless substantial outside funding support is successfully secured. This means that utility bills will project the same or higher in each of the alternatives, because of added project cost, without outside funding support. Figure ES - 3 shows the projected water and wastewater combined 5,000-gallon monthly bills in FY2050 if the utilities participate in a regionalization alternative solution.

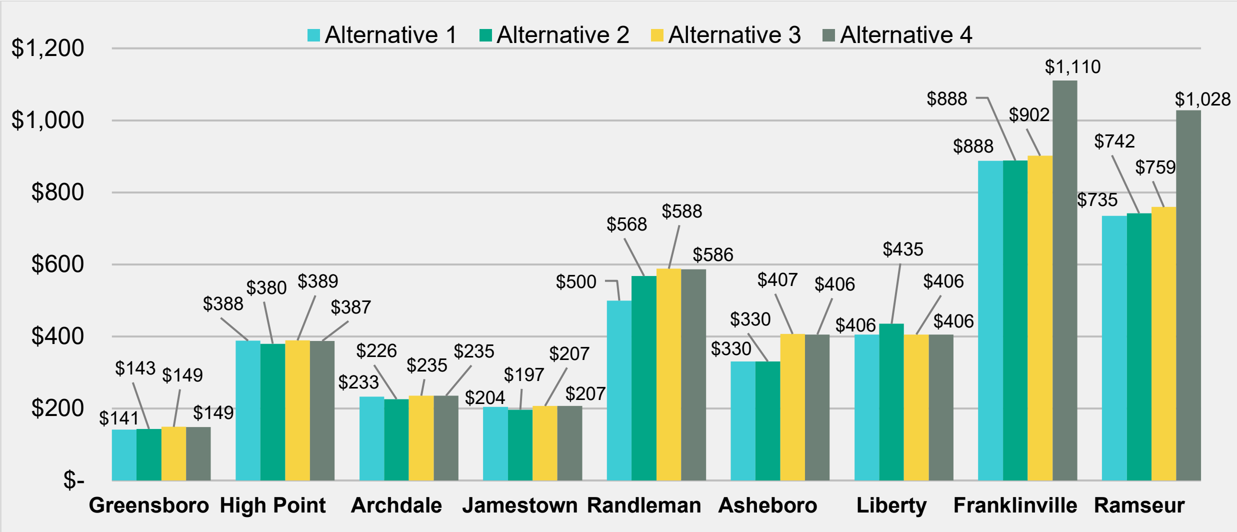


Figure ES - 3: Projected FY50 Residential Monthly W & WW Bills by Alternative (5 kgal)

Figure ES - 3 illustrates that without some level of outside funding support, proceeding with a regionalized alternative would have the same if not worse impact on water and wastewater user rates compared to the "Go-it-Alone" scenario, making monthly utility bills in FY2050 particularly unreasonable for the smaller communities in Randolph County.

Financial Recommendations

Based on the unit cost analysis comparing the "typical" utility bill impacts for the four regionalization alternatives against the "Go-it-Alone" scenario, the following strategic financial recommendations are crucial for ensuring the successful implementation of a regionalization alternative.

- **Financial Planning:** Each individual utility should conduct detailed financial planning and rate analysis using the project costs that develop from the PTRWA Regionalization Study. While this Study utilizes primarily publicly available information to inform the financial results, utilities should use internal knowledge of their own systems to supplement these findings. This will allow utility and local government leadership to make the most educated decisions regarding participation in the regionalization alternatives.
- **Acquire Outside Funding Support:** For any regional alternative to be feasible, as it pertains to the financial viability and reasonability of projected "typical" customer bills, a level of outside funding support is needed to subsidize the capital cost for the most vulnerable communities. It should be noted that outside funding support will also be required in the "Go-it-Alone" scenario, otherwise vulnerable utilities will continue to defer necessary capital maintenance and improvements. While individual utilities in the "Go-it-Alone" scenario could potentially acquire grant funding, the North Carolina State Legislature has indicated a clear strategic preference for supporting regional solutions. The Hwy 421 capacity analysis which was facilitated by prior legislative action and House Bill 694 in the current legislative session, which directs the University of North Carolina (UNC) Environmental Finance Center to study

regionalization with the intention of identifying pathways to lower the cost of utility services across the State are the most telling indicators of the Legislature's intent regarding utility funding. Therefore, for the purposes of this comparative analysis, it is conservatively assumed that the "Go-it-Alone" scenario would not receive outside funding support, while a regionalization Alternative would likely be positioned to receive and leverage a higher level of external financial assistance. Table ES - 6 displays the identified level of outside funding support required for each utility in each alternative for projected water and wastewater charges to remain reasonable in FY2050.

Table ES - 6: Identified Level of Funding Support

Utility Provider	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Greensboro	-	-	-	-
High Point	$ 234.3 M	$ 314.2 M	$ 315.0 M	$ 314.5 M
Archdale	-	-	-	-
Jamestown	-	-	-	-
Randleman	$ 83.7 M	$ 134.3 M	$ 124.5 M	$ 124.5 M
Asheboro	-	-	$ 472.6 M	$ 473.0 M
Liberty	$ 21.6 M	$ 33.6 M	$ 21.6 M	$ 21.6 M
Franklinville	$ 9.2 M	$ 9.2 M	$ 9.2 M	$ 21.9 M
Ramseur	$ 74.9 M	$ 77.4 M	$ 90.5 M	$ 156.6 M
Total Funding Support	**$ 423.7 M**	**$ 568.7 M**	**$ 1,033.4 M**	**$ 1,112.1 M**

- **Acquire Outside Funding Support (cont.):** Every dollar of alternative regional project cost for Liberty, Franklinville, and Ramseur is identified to require outside funding. The outside funding support for the designated utilities will significantly reduce the burden of the large upfront capital investment that is required in all alternatives. The impacts the funding support will have on the FY2050 "typical" water and wastewater residential customer bills is shown in Figure ES - 4 and Figure ES - 5. It is crucial to highlight that, even with the outside funding support, Figure ES - 5 illustrates that Greensboro and High Point utilities are paying at or above the "Go-it-Alone" scenario rate for their alternative Regionalization Study capital projects and a majority of the Randolph County utilities are paying at or below for theirs. When considering this impact, it should be noted that Alternatives 1-4 are more expensive for Greensboro and High Point because they are acquiring more wastewater capacity than in the "Go-it-Alone" scenario and there is a substantial cost in transferring the wastewater from these systems to Randolph County. The "Go-it-Alone" scenario also does not address the full future wastewater demands for the region, so growth would stop before the end of the planning period or additional funds would need to be expended to obtain capacity in some other manner.

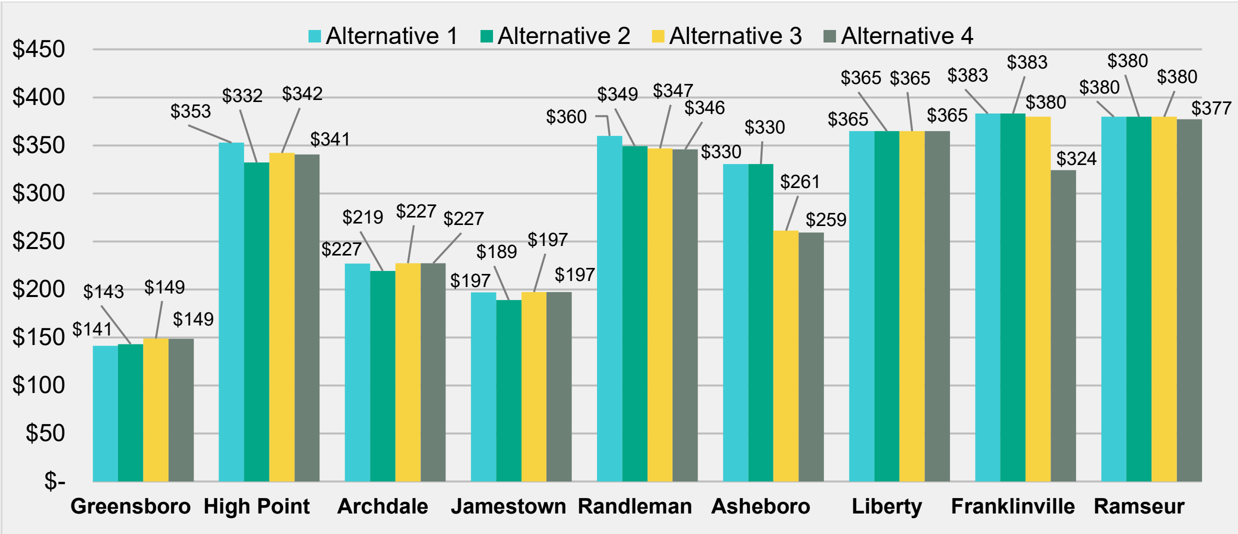


Figure ES - 4: Projected FY50 Monthly W & WW Bills by Alternative with Support (5 kgal)

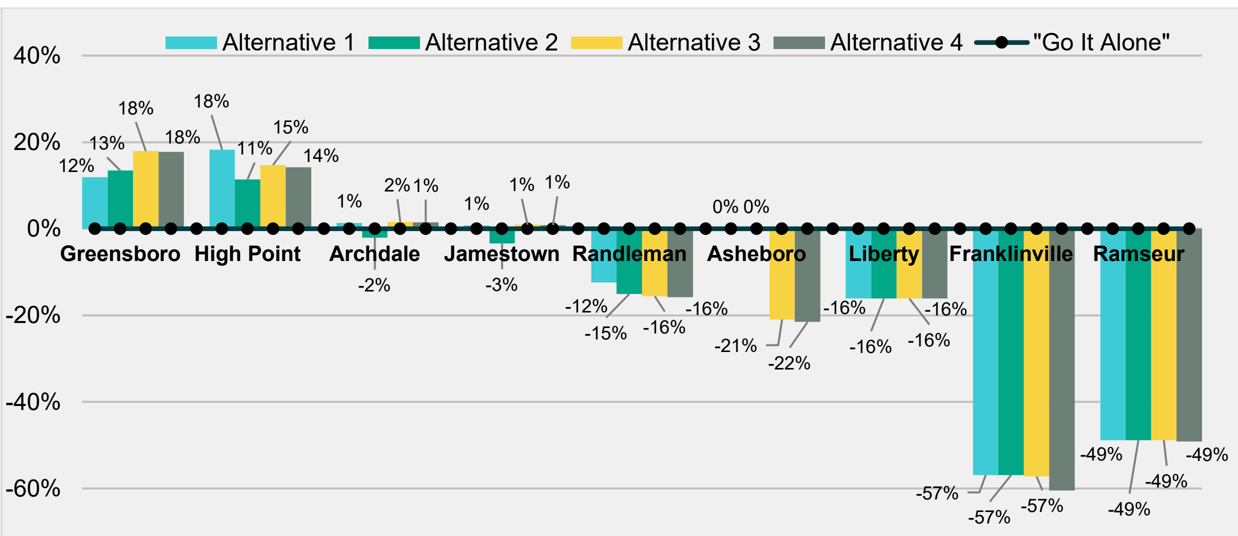


Figure ES - 5: Alternatives with Support vs. "Go-it-Alone" FY50 Monthly Bills % Difference

*The "Go-it-Alone" scenario does not address the full wastewater demands for the region through 2050

- **Pursue Alternatives:** Each of the nine utilities will need to work with PTRWA and/or the planned utility provider to begin the engineering, financial, and governance processes for the implementation of the selected alternatives. Communication of financial objectives and challenges will be key to the success of Guilford and Randolph County water and wastewater regionalization efforts.

- **Explore Additional Regionalization Solutions:** The PTRWA Regionalization Study alternatives present regional solutions in the framework of wholesale water and wastewater capacity allocations, as is currently the model for water treatment at PTRWA. Other formal partnerships such as ILAs for purchasing treatment or contracting of infrastructure management can alleviate the high cost of maintaining and operating a full utility system, especially for the communities that lack the economies of scale to effectively do so. If a stakeholder's primary regional objective is to achieve regional rate parity with peers, consolidation of the utility services is the most practical regional solution. Consolidation could be pursued independent of the decisions made around regionalization or as a part of those discussions.

Conclusions

This analysis was completed with an objective perspective to evaluate feasible alternatives to best meet the needs of the region as a whole, while not adversely impacting the individual interests of each municipality.

The Study identifies that a significant investment in infrastructure will be required whether each utility maintains the status quo of fragmented, individualized services or participates in a fully regionalized approach, thus the findings represent that the benefits gained by a collective approach will be the best approach for the citizens of Guilford and Randolph counties as a whole.

Without wastewater utility regionalization, a negative impact on economic development activity and growth in the urban areas will stifle development for the whole region, likely forcing residential development to surrounding counties to support the economic development initiatives in our area. Given that the entire region recognizes the need to expand housing opportunities at all levels, a solution that fosters residential growth must be pursued. With this need in mind and the efficiencies gained by combining wastewater discharges, the shared cost of upgrades and operations, the advanced source reduction gained with modern technologies, and the reduction of emerging contaminants in the receiving streams, the benefits of regionalization should far outweigh any concerns that any individual utility should have regarding maintaining individual governance over any one facility.

Additional analysis, meetings, and ongoing collaboration will be required to ensure that each governing body will have sufficient control and capacity to advocate for their own responsible growth through this critical period for our area. We trust that just like when prior leadership chose to work together to form PTRWA and build a water supply to ensure the future viability of the Triad, the leaders of today will be able to work together to address the current critical needs, charting a course that ensures continued success for the entire region.

1. Background and Study Purpose

The Piedmont Triad region is experiencing rapid economic development and population growth, particularly along key transportation and commercial arteries in Guilford and Randolph Counties. While this growth signifies a vibrant regional economy, it has simultaneously placed enormous and escalating demands on existing water and wastewater infrastructure. In addition to accommodating growth, utilities must comply with continually evolving regulatory standards including new EPA standards for perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS) in drinking water and anticipated nutrient reduction requirements for wastewater discharges in both the Haw and Deep River sub-basins of the Cape Fear River Basin. The current organizational landscape within the two-county area is characterized by a mostly fragmented system of multiple, independent service providers. This fragmentation severely limits the ability of the region to engage in the coordinated, long-term resource planning, financing, and capital investment necessary to sustainably support future development and maintain regulatory compliance. While local utilities have managed their infrastructure successfully to date, the complexity and scale of future infrastructure needs and regulatory requirements demands a collaborative approach.

The impetus for this comprehensive regionalization study originated from the North Carolina General Assembly's recognition of these systemic limitations. NCDEQ was directed by the General Assembly to evaluate the current infrastructure and utility needs along the US Hwy 421 Corridor in Session Law 2023-134. This legislation culminated in the previous foundational work for this effort, titled “Regional Water and Wastewater Infrastructure Concept Plan - US 421 Corridor”. The Plan offered concepts where utility regionalization efforts could address the current and future infrastructure demands along the US Hwy 421 Corridor.

As a result of the NCDEQ US Hwy 421 Corridor Plan, the sustained economic development success in Guilford and Randolph Counties, and the updated mission and vision the PTRWA Board of Directors adopted as part of a collective Strategic Planning initiative in 2024, PTRWA commissioned Hazen and Sawyer, Raftelis and The Wooten Company to complete the Piedmont Triad Regional Water Authority Water and Wastewater Regionalization Study (the “Study” or the “Regionalization Study”), a study to further investigate the need and viability of a regional effort to meet the water and wastewater requirements in the two-county region. The Study addresses the following items:

- Identifies the public water and wastewater providers in the two-county region and develops an understanding of water supply and water quality needs.
- Develops an estimate of the future demands due to population and industrial growth due to economic development and organic communal growth, working with the municipality leadership to understand the impact to governance and utility service requirements.
- Evaluates the existing conditions, capacity and general treatment capabilities of the existing treatment facilities and provides a high-level assessment of their long-term viability.
- Identifies opportunities to satisfy future demands under a cost-effective, environmentally responsible regionalized approach.

- Develops alternatives to meet future demands and completes financial evaluations of the study area to identify potential impacts to the affordability of water and sewer.
- Identifies the public funding subsidy needed and cost sharing opportunities available to support a regional approach to water and sewer for a sustainable future for the entire two-county study area.

This master plan will provide the PTRWA Board of Directors with solutions the organization can build consensus around to enable the region, its partners and the citizens of Guilford and Randolph Counties to most effectively manage the limited water and wastewater resources in the Upper Cape Fear River Basin.

1.1 General Development Trends and Economic Development

1.1.1 Economic Overview of Guilford and Randolph County

The last two decades were a period of necessary and often painful transition for the economy of the Piedmont Triad. The early 2000s marked the end of the region's historical dominance in textiles, furniture, and tobacco. Driven by globalization and shifting trade policies, manufacturing employment hemorrhaged jobs, leading to high unemployment, lagging population growth compared to Charlotte and Raleigh, and a sense of regional economic uncertainty, which was severely compounded by the national impact of the Great Recession. The Triad was left with the challenge of replacing centuries of industrial tradition with new, sustainable economic anchors.

The response to this structural crisis was a deliberate and long-term commitment to high-skill specialization. Local leadership pivoted their focus, recognizing that the region's inherent geographic advantage and the massive infrastructure of the PTI Airport were its greatest assets. This strategic planning came to fruition with a major victory in the mid-2000s: securing the global headquarters and manufacturing facility for HondaJet. This investment was a pivotal turning point, successfully validating the "Aerotropolis" concept and demonstrating the region's viability for advanced, specialized manufacturing, thereby setting the essential groundwork for the larger aerospace commitments that would follow much later.

While manufacturing was evolving, the Triad relied heavily on logistics and distribution to stabilize the job market. Leveraging its critical junction along the I-40 and I-85 corridors, the region successfully attracted and expanded major distribution centers from giants like FedEx and, later, Amazon. This sector provided thousands of new positions, proving resilient through the recession and leveraging the region's strong transportation infrastructure. Complementing this growth, the "eds and meds" sectors—led by anchor institutions like Cone Health, Wake Forest Baptist Health, and the major universities (UNC Greensboro (UNCG) and North Carolina Agricultural and Technical State University (NC A&T))—provided a necessary economic buffer, maintaining high-wage, knowledge-based employment and preserving the intellectual capital needed to drive future high-tech growth.

By the later years of this two-decade cycle, roughly post-2014, the focus shifted toward improving the regional quality of life to better attract and retain the skilled professional workforce required by the newly developing high-tech sectors. This period saw increased investment in downtown revitalization, particularly in Greensboro, featuring new urban housing, arts districts, and entertainment venues. These efforts began to transform the region's image from one of industrial stagnation to that of a promising urban center. Ultimately, the 2004-2024 era was a necessary, difficult transition—a strategic effort to upgrade the economic base from low-cost production to specialized, high-skill industries that successfully created the infrastructure and talent pipeline that would finally attract the next generation of industrial giants.

The next two decades promise a profound transformation for the Piedmont Triad Region. Today the Triad is aggressively repositioning itself as a powerhouse of advanced manufacturing, aerospace, and cutting-edge logistics. This dramatic shift is based on massive, confirmed capital investments—often referred to as “megaprojects”—that are structurally reshaping the regional economy and securing high-wage jobs for generations.

The PTI Aerotropolis remains at the heart of this economic revolution. This zone is set to become one of the nation’s premier hubs for modern industry. The establishment of the Boom Supersonic Overture Superfactory, dedicated to building the next generation of commercial airliners, serves as the ultimate anchor. This plant, alongside established operations like HondaJet and the planned investment of JetZero, a passenger jet-maker, guarantees a robust aerospace cluster that will demand thousands of highly skilled engineers, technicians, and maintenance professionals. The supply chain required to feed these colossal operations—everything from advanced composite materials to specialized components—will spur significant ancillary business creation throughout the region. Complementing aerospace is the growth in electric vehicle (EV) component and battery manufacturing. The significant investment being made by Toyota at the Greensboro Randolph Megasite to produce batteries for hybrid-electric, plug-in hybrid electric, and battery electric vehicles is ensuring that the Triad's manufacturing base is diversified and forward-looking.

Beyond the factory floor, the region’s central location is set to solidify its role as a critical logistics and distribution nexus for the East Coast. Sitting at the intersection of major interstates (I-40, I-85, I-73 & I-74), the Triad offers unparalleled access to major markets. This geographic advantage is drawing continued expansion from national e-commerce and distribution giants, ensuring stable growth in warehousing, supply chain management, and transportation sectors. Furthermore, the region is emerging as an attractive alternative for specialized high-tech infrastructure. The availability of land and competitive energy costs makes the Greensboro-High Point (GHP) area ripe for major data center expansion, creating a stable sector that demands reliable utility investment and technical expertise.

This influx of high-wage, high-value jobs will inevitably have a profound impact on the quality of life of the region, particularly in real estate. The Triad, long known for its exceptional affordability, will face significant upward pressure on housing prices and demand, especially in areas near the PTI economic engine. Consequently, the revitalization of urban cores in Greensboro, High Point and Asheboro will continue, fueled by new residents demanding improved amenities, entertainment, and urban density.

The 10-to-20-year outlook for the Piedmont Triad Region is overwhelmingly positive and defined by transformation. The era of sustained, capital-intensive manufacturing growth has begun. While this growth promises rising productivity, higher average wages, and increased national economic relevance, the ultimate test for the Triad will be its ability to finance and execute the massive infrastructure upgrades required to support this exponential growth and, most importantly, to ensure that the economic benefits of this profound industrial shift are distributed widely and equitably among all of its residents.

1.1.1.1 Housing Overview and Summary of Recent Studies

In 2024, Bowen National Research issued a *"Housing Needs Assessment"* report for the Carolina Core Region in North Carolina, including an in-depth assessment of Guilford and Randolph County. The governing agencies in both counties have responded with housing initiatives to meet the growing demand.

Guilford County: The Guilford County Housing Overview identifies a pressured and increasingly constrained housing market shaped by strong population and household growth, high in-migration, and steadily rising housing costs. Between 2010 and 2023, the county added over 63,000 residents, and households grew by 12.4%, contributing to elevated demand across both rental and ownership markets. Guilford County's housing stock is older than regional and statewide averages, with over 27% of all renter and owner units built before 1970, creating ongoing challenges related to aging infrastructure, deterioration, and unit quality. Substandard housing affects more than 5,500 renter households and 2,600 owner households, driven by overcrowding, incomplete plumbing/kitchen facilities, and aging structures.

Affordability is a central concern: 46.8% of renters and 19.7% of homeowners are cost-burdened, and over 28,000 households face severe cost burdens (paying more than half their income on housing). This burden is amplified by tight rental conditions—multifamily vacancies are extremely low for affordable units (Tax Credit: 2.2%, subsidized: 0.1%), with long waitlists indicating substantial unmet demand. Non-conventional rentals (e.g., single-family, mobile homes) show a vacancy rate of 0.5%, far below the healthy 4–6% benchmark. The imbalance between demand and supply is exacerbated by strong commuting patterns: more than 145,000 workers commute into the county for employment, representing a substantial potential resident population if adequate housing were available.

Overall, the document highlights a significant housing deficit marked by: (1) insufficient affordable rental supply, (2) aging and inadequate housing stock, (3) rising rents and home prices outpacing income growth, and (4) limited availability of units across all housing types. These factors necessitate strategic expansion of affordable housing, rehabilitation of older units, and development targeted near employment centers.

Randolph County: The Randolph County Housing Overview identifies a pronounced and growing housing deficit, driven by extremely low vacancy rates, an aging rental and ownership inventory, rising for-sale housing prices, and a high proportion of low-income households. Randolph County has an estimated housing gap of 10,640 units and faces risk of losing residents, as both multifamily and non-conventional rentals show near-zero availability (3.0% and 0.2% vacancy, respectively). Many residents already face affordability challenges: 40.2% of renters and 16.1% of owners are cost-burdened, with thousands paying over half their income toward housing. The county also has older housing stock—30.9% of rental units and 25.2% of owner units built before 1970—and higher-than-average levels of overcrowding and incomplete plumbing/kitchen facilities, placing more than 2,500 households in substandard living conditions.

Demand pressures are intensified by regional job growth and commuting patterns: more than 38,000 residents commute out of the county daily, while 21,568 workers commute in, representing a major untapped market for new housing. Rental affordability is limited, with nearly 70% of rental units priced under $1,000, yet the supply remains insufficient due to high occupancy and lack of new construction. The for-sale market shows low availability (113 units listed) and rising prices, further restricting options.

Key recommendations/needs identified include:

- Accelerating new housing development, particularly affordable units, to address the quantified 10,640-unit gap.
- Expanding multifamily housing, given extremely low multifamily vacancy rates (3.0%) and long waitlists.
- Rehabilitating older rental and owner-occupied homes, as large shares of the inventory are pre-1970 and subject to deterioration.
- Developing near employment hubs to capture the 21,568 daily in-commuters who represent strong potential for local residency.

Stabilizing the for-sale market by increasing attainable homeownership opportunities to reduce out-migration.

1.1.2 History and Development of Piedmont Triad Regional Water Authority

PTRWA is a wholesale drinking water supplier located in the northernmost portion of Randolph County. PTRWA provides potable water to its member governments at entry point meters to their distribution systems in accordance with a 50-year contractual agreement. The member governments who are currently allocated water from PTRWA's JFK-WTP are the cities of Archdale, Greensboro, High Point and Randleman as well as the Town of Jamestown and Randolph County.

1.1.2.1 Regional Need for Water

The regional need for an expanded and reliable water supply in the Piedmont Triad of North Carolina was a long-standing issue, with plans for a reservoir dating back to the 1930s, but it gained critical momentum from the 1970s through the 1980s due to rapid metropolitan growth and increasing future demand. As the cities of Greensboro, High Point, and surrounding communities expanded, it became evident that existing local water sources would not be adequate to sustain projected population and economic development for the next 30 to 50 years. When the Reagan administration made the decision to abandon Randleman Reservoir as a flood control project this urgency culminated in the formation of the PTRWA in 1986 by six local governments. The Authority's central purpose at that time was to undertake the Randleman Dam Project to create an 18-billion-gallon reservoir with an ultimate safe yield of 48 MGD, securing a foundational water source to ensure the region's long-term viability and to satisfy the needs of the cooperating jurisdictions.

The project was not simply about water quantity but also about quality, a factor that became increasingly prominent in the 1990s and beyond. The Deep River, which serves as the water source for the reservoir, was subjected to concerns regarding industrial waste, contaminants, and upstream wastewater treatment plant discharges. The creation of a dedicated, high-yield drinking water source, though challenged by environmental and permitting concerns, highlighted a critical regional shift towards securing a dependable, regulated, and high-quality source of water to replace or supplement fragmented, lower-capacity supplies. This regional approach, embodied by the multi-jurisdictional cooperation of the PTRWA, was fundamentally necessary to address water resource management challenges that transcended individual municipal boundaries and to support the growing demands of the Piedmont Triad.

1.1.2.2 Description of the Members and the Governance Agreement

The foundational governance of the PTRWA was established in 1986 through a Joint Governmental Agreement (JGA) and the filing of Articles of Incorporation, uniting five municipal jurisdictions—the cities of Archdale, Greensboro, High Point, Randleman, and the Town of Jamestown—and one county government, Randolph County. This initial agreement established the Authority as a public body corporate under North Carolina General Statutes (G.S.) 162A-1 et seq. and formalized the initial ownership percentages for financing and allocation of the eventual 48 MGD safe yield of the Randleman Dam Project and the JFK-WTP. The governance structure was set up with a ten-member Board of Directors appointed by the organizing political subdivisions, with an uneven distribution of seats reflecting proportional stakes (e.g., three members for Greensboro, two for High Point and Randolph County each, and one for the smaller members). A key principle embedded in the governance from the start was the requirement for a unanimous vote of all members' governing boards for any questions that would alter the allocation of water or the percentage of financial participation, ensuring that the fundamental rights of all member jurisdictions are protected and that all members are bound by a robust intergovernmental compact.

The governance construct has been continually refined and strengthened through a series of Amended and Restated JGAs in 2007, 2016, and the anticipated 2025 agreement, adapting to major capital projects and revised ownership dynamics. These successive agreements (which supersede the previous versions while reaffirming the core multi-jurisdictional structure) explicitly detail the current stakeholders'—the "Members"—rights concerning treated water allocations (Initial Firm, 2016 Expansion, and 2025 Expansion), their obligations for Water Treatment, Administration, Debt Service, and capital costs, and the process for future expansions. Critically, the current structure acknowledges that the Members own an equitable interest in all Authority assets, including the Randleman Dam and the JFK-WTP, pro rata based on their overall percentage allocation of costs. The governance remains centered on the ten-member Board of Directors, which sets a uniform rate structure for water distribution, manages the utility's operations, and is ultimately bound by the terms of the JGA, which mandates absolute, unconditional payment obligations from all Members to secure the system's financial viability, particularly for long-term revenue bond debt.

1.2 Applicable Studies in Guilford and Randolph County

1.2.1 Northeast Randolph County Growth Management Plan

The Northeast Randolph County Growth Management Plan, adopted by the County in October 2023, was reviewed to help validate the growth projections in Randolph County used in this Study. Randolph County summarized the plan as a being “a comprehensive and dynamic roadmap that sets forth a vision for the future development of Randolph County”. The plan focused on the northeast segment of Randolph County, bounded by I-73/I-74, US Hwy 64, and the eastern and northern boundaries of the county, which is projected to have significant growth around the Greensboro-Randolph Toyota Megasite.

The plan presents a growth management area map that denotes areas within the northeast section of the county as being a primary growth area, secondary growth area, rural growth area, or municipal growth area. This Study took these designations for growth areas into account when projecting growth for water and sewer service. The plan also included a water infrastructure map and sewer infrastructure map that presented existing water/sewer lines and proposed new water/sewer lines for the northeast area of the county which aligns with the recommendations of this Study.

1.2.2 Guilford County Conditional Use Plan

The July 2024 Draft Guilford County Comprehensive Plan was reviewed to help validate the growth projections in Guilford County used in this Study. Guilford County began developing their updated plan in 2023 and noted they received input from the public, key stakeholders, and municipalities. The plan includes an infrastructure map that depicts areas within the county identified as being within future growth tiers for water and sewer. Guilford County does not currently provide public water or sewer services, and the plan acknowledged the County is reliant on its partnerships and collaborations with local and regional utility providers. In addition to the infrastructure map, the future land use map in the plan provided insight into preferred development types, locations and patterns desired by the County.

1.2.3 Randolph County Water and Sewer Master Plan

The Randolph County Water and Sewer Master Plan dated December 2022 and produced by The Wooten Company was a helpful resource for this Regionalization Study. This plan created the initial funding schedule for the $85 million ARPA funding granted to Randolph County and was a guide for projects initially accepted by the utilities in Randolph County.

1.2.4 Greensboro Water Distribution Master Plan

The Greensboro Water Distribution Master Plan is a study being completed by Hazen and Sawyer to revise the population and demand projections through planning year 2050, update and calibrate the distribution system water model, evaluate the distribution system's capability to serve those projected demands, identify shortfalls in the system to meeting that demand such as new tanks, booster pump stations, or transmission lines and recommend improvement projects required to meet those demands in the system.

Our team used this study to confirm our population and demand projections and to develop an understanding of the overall needs for the City of Greensboro.

1.2.5 Greensboro Sewer Collection System Master Plan

The Greensboro Sewer Collection System Master Plan is a study being completed by Hazen and Sawyer to evaluate the sewer system capacities in the city and the ability to convey the projected flow for planning year 2050 to the treatment facility. The study includes an extensive flow monitoring program to evaluate the wet weather impacts to develop an understanding of the inflow and infiltration potential in the system, recommend improvements required to convey future flows and identify areas where sewer rehabilitation can reduce the current or future capacity limitations in the system.

The Regionalization Study team worked with the sewer collection master planning team to understand where the Greensboro flows could best be diverted to a regional facility and the volume of flow that could practically be removed without significant modifications to the Greensboro sewer collection system.

1.2.6 Regional Water and Wastewater Infrastructure Concept Plan - US 421 Corridor

The Regional Water and Wastewater Infrastructure Concept Plan for the US Hwy 421 Corridor in North Carolina (the Plan) was developed by the North Carolina Department of Environmental Quality (DEQ) to evaluate the current and future utility needs in the study area as directed in Session Law 2023-134. This Plan offers concepts where regionalization can address the concern that the current infrastructure needs along the US Hwy 421 Corridor will be unable to meet future economic and residential demand. This Plan is intended to be a high-level analysis of the region's water and wastewater needs and the potential methods to address future growth and environmental challenges in a responsible way.

The study area included the counties of Guilford, Randolph, Chatham, Lee, Harnett, Johnston, and southern Wake. The study found that the entire study area faced a significant challenge to meet the needs of the growth infused into the region and that without a collective approach to optimizing the resources available, the area could see a significant deficit in water and wastewater capacity in the future. It found that the area needs to focus on long-term regional solutions to meet the demands and to meet pending regulatory changes to remove emerging contaminants in the potable water and nutrients in the wastewater stream. Regionalization was determined to be the best path forward to keep costs affordable for the rate payers in the Carolina Core.

1.3 Water Resource Management

1.3.1 Water Availability Considerations

Expected growth through the planning horizon will increase the need for potable water in the study area. The Study defines the water supply needs and compares them to the existing availability of source water. Most of the water supply needs in the study area are met through surface water withdrawals from reservoirs. It is important to note that current water supply availability is based on prior studies, the LWSPs and the feedback of the individual utilities for reservoir safe yield. The use of DEQ's OASIS hydrologic modeling for the Cape Fear River Basin is recommended for use in planning as a predictive tool for the available water supply in future scenarios.

The City of Greensboro has commissioned a safe yield analysis that is nearing completion, the City of High Point and PTRWA have expressed interest in completing this analysis soon, it is recommended that the City of Asheboro and the City of Ramseur consider completing these analyses soon to understand the available safe yield to meet average day demands into the future.

The quantity and location of treated wastewater discharge, such as the Eastside WWTP to Randleman Lake, to surface water influences the water available for withdrawal and is accounted for in the management of water resources. It is important to note that water and wastewater quantity is tied very closely to water quality. Water reuse is one strategy that can address both water supply demands and increased wastewater loadings. By reusing treated wastewater for industrial processes or irrigation, the water supply is augmented and pollutant loadings to the receiving waters are reduced.

Based on the demand projections included in this report, the available water supply is limited in the 2050 scenario in the region. Included herein, the report will expand on the following recommendations that should be taken from this report as action items for the utilities in the region:

- The City of Asheboro is currently limited to 9.36MGD through their limitation on the grandfathered interbasin transfer allowance. The Study recommends the utility apply for an interbasin transfer certificate to allow access to the available 26 MG of safe yield in Asheboro's reservoirs to supply water to Randolph County past 2050.
- The Study recommends for all wastewater treatment facilities in the region be open to the opportunities for potable reuse in the future. Reliable potable reuse opportunities can open up discharge and nutrient capacity at existing facilities with increasing the discharge to downstream surface water sources. Finding reliable industrial needs can be beneficial for economic development and utility security past 2050.

1.3.2 Water Quality Considerations

Water quality is an important consideration in water resource management and impacts the requirements to treat water for use as well as the health of the surface waters and the ecosystems they support. Surface waters within the study area can be nutrient sensitive, impacted by contaminants of emerging concern, or have other impairments impacting their ability to receive treated wastewater with certain characteristics. Water quality has a significant impact on potential water quantity in the study area and is governed by state and federal regulation and laws.

1.3.3 River Basin and Interbasin Transfer Considerations

The study area focuses primarily on the upper Cape Fear River basin but also includes portions of the Yadkin-Pee Dee River basin in the case of the City of Asheboro. Interbasin transfer (IBT) statutory boundaries differ from watershed or river basin boundaries, but the boundaries are closely aligned in the study area. Considerations of existing IBT laws are acknowledged within the Study; however, some future scenarios past the planning year should consider other alternatives as recommended in Section 1.3.1.

1.3.3.1 River Basins

Guilford and Randolph County are primarily in the upper sections of the Cape Fear River Basin but are split between the Haw River sub-basin and the Deep River sub-basin. All utilities are located in one of these two sub-basins apart from the water supply for the City of Asheboro. The Asheboro WTP and supply reservoirs are located in the Uwharrie River sub-basin of the Yadkin-Pee Dee River Basin. A figure of the river basin delineation boundaries and a summary table of water supply and wastewater discharges are provided below.

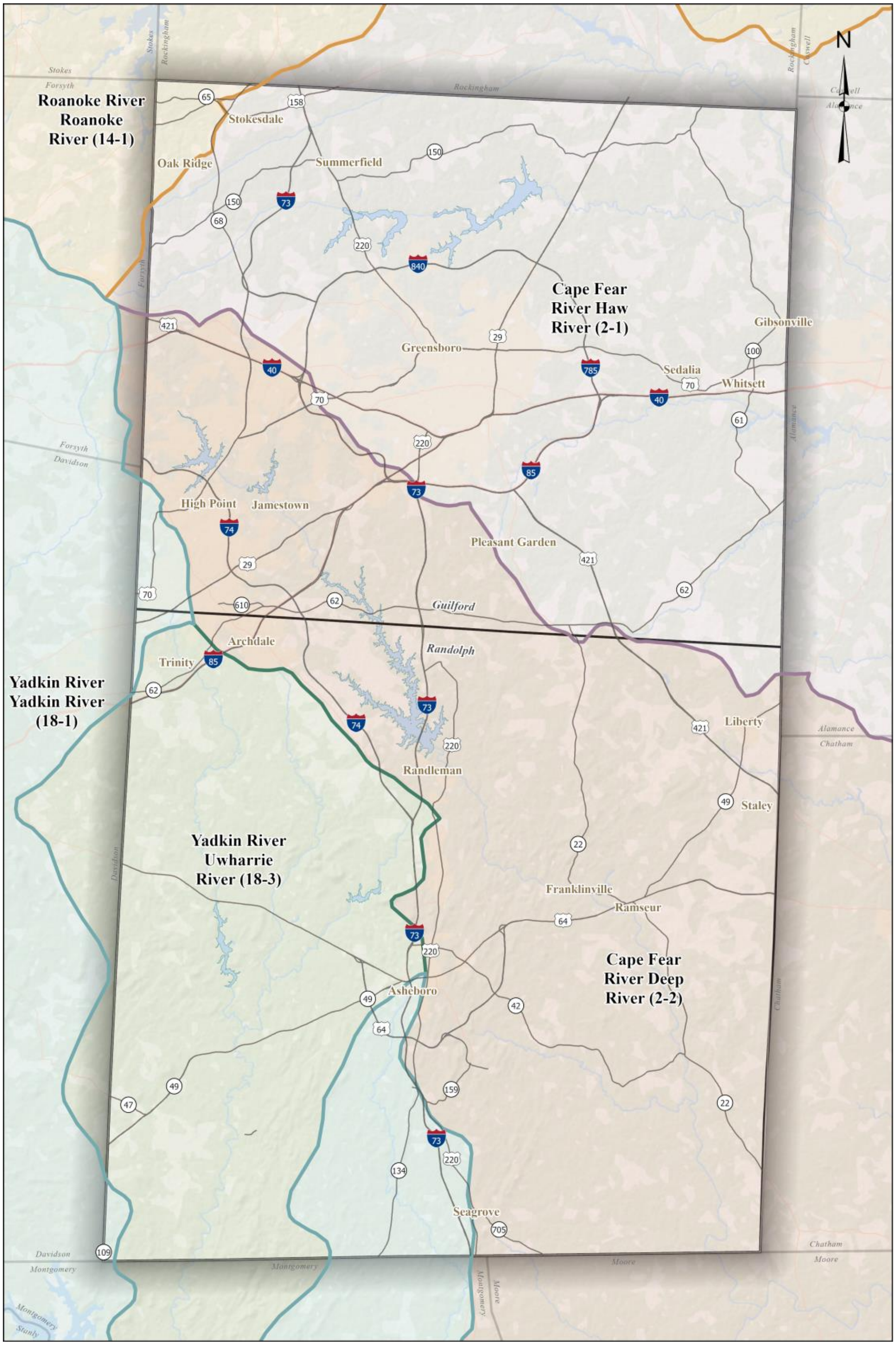


Figure 1-1: IBT Basin Boundaries

Table 1-1: Summary of Water Supply Basins and NPDES Discharge Points

Municipality	Water Supply Basin	WW NPDES Discharge Point
Archdale	Deep River (via PTRWA)	Deep River (via Eastside WWTP)
Asheboro	Yadkin-Pee Dee River Basin (via Asheboro WTP)	Deep River (Asheboro WWTP)
Franklinville	Deep River (via Ramseur WTP)	Deep River (Franklinville WWTP)
Gibsonville	Haw River (via Burlington)	Haw River (via Burlington)
Greensboro	Haw River (Mitchell and Townsend WTP) & Deep River (via PTRWA)	Haw River (T.Z. Osborne WRF)
Guilford County	-	-
High Point	Deep River (Ward WTP and PTRWA)	Deep River (Eastside WWTP)
Jamestown	Deep River (via PTRWA)	Deep River (via Eastside WWTP)
Liberty	Haw River (via Mitchell and Townsend WTP) & Deep River (via PTRWA) [1]	Haw River (via T.Z. Osborne WRF) [1]
Oak Ridge	Yadkin-Pee Dee River Basin (via Winston-Salem/Forsyth Co. Utilities) [2]	-
Pleasant Garden	Haw River (via Mitchell and Townsend WTP) & Deep River (via PTRWA) [1]	Haw River (via T.Z. Osborne WRF)
Ramseur	Deep River (Ramseur WTP)	Deep River (Ramseur WWTP)
Randleman	Deep River (via PTRWA)	Deep River (Randleman WWTP)
Randolph County	-	-
Seagrove	Yadkin-Pee Dee River Basin (via Asheboro WTP)	Deep River (Seagrove Ulah MWD)
Sedalia	Haw River (via Mitchell and Townsend WTP) & Deep River (via PTRWA) [1]	Haw River (via T.Z. Osborne WRF) [1]
Staley	-	-
Stokesdale	Yadkin-Pee Dee River Basin (via Winston-Salem / Forsyth Co. Utilities)	-
Summerfield	Haw River (via Mitchell and Townsend WTP) & Deep River (via PTRWA) [3]	-
Trinity	Yadkin-Pee Dee River Basin (via Davidson Water, Inc.)	Yadkin-Pee Dee River Basin (via Thomasville)[4]
Whitsett	Haw River (via Burlington)	Haw River (via Burlington and Greensboro)

[1] Designs and agreements are currently in process to connect to Greensboro utilities
[2] Agreements are in place to provide potable water
[3] Will provide fire protection through a groundwater supply and elevated storage tank
[4] Project underway to divert flow to the High Point – Westside WWTP

1.3.3.2 Interbasin Transfer Considerations

An IBT is defined as the withdrawal, diversion, or pumping of surface water from one river basin that is then discharged into a different river basin. Per NC G.S. 143-215.22L, a transfer of surface water discharged to the receiving basin greater than 2 MGD requires an IBT Certificate and is subject to regulatory oversight. However, a certificate is not required for facilities that were operational or under construction before July 1, 1993, as they are exempt from this requirement, allowing those facilities to transfer water at a flow equivalent to their permitted capacity on this date.

1.3.3.2.1 City of Asheboro

The City of Asheboro operates under a pre-existing "grandfathered" IBT allowance worksheet dated May 31, 2018, from the City of Asheboro to NCDEQ memorializing the ability to transfer up to 9.36 MGD from the Uwharrie River in the Yadkin-Pee Dee River basin to the Deep River in the Cape Fear River Basin. This IBT limitation for the city of Asheboro could limit the region's ability to meet the water demands past the 2050 planning year and should be included as an action item for the regional solution to allow access to the full 26 MG safe yield in Asheboro's reservoirs.

1.3.3.2.2 PTRWA

The Environmental Management Commission (EMC) approved the Piedmont Triad IBT Certificate on December 12, 1991, to transfer up to 28.5 MGD from the Deep River Basin to the Haw River Basin and up to 2.0 MGD to the Yadkin River Basin.

1.3.3.2.3 Haw River and Deep River Intrabasin Designations

Pursuant to NC G.S. 143-212 and 143-213, the Cape Fear River Basin was comprised of 6 distinct sub-basins, generally beginning at the top of the watershed at the northern limits of Guilford County as shown in Figure 1-1. The Haw River (2-1) and the Deep River (2-2) combine just downstream of Jordan Lake to form the Cape Fear River (2-3) and due to the distinct subbasin designations, the transfer of water across the subbasin boundaries discussed in the previous section for the PTRWA facility required an approved IBT Certificate. However, in 2025, the General Assembly enacted amendments to the referenced General Statutes in Session Law 2025-77 (HB 694) to eliminate the subbasin designations for the Haw River and Deep River and combined their designations into the "2-3: Cape Fear River, which includes the Haw River (2-1) and Deep River (2-2)." The removal of the limitation to transfer water and wastewater across the subbasin boundaries will provide tremendous flexibility to the region and remove a potential regulatory obstruction that would have delayed the success of the regional alternatives presented in this Study. The Legislative Findings to support this change included the following that further supports the General Assembly's commitment to utility security in the growing Piedmont Triad region.

Legislative Findings:

(1) These subbasins serve rapidly growing areas facing urgent water supply and economic development pressures.

(2) Flexibility in intrabasin transfers within the Neuse and Cape Fear major river basins strengthens drought resilience and supports emergency water management.

(3) Reducing unnecessary regulatory barriers allows municipalities and utilities in these subbasins to better plan and finance regional water infrastructure, improving affordability for consumers.

(4) Existing watershed planning and management systems within the Cape Fear River and Neuse River major river basins mitigate potential environmental impacts caused by intrabasin transfers.

1.3.4 Financial Considerations

The successful realization of a regionalized water and wastewater strategy hinges critically upon a thorough consideration of the financial capacity of public providers and the substantial cost of implementing the required infrastructure. It is a fundamental reality that the scale of investment necessary for regionalization surpasses the funding capabilities of several individual water and wastewater utilities in the study area. Consequently, the assumption underpinning the financial analysis is that achieving these vital infrastructure goals is highly unlikely without significant financial support from the state or other external funding sources. Since the creation of the Viable Utilities Program the North Carolina General Assembly has altered its strategy for providing funding support to smaller, often non-viable water and sewer utilities. The shift reflects a change in philosophy from simply subsidizing unsustainable systems toward actively incentivizing consolidation, regionalization, and long-term viability.

While this report develops detailed capital cost estimates for various regional alternatives, it is crucial to recognize the inherent limitations of these preliminary figures. These estimates are developed under several simplifying assumptions and attempts to account for existing commitments, such as already funded projects or planned local investments, but should be monitored as participation in alternative solutions is pursued. Nevertheless, by undertaking a high-level assessment of the ratepayer impacts to each stakeholder, based on these initial cost projections, critical determinations for utility providers can be informed by this analysis.

It is determined in this report that there is critical need for funding assistance for several of the impacted public water and wastewater providers. NCDEQ has fully acknowledged that while regionalization necessitates a considerable financial obligation, this investment is not merely an expense; it represents a strategic opportunity that promises significant long-term value to the participating municipalities and to the broader state economy and environment. Crucially, the full costs of not regionalizing, which include the consequences of system failure, escalating localized maintenance costs, diminished resilience, and inability to meet future growth demands—are not yet fully known and remain inherently difficult to precisely quantify in economic terms.

Therefore, as the regional concept progresses toward implementation and individual public water and wastewater providers refine their specific roles and commitments, further, more individualized financial planning studies are necessary. These next-phase studies must move beyond generalized cost estimates to include detailed assessments of rate impacts to customers, ensuring that the long-term benefits of resilient, regional infrastructure are delivered in a financially sustainable manner for the rate payers who ultimately bear the cost.

2. Study Area Definition and Water and Wastewater Providers

2.1 Study Area

The study area for this Regionalization Study includes Guilford County and Randolph County located in the piedmont region of North Carolina. In total, there are nineteen (19) incorporated municipalities in the two counties. Figure 2-1 provides a depiction of the study area.

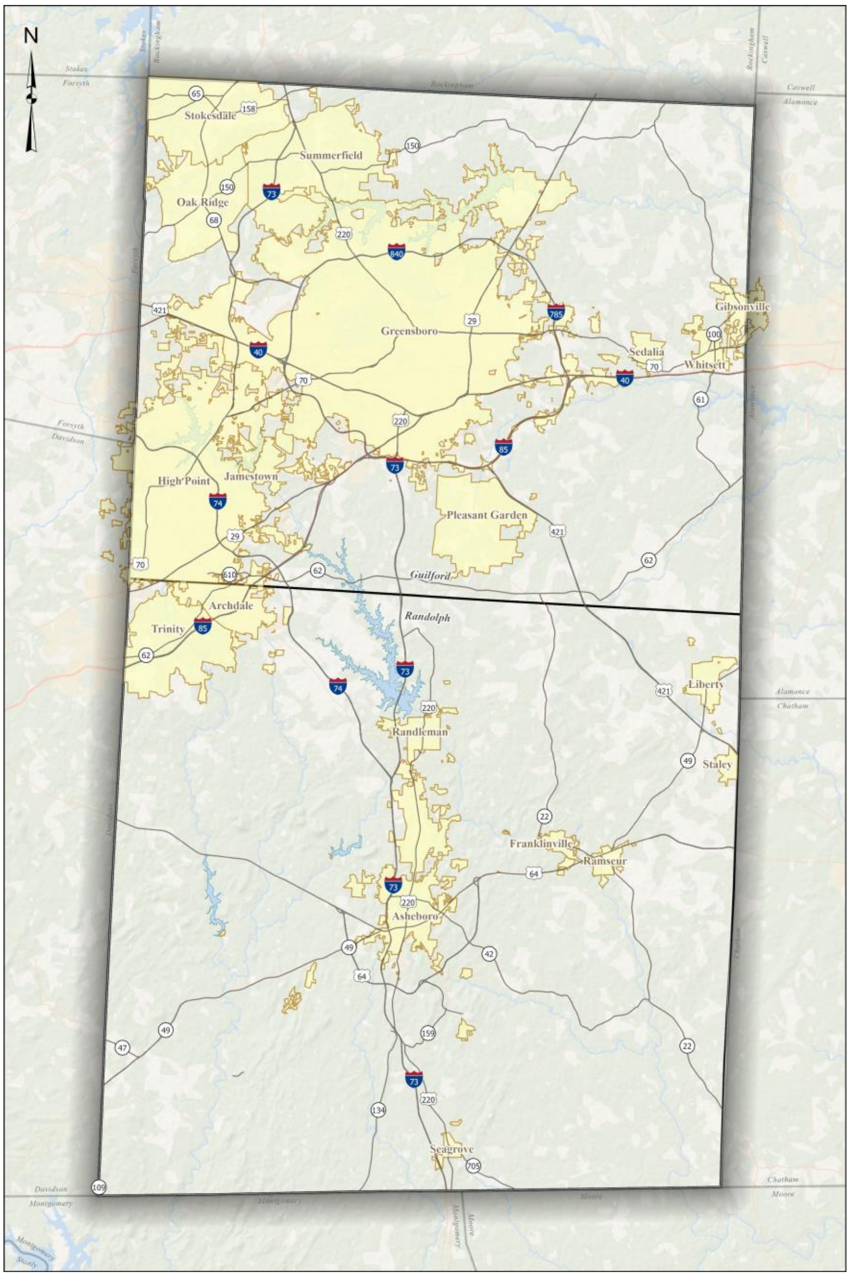


Figure 2-1: Study Area

While the study area is confined to this footprint, public water and wastewater providers within the study area are supported by systems adjacent to the study area and vice versa. As noted, this area is also home to some of North Carolina's most recent, transformative economic development projects.

2.2 Study Area Water and Wastewater Providers & Stakeholders

There are nineteen (19) providers operating utility departments within the study area. The providers are existing utilities providing water, wastewater or both services or have plans to do so in the immediate future. Table 2-1 identifies the providers.

Table 2-1: Water and Wastewater Providers

County	Public Water and Wastewater Providers
Randolph County	Retail water and sewer: Archdale, Asheboro, Franklinville, Liberty, Ramseur, Randleman, Seagrove-Ulah Metro Water District, Trinity (water via Davidson Water, Inc.) Wholesale: Randolph County, Piedmont Triad Regional Water Authority
Guilford County	Retail water and sewer: Gibsonville, Greensboro, High Point, Jamestown Retail water only: Stokesdale, Whitsett Retail water only (Future): Oak Ridge, Pleasant Garden, Summerfield, Sedalia Wholesale: Piedmont Triad Regional Water Authority

Twelve (12) utilities operate retail water and sewer systems, with Trinity operating under a regional water partner, two (2) provide retail water only, four (4) are currently in planning and design to add water service availability for potable water and/or fire protection in the case of Summerfield and two (2) operate wholesale utility services to the retail utilities.

The wastewater facilities for the utilities in the two counties discharge to the Cape Fear River Basin, specifically to either the Haw River subbasin and are subject to the Jordan Lake Watershed rules or to the Deep River subbasin. The water facilities include intake structures on one of these subbasins apart from the City of Asheboro that sources their water supply from the Yadkin-Pee Dee River Basin, more specifically, the Uwharrie River subbasin.

The Sedgefield Sanitary District operates in the southeast portion of Guilford County and discharges to the City of High Point sewer system. The SSD operates for a small established portion of the Sedgefield and Grandover neighborhoods and does not intend to expand demand. Therefore, this area was considered to be a part of the High Point growth and demand projections for both water and sewer.

2.3 Community and Stakeholder Discussions

An initial task of the Study was to identify and engage with the stakeholders in Guilford and Randolph County to understand each stakeholder's water/wastewater challenges, review pending capital improvement projects, identify any economic development pursuits, discuss the governing body's philosophy on growth and development, and understand the stakeholder's initial desires and concerns on regionalization of utilities. The project team held in-person meetings with each of the following municipal stakeholders from Fall 2024 through Spring 2025:

- Guilford County
- City of Archdale
- City of Greensboro
- City of Randleman
- Randolph County
- City of Asheboro
- City of High Point
- Town of Franklinville
- Town of Jamestown
- Town of Oak Ridge
- Town of Ramseur
- Town of Liberty
- Town of Pleasant Garden
- Town of Summerfield

In addition to the municipal stakeholders listed above, the project team engaged with economic developers, trade associations, and local, state and federal elected leaders throughout the course of the Study.

2.3.1 PTRWA Steering Committee

The Steering Committee for Water & Wastewater Regional Capacity Development was launched as a high-level, multi-stakeholder advisory body by the PTRWA Board, in partnership with key stakeholder groups throughout the Triad Region. The intent of the Steering Committee was to provide input, advice, and advocacy to the project team conducting the comprehensive Regionalization Study for PTRWA.

Leadership: The Committee is notably co-chaired by Jon Hardister (President of Triad Real Estate and Building Industry Coalition: TREBIC) and David Parrish (PTRWA Board Member) working alongside Greg Flory (PTRWA Executive Director).

Membership: The Committee is designed as a prominent coalition of stakeholders, including:

- Elected Officials and Administrators: Mayors, City/County Managers, and Council/Commission members from key municipalities (Greensboro, High Point, Asheboro, and Randolph County).
- Economic Development Leaders: Representatives from the Greensboro and High Point Chambers of Commerce, Randolph County Economic Development, and TREBIC.
- Technical Experts: Representation from consulting firms (Raftelis, Hazen and Sawyer) and PTRWA staff.
- Legislative Liaisons: Staff representing State and Federal elected officials.

Mission and Focus:

The Committee's mission is:

> *To be a prominent coalition of stakeholders engaged in arriving at an optimized regional approach to enhance water and wastewater utility capacity development and service availability in support of community well-being, sustainable growth, job creation and economic development in Guilford and Randolph counties.*

The primary focus is to advance enhanced regional water and wastewater utility capacity and service availability across Guilford and Randolph Counties to meet the substantial demands driven by current and projected economic development projects (e.g., the Toyota, Ross Distribution, Wolfspeed, and JetZero). This involves moving away from the current "patchwork" approach toward long-term, systemic, and sustainable regional solutions.

Committee's Core Objectives:

The committee operates with four key objectives designed to support the regionalization initiative:

- **Organize**: Form a strong coalition of stakeholders to promote the enhancement of PTRWA's regionalization initiative.
- **Engage**: Meet with key policy makers and community leaders to understand community perspectives.
- **Educate**: Assist with educating and informing stakeholders of the regional need.
- **Advocate**: Stay actively involved and advocate for support and assistance from Local, State and Federal Agencies.

Committee's Top Priorities:

Based on discussions, action items, and the context of the PTRWA Regionalization Study initiative, the Committee's top priorities are:

- **Assist with the Launching and Guiding the Regional Regionalization Study:** Drive the PTRWA-led Regionalization Study (an effort being led by Hazen, Raftelis and The Wooten Company) to identify the "best path forward" for enhanced regional capacity, focusing on technical feasibility, financial sustainability, and optimal governance structures.
- **Securing Regional Unity and Collaboration:** Achieve a unified and cohesive commitment among the "Big Five" jurisdictions (Guilford County, Greensboro, High Point, Randolph County, and Asheboro) to adopt a regional approach, including focused meetings with City/County Managers to ensure alignment and shared messaging.
- **Comprehensive Stakeholder Engagement and Education:** Implement a broad engagement strategy involving all levels of government (local, state, federal), community leaders, and the public to raise awareness, gather input, and build political support for the multi-billion dollar (estimated) regional capacity investments necessary to succeed.

- **Developing a Robust Legislative and Funding Strategy:** Advise toward the crafting of a strong legislative agenda and actively engage Local, State, and Federal agencies to secure significant grants, loans, and regulatory relief necessary to implement the plan produced in this Regionalization Study and ensure that costs are distributed fairly and equitably, rather than solely falling on current ratepayers.
- **Economic Justification and Impact Analysis:** Ensure integration of an economic impact study (leveraging UNCG's Bryan School of Business Capstone Program) into the Regionalization Study effort to clearly articulate the economic benefits (job creation, sustainable growth, and community well-being) of regionalization and the costs of inaction.

2.3.2 UNCG Bryan School of Business Capstone Summary

The PTRWA Regionalization Study effort was formally supported by academic research from the UNCG Bryan School of Business and Economics Capstone Team. The UNCG team's objective was to provide a data-driven economic, environmental, and societal benefit analysis to justify a more regionalized approach to water and wastewater capacity for Guilford and Randolph Counties. Their comprehensive study, which included market analysis, cost comparisons, and case studies of successful and failed utility systems, concluded that a fragmented, local approach is unsustainable in the long term. Specifically, the analysis highlighted that smaller municipalities operating independent wastewater treatment plants incur significantly higher per capita costs compared to the larger, quasi-regionalized systems in the Triad Region, underscoring the strong economic incentive for enhanced regional cooperation.

The research strongly validated that a regionalized wastewater solution, in addition to the continued regional approach for water is a viable, cost-effective path forward, offering critical economies of scale and long-term resilience that supports continued economic expansion. By partnering with PTRWA, participating municipalities gain access to essential financial benefits, regulatory compliance support, and modern infrastructure required to meet the demands of large-scale economic development, as evidenced by major projects in the Triad. Furthermore, the analysis provided a cautionary tale by detailing the consequences of deferred maintenance and inadequate systems in other cities—including economic decline, public health risks, and regulatory setbacks—underscoring the critical importance of proactive, strategic investment.

The overall findings of the Capstone Team were that regional collaboration secures the future of member communities by reducing the financial and operational burden of managing complex utility systems, thereby enhancing service delivery, affordability, and the long-term quality of life for all Triad residents within Guilford and Randolph Counties.

2.4 Current Financial Review of Water and Wastewater Providers

The current fragmentation of water and sewer utility services across small, divided communities presents significant, interconnected financial challenges that threaten the long-term affordability and sustainability of these essential services. These challenges are particularly acute in systems that lack the economies of scale necessary to effectively manage modern infrastructure demands and regulatory compliance. Several of the most significant challenges facing the communities in Guilford and Randolph County are summarized as follows:

1. **Cycle of Deferred Maintenance and Financial Strain:** One of the most pervasive financial challenges facing small utilities is the deferral of necessary capital improvement and renewal and replacement projects. While this strategy allows utilities to avoid rate increases in the short-term it guarantees exponentially higher repair costs, exposes systems to failures, and emergency fixes in the long run, leading to spikes in operational spending.

   - **Lack of Economies of Scale –** Smaller service areas inherently face higher fixed costs per customer. They cannot spread the substantial costs of specialized equipment, highly skilled personnel (e.g., licensed engineers, certified operators), and complex planning across a large rate base. This inefficiency often leads to thin operating margins. The NCDEQ recognizes this in their Viable Utility Program assessment criteria, scoring a point against any utility systems serving less than 10,000 people, which is true of all but three utilities in this Study.

   - **Pressure to Suppress Rates:** Driven by a strong interest in mitigating ratepayer impacts, often in economically sensitive communities, utility boards and local governments frequently prioritize keeping current rates low. This political and public pressure directly conflicts with the need to generate sufficient revenue to cover full system costs, including preventative maintenance and future capital replacement.

2. **Constraints on Sustainable Growth and Resource Capacity:** Modern utility management must navigate the reality that water and wastewater resources are finite, and the ability to expand services is constrained by regulatory, environmental, and technical limitations.

   - **Stringent Regulatory Restrictions:** Environmental regulations (e.g., those governing nutrient discharges, watershed protection, and drinking water quality standards) often impose significant, non-negotiable costs on utilities. Small systems frequently lack the financial capacity and technical expertise to implement the advanced treatment technologies required to comply with these rules.

   - **Inability to Realize Capacity Needs:** A growing region requires greater wastewater treatment capacity and reliable water sourcing. However, a fragmented approach often means that individual utilities either cannot obtain the necessary permitting for plant expansions, or they are unable to finance the large-scale upgrades needed to meet regional demand. Furthermore, the capacity that is available may be severely limited by previous regulatory actions which creates an inability to obtain new permits. These restrictions transform a regulatory and technical capacity problem into a severe economic constraint, as new residential or commercial development cannot be serviced.

3. **Inefficient Financial Structure or Borrowing Limitations:** Small and segmented utilities are financially disadvantaged when seeking capital for necessary improvements and face a higher per capita cost for providing the same level of utility service.

   - **Higher Cost of Capital:** Due to a smaller revenue base, limited financial reserves, and a less diverse ratepayer base, small utilities often present a greater financial risk to lenders. This translates into lower credit ratings and consequently higher interest rate to borrow funds compared to larger, regional systems.

- **Inadequate Rate Structures:** Many small utilities fail to employ professional rate-setting practices that incorporate cost-of-service, capital replacement costs, and reserve funding. Reliance on ad-hoc or politically influenced rate adjustments prevents the establishment of stable, predictable revenue streams necessary for long-term financial planning and investment.

In summary, the decentralized structure of utility service in small communities creates a systemic trap: the desire to maintain short-term affordability through suppressed rates forces the deferral of essential capital maintenance. This deferral, combined with the difficulty of meeting complex regulatory demands and accessing affordable capital, severely undermines the long-term viability of the utility, ultimately leading to unsustainable service and higher costs for future generations of ratepayers. Regionalization initiatives like the ones devised in this PTRWA Regionalization Study seek to overcome these fundamental challenges by leveraging economies of scale, professionalizing financial management, and establishing a unified platform for strategic infrastructure investment and regulatory compliance.

3. Water Demand and Wastewater Flow Projections

3.1 Methodology for Water Demand and Wastewater Flow Projections

This Study developed water and wastewater projections for each municipality through the year 2050. The developed projections relied on existing datasets and other sources, including: LWSP developed by individual systems and submitted to NCDEQ's Division of Water Resources (DWR), population growth from the latest Traffic Analysis Zone (TAZ) performed by the Piedmont Authority of Regional Transportation (PART), previously completed or ongoing planning studies completed for or by public water and wastewater providers, input from local representatives familiar with growth not captured in existing available data, and projections from the North Carolina Department of Commerce (NC Commerce) for major incentivized economic development projects. In many cases, the growth and future water and wastewater needs are dynamic due to the rapidly changing development conditions, and the imperfect understanding of how this development will impact the study area.

Each utility is assigned a gallons per capita demand (gpcd) based on historical demands or demands of a similar sized utility for future providers. The assigned per capita demand is used to predict total demand for each utility provider for years 2030, 2040, and 2050 is done with the following equation.

$$D_T = D_{2022} + (\Delta P_{T-2022} \times GPCD)$$

where GPCD is gallons per capita demand and $\Delta P_{T\text{-}2022}$ is the change in population between year T and 2022.

The 2022 demand is from the LWSPs, and the change in population comes from a combination of input from TAZ study, the LWSP completed by each utility, individual meetings with utility stakeholders and communities, and other studies as described in Section 1.

3.1.1 Local Water Supply Plans

The LWSP for Guilford and Randolph County service providers were used to develop a per capita demand that is representative of the average daily demand (ADD). Because of differences in system efficiencies and customers, the ADDs were adjusted individually for each provider. Per capita demand was split into three categories: residential and commercial, institutional and industrial, and process and non-revenue. Table 3-1 below contains the average of these categories of demand for the LWSPs from 2019 to 2023 for all current service providers. For most municipalities, summing up the categories developed a historical per capita demand that provided an accurate value to project future demand. For municipalities with system process and non-revenue demands greater than the average of the non-revenue demand for all municipalities (25 gpcd), the demand for this category was capped at the average. The current losses are quite excessive if they are more than 25 gpcd, and it is assumed that new development will not have the same rate of water system leakage in the future.

The analysis summarized in Table 3-1 was completed on an individual utility review, combining the best available information from our stakeholder meetings and regional knowledge. Adjustments made to each location were required in an effort to not project needs that were too aggressive requiring premature upgrades but provide projections we could confidently move forward for regional planning. Additional studies and adjustments may be required to further refine these projections if additional information becomes available that would change the assumptions in this report.

The following service areas' per capita demands were adjusted individually depending on available data and growth:

- Greensboro – Hazen is completing a water distribution and sewer collection system master plan for the City of Greensboro which included additional analysis and demand projection tasks. The future industrial and institutional demand for the city was included as a surplus due to the City's understanding of the specific need for the area.
- Jamestown – The industrial and institutional demands for this area were omitted due to the limited opportunity for this specific growth in the area.
- Randleman – The per capita demand was adjusted use the 2023 historical demand because of the closing of a key user in Randleman's system.
- Oak Ridge, Pleasant Garden, Sedalia, Summerfield, and Trinity – These municipalities do not presently provide water services and for future projections are all set equivalent to the Greensboro per capita demand.
- Randolph NA and Guilford NA are defined as the areas of the two counties that are not currently included within municipal boundaries. The per capita demand for these two areas was set as the average of the per capita demands for existing utilities in their respective counties.

Table 3-1: Per Capita Water Demand Assumptions by Service Area

Service Area	Total Per Capita Demand from LWSP (gpcd)	Per Capita Demand Used for Future Projections (gpcd)	Comments
Archdale	73	73	
Asheboro	177	153	Capped the System Process + Non-Revenue to 25 gpcd for future growth
Franklinville	98	90	Capped the System Process + Non-Revenue to 25 gpcd for future growth
Gibsonville	69	69	
Greensboro	107	75	Adjusted based on detailed analysis in the Water Distribution Master Planning Project
Guilford NA	-	85	Developed from the average of Guilford County Utilities
High Point	110	106	Capped the System Process + Non-Revenue to 25 gpcd for future growth
Jamestown	75	62	Removed Industrial and Institutional Demand from Per Capita Demand and added
Liberty	88	88	
Oak Ridge	-	75	Developed from the Greensboro gpcd
Pleasant Garden	-	75	Developed from the Greensboro gpcd
Ramseur	167	116	Capped the System Process + Non-Revenue to 25 gpcd for future growth
Randleman	187	120	Reduced historical gpcd due to closing of the largest industrial water user
Randolph NA	-	102	Developed from the average of Randolph County Utilities
Seagrove	73	73	
Sedalia	-	75	Developed from the Greensboro gpcd
Stokesdale	114	114	
Summerfield	-	75	Developed from the Greensboro gpcd
Trinity	-	75	Developed from the Greensboro gpcd

3.1.1.1 Peaking Factors

To calculate the maximum daily demand (MDD), peaking factors were calculated from the historical ratios of MDD to ADD in the LWSPs. The 2022 ratio of the MDD to ADD was used as the baseline MDD factor. This factor is multiplied by the forecasted ADD values for 2030, 2040, and 2050 to project future MDD. Ratios outside the range of 1.5 to 2 were rounded up or down on the assumption that ratios above 2 are significantly higher than conventional maximum demand levels and below 1.5 was not conservative enough based on the comparison to other aging utility infrastructure in the area. Therefore, based on our industry experience, the range of MDD peaking factors were bracketed for the region.

Service areas that do not currently have a LWSP were assigned a ratio of 1.5 to be in line with the expectations for newer water systems with minimal leakage expectations.

Table 3-2 below contains the historical MDD peaking factor and the adjusted factor used for final calculations.

Table 3-2: MDD Factor Assumptions by Service Area

Service Area	2022 ADD (MGD)	2022 MDD (MGD)	MDD Factor	Adjusted MDD Factor
Archdale	0.89	1.81	2.03	2.00
Asheboro	4.97	7.02	1.41	1.50
Franklinville	0.11	0.12	1.14	1.50
Gibsonville	0.61	0.73	1.19	1.50
Greensboro	34.79	48.31	1.39	1.50
Guilford NA	-	-	-	1.50
High Point	13.32	15.00	1.13	1.50
Jamestown	0.46	0.54	1.16	1.50
Liberty	0.26	0.31	1.21	1.50
Oak Ridge	-	-	-	1.50
Pleasant Garden	-	-	-	1.50
Ramseur	0.50	1.51	3.05	2.00
Randleman	0.77	1.98	2.56	2.00
Randolph NA	-	-	-	1.50
Seagrove	0.18	0.21	1.20	1.50
Sedalia	-	-	-	1.50
Stokesdale	0.15	0.26	1.71	1.71
Summerfield	-	-	-	1.50
Trinity	-	-	-	1.50

3.1.2 Recent and Ongoing Studies

In many cases, the utility provider had previously completed or has ongoing planning studies that were referenced in Section 1 and relied upon for adjustments to, or replacement of, the projections included in the LWSP. Where they existed, they were used as a source of best-available information to define the water and wastewater needs. Utilities should consider updating the LWSPs to account for the growth discussed in this Study.

3.1.3 Economic Development Sites

3.1.3.1 State Incentivized Projects

The activity at North Carolina's economic development sites is an important driver for growth and demand considerations in this Study. The Study highlights five recently incentivized economic development projects within the study area with two of these projects initiating after the NCDEQ US

Hwy 421 Corridor Concept Plan. Table 3-3 identifies the industry partners associated with these projects within the study area.

Table 3-3: Recently Incentivized Economic Development Projects

Site Name	Location	Industry Partner
Greensboro – Randolph	Liberty (Randolph County)	Toyota
Piedmont Triad International Airport	Greensboro (Guilford County)	Boom Supersonic
Piedmont Triad International Airport	Greensboro (Guilford County)	JetZero
I-74 Industrial Center	Randleman (Randolph County)	Ross Distribution
Chatham Advanced Manufacturing Site	Siler City (Chatham County)	Wolfspeed

The projects identified in Table 3-3 at these sites requires water and wastewater services for the specified project as well as the associated businesses (indirect) that may choose to co-locate adjacent to these industries and for complementary businesses (induced) and service industries that may be attracted by the concentration of the customer base associated with the overall development.

Water and wastewater demand associated with this development activity was estimated for the industries themselves, the associated and complementary industries and businesses, and the new employee job growth using the methodology discussed below.

3.1.3.2 Associated and Complimentary Business Growth

It is difficult to predict the actual demands of the identified direct, indirect and induced businesses that could be created within the 2050 planning year with total accuracy. Several factors can impact infrastructure and human capital demands including the expansion of existing businesses or additional large economic development projects locating within the study area. One large, transformative project, such as JetZero, can significantly impact available capacities within the study area. When considering economic impacts and infrastructure needs, partners will benefit from a thorough evaluation of this report and the availability of water and wastewater during the business recruitment and expansion process.

In general, the contract amounts listed in existing Economic Development Agreements (EDAs) as reported by the utility for the planned incentivized industrial development were used to project the water and wastewater needs for the projects unless later, more reliable information was available, warranting a different projection. The contract amounts in the EDAs may represent minimum commitments over a relatively short time period as compared to the 2050 planning year.

Water and wastewater capacity to accommodate possible future expansions of these recently incentivized projects are not directly considered by this Study; however, planning projections generally do anticipate continued economic growth in the vicinity of these sites and may be adequate for expansions. It should also be noted that many of the industries North Carolina is recently attracting have the potential to require significant water and wastewater quantities with considerable waste treatment needs. The assumed demands for the recently incentivized projects in the study area are provided in Section 3.1.5.2.

Each incentivized industry is anticipated to spur the development and growth of indirect associated and complementary businesses located near the listed economic development sites that will have their own associated water and wastewater demands. The demands of these indirect or induced businesses are ultimately unknown. It might be assumed that most induced businesses will have much smaller demands than those associated with identified developments in the Study. However, some indirect businesses are likely to have significant water and wastewater demands of their own. In some areas within the study area, these indirect and induced businesses have been updated and incorporated into the LWSP, while others were adjusted based on best available data as indicated in Section 3.1.5.2.

3.1.3.3 New Job Growth Demands

In the NCDEQ Hwy 421 Corridor Concept Plan, NC Commerce developed new job growth projections for each direct, indirect and induced economic activity associated with the incentivized industrial developments. These industries are expected to bring a total of approximately two and half times the number of jobs to North Carolina than the direct jobs announced. An update to the NC Commerce model was not available for this Study, but an estimation was made for the population impacts associated with each economic development incentive. The multiplier for Boom Supersonic was assumed for JetZero's projections and the average multiplier was used for Ross Distribution. Table 3-4 below reflects the number of direct, indirect and induced jobs these incentives are anticipated to bring to North Carolina.

Table 3-4: Total New Direct, Indirect, Induced Jobs per project

Total New Jobs	Industry Partner and Location					
	Toyota Randolph	Boom Supersonic Guilford	JetZero Guilford	Ross Distribution Randolph	Wolfspeed Chatham	Totals
Direct	3,875	1,761	14,560	852	1,802	**22,850**
Indirect	1,878	1,327	*10,970*	*650*	2,476	***17,301***
Induced	2,708	1,586	*13,113*	*743*	2,196	***20,346***
Total	8,460	4,674	*38,643*	*2,245*	6,475	***60,497***

* Italicized values are not supported by NC Commerce data and are estimates

A total of 22,850 new employees is predicted to move into the study area in the next 10 years to meet these industrial needs. The economic model used by NC Commerce assigns this new job growth to the geographic area surrounding each incentivized project to represent the proportion of the new employees within one of four commuting distances of the developments: less than 10 miles, between 10 and 24 miles, between 25 and 50 miles, and beyond 50 miles.

To plot the residential impact these direct, indirect, and induced jobs would have on the region, Hazen converted the new job growth projections to a new residential population based on the assumption that each employee would represent a household of 2.5 people. The additional population estimates totaled approximately 150,000 people for the study area and were distributed by county based on proximity to the respective sites within 24 miles. Distribution of population within each county was further refined based on a weighting developed according to the 2050 population for each utility stakeholder prior to the addition of new job growth. Demands for new residents beyond 24 miles from the sites are assumed to be included in existing LWSPs or other local projections. The LWSPs appears to account for the additional population associated with Toyota, Boom Supersonic and Wolfspeed for the two counties, however, adjustments in the demand projections were made for industrial and commercial growth to account for JetZero and Ross Distribution.

3.1.4 Traffic Analysis Zone Review

To develop water demand forecasts for Guilford and Randolph Counties, population predictions from the Metropolitan Planning Organization (MPO) provided the basis for spatially distributed population growth. The Piedmont Triad Regional Model (PTRM) distributed the population and household spatially down to the Traffic Analysis Zone (TAZ) level.

The underlying population and household size data for the model was developed at the county level. Population for the forecasted years (2030, 2040, and 2050) was sourced from the 2022 NC State Demographer published trends. Household sizes for the forecasted years were estimated at the county level by assuming a continuation of the linear trend in population per household between the 2010 and 2020 censuses. The forecasted number of households for each county was then calculated by dividing population by household size. Both Guilford and Randolph counties experienced a decrease in persons per household between 2010 and 2020, causing the estimated household size by 2050 to decrease to 2.21 and 2.19 persons per household respectively.

Model base year (2022) household and population distribution reflected observed population density by TAZ areas, however. The use of localized household size for the base year and generalized-county level household size for the forecasted years resulted in negative population growth in several TAZ areas.

For the purposes of this Study, population growth in each TAZ was assumed to stay constant if the TAZ data suggested a negative growth. Negative population growth between years was instead assumed to be none and updates to totals were propagated to subsequent years. Table 3-5 provides example TAZ parcels and their corresponding corrections. The population projections remain when the population is increasing (e.g. TAZ 1 from 2022 to 2030). But when the population decreases between the population of the previous year and the projection of the next, the projected year's population becomes the previous year's population as seen by TAZ 2. For a given year, no TAZ unit could have a population lower than any of the population forecasts for previous years.

Table 3-5: TAZ Population Correction Example

	2022 Population	2030 Population	2040 Population	2050 Population
TAZ 1	50,000	60,000	55,000	65,000
Corrected TAZ 1	50,000	60,000	60,000	65,000
TAZ 2	50,000	47,000	49,000	48,000
Corrected TAZ 2	50,000	50,000	50,000	50,000

With these corrections, the total population of the counties increased more each decade from the original total county population from the TAZ data as seen in Table 3-6. Guilford County overall had higher percentage change in all three forecast years than Randolph County did. The overall population change for the study area was less than five percent and less than three percent in 2050. This provided confidence that the adjustments were not creating unreasonable changes in population while removing the original TAZ data decreases.

Ultimately, our analysis suggested this was an oversight in the TAZ population projections and not a reflection of the actual growth anticipated in this area. Based on the reasonable sensitivity analysis described previously and the consistent growth resulting from our adjustments, we believe this to be a justified modification of the population projection data.

Table 3-6: TAZ Population Adjustments by County

County	Year	Original	Adjusted	Change	Percent Change
Randolph	2022	143,985	143,985	-	-
	2030	150,112	151,101	989	0.66%
	2040	156,880	158,370	1,490	0.95%
	2050	163,818	165,740	1,922	1.17%
Guilford	2022	518,430	518,430	-	-
	2030	549,639	578,651	29,012	5.28%
	2040	599,989	622,849	22,859	3.81%
	2050	648,071	667,662	19,592	3.02%
Total	2022	662,415	662,415	-	-
	2030	699,751	729,752	30,001	4.29%
	2040	756,869	781,218	24,349	3.22%
	2050	811,889	833,402	21,514	2.65%

To develop projections for the demand for each service provider, the populations from LWSPs were used as the baseline population in 2022 to ensure projections align with accurate 2022 demand. Each of the TAZ polygons was assigned a representative service provider, and the composite population of the parcels for that service provider were used to calculate the growth in population between 2022 and the forecast years. Thus, the population growth came from the TAZ data but retained the real 2022 demand from LWSPs as the starting point for demand growth. Some exceptions were made to reconcile mismatches of populations in the TAZ parcels and the LWSPs, especially with utilities that do not currently function as a service provider but may do so in the future. The following section provides details of the individual service area population adjustments.

TAZ parcels are each assigned to a service provider based on a qualitative assessment of what municipality boundaries it is contained by what service lines currently exist, the evaluation of any capital projects planned for the region, and the understanding of the utility provider best positioned to serve the TAZ parcel.

We then evaluated the comprehensive land use plans by Guilford County, Randolph County, the City of Greensboro and our stakeholder meeting conversations to develop a growth strategy plan for each utility and incorporated the TAZ parcels by planning years 2030, 2040 and 2050. We worked closely with the Steering Committee to confirm our assumptions were aligned with the understanding of the planners and developers and then used those assignments to develop the future growth projections. These growth projections by planning year are depicted in Figure 3-1, Figure 3-2, and Figure 3-3 in the following section.

3.1.5 Summarized Population Growth, Industrial and Commercial Growth

3.1.5.1 Population Growth

As a result, the population growth of each utility is summarized below with notes regarding specific adjustments that were made to individual utilities. Due to the size of TAZ parcels, many times smaller towns' populations were misrepresented when they only intersected a few TAZ polygons rather than fully encompassing them or vice versa. This led to some cases where the growth from TAZ parcels was less than the growth shown in the LWSPs. Thus, LWSP populations were used for forecasted populations in place of TAZ growth adjustments to conservatively assume a greater rate of increase in residential and commercial demand. Jamestown, Seagrove, Stokesdale, Ramseur, and Trinity all have population growth following LWSPs for this reason. Trinity does not have an LWSP due to their services being provided by Davidson Water, Inc. (DWI), but their population comes from DWI's LWSP and reports 16% of their service population is in Randolph County. Since Trinity is the recipient in Randolph County, the Trinity population is roughly 16% of the Davidson County service area population.

The municipalities that currently do not have utility systems but have developed plans to tie to a system soon were included in the demand projections for the future planning years. These areas include Guilford and Randolph Counties, Oak Ridge, Pleasant Garden, Sedalia, and Summerfield. For these utilities, assumptions were made for the existing population and future developments. Scenarios for the existing population to tie into a new potable water system include failing individual and neighborhood well and distribution systems, contaminated drinking water aquifers, and organic expansion of the water system to serve safe drinking water supplies. Those assumptions for each utility are included in the notes column of Table 3-7.

TAZ parcels outside the service area for any municipality were assigned to Guilford and Randolph unincorporated populations. It is assumed that some of those populations outside of a municipality will be annexed into the closest municipality and thus, those demands were included in the future planning years for those utilities. However, we also anticipate that some developments will remain in the unincorporated portions of the counties and will tie into public water supply systems through interlocal agreements and served through outside rate structures. For both Randolph and Guilford County, the 2022 populations served are set to zero, but the existing population that is serviced grows to 5%, 10%, and 20% in 2030, 2040, and 2050. Those demands, although assigned to the County, are included in the projections for the municipality best suited to serve them.

Table 3-7 on the following page details the populations of each municipality to be served by the water and wastewater systems in the region.

Figure 3-1, Figure 3-2, and Figure 3-3 illustrate the growth and the corresponding TAZ parcels that will be incorporated to the utilities for years 2030, 2040, and 2050. (population figures without water and sewer). Each of these has been adjusted according to the method described above to remove decreases in population. Greensboro, High Point, and Asheboro continue to have the densest populations with the density decreasing outward from their municipal boundaries. Additionally, the corridor along I-73/US Hwy 220 is forecasted to see increasing population density. While little significant increase in population density is seen in these figures in the northwest corner of Guilford County, that is expected to be one area of large growth particularly for new residential development that will be served by a public water supplier and the adjustments discussed above are to account for this.

Table 3-7: Service Area Population Projections

Service Area	Population Served by the Utility in the Proposed Planning Year				
	2022	2030	2040	2050	Notes
Archdale	12,431	14,429	16,009	17,722	• Used LWSP for population served • Used TAZ Growth for future years
Asheboro	27,473	29,954	33,055	36,155	• Adjusted to reflect population served
Franklinville	1,196	1,258	1,335	1,412	• Adjusted to reflect population served
Gibsonville	8,920	10,918	13,975	17,888	• Used 2022 LWSP Projections
Greensboro	320,756	368,579	401,475	434,988	• Adjusted to reflect population served
Guilford County	-	1,804	3,550	6,974	• 2030 -Reflects 5% of 2022 population served plus 20% of future growth • 2040 – Reflects 10% of 2022 population + 20% of future growth • 2050 – Reflects 20% of 2022 population + 20% of future growth
High Point	116,270	121,237	130,613	139,011	• Used 2022 LWSP and future TAZ growth projections
Jamestown	6,543	10,000	10,500	11,000	• Used LWSP Growth Projections
Liberty	2,676	3,017	3,443	3,869	• Adjusted to reflect population served
Oak Ridge	-	2,342	3,842	5,009	• 2030 -Reflects 25% of 2022 population served plus 50% of future growth • 2040 – Reflects 35% of 2022 population + 100% of future growth • 2050 – Reflects 50% of 2022 population + 100% of future growth
Pleasant Garden	1,823	2,243	2,698	3,850	• 2022 – Reflects 25% of existing population to be served • 2030 – Reflects 30% of 2022 population served + 50% of future growth • 2040 – Reflects 35% of 2022 population + 100% of future growth • 2050 – Reflects 50% of 2022 population + 100% of future growth
Ramseur	2,893	2,951	3,260	3,565	• Used LWSP Growth Projections
Randleman	4,631	5,195	5,900	6,605	• Adjusted to reflect population served
Randolph County	-	2,188	4,342	8,647	• 2030 -Reflects 5% of 2022 population served + 10% of future growth • 2040 – Reflects 10% of 2022 population + 15% of future growth • 2050 – Reflects 20% of 2022 population + 25% of future growth
Seagrove	2,413	2,462	2,719	2,974	• Used LWSP Growth Projections
Sedalia	1,687	2,164	2,758	3,484	• Assumed 75% of population will be served initially and all future growth
Stokesdale	1,495	1,586	2,132	2,781	• Used LWSP Growth Projections
Summerfield	-	2,985	4,557	6,251	• 2030 -Reflects 25% of 2022 population served + 50% of future growth • 2040 – Reflects 35% of 2022 population + 100% of future growth • 2050 – Reflects 50% of 2022 population + 100% of future growth
Trinity	7,236	7,445	7,880	8,341	• Used LWSP Growth Projections

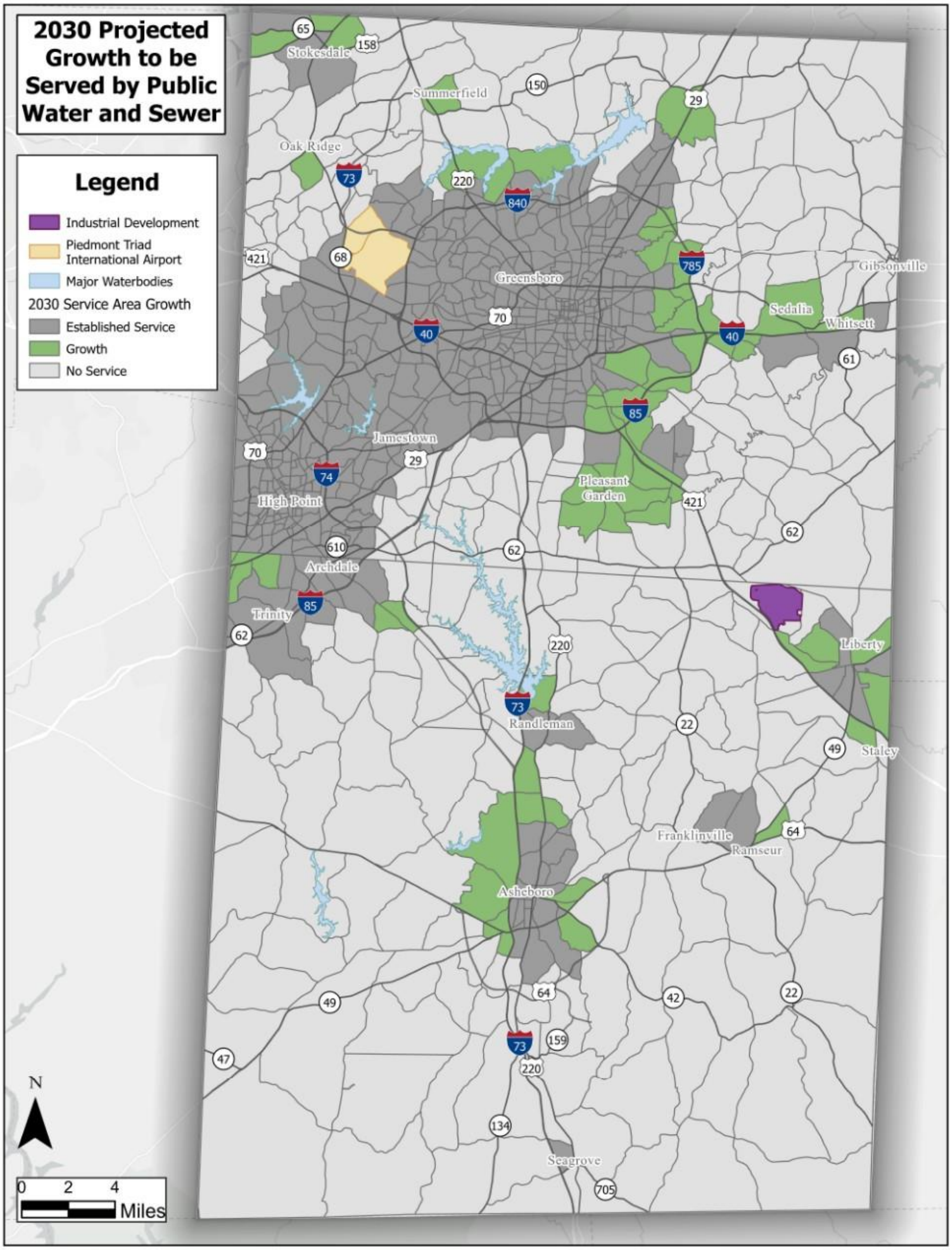


Figure 3-1: Projected 2030 Growth to be Served by Public Water and Wastewater

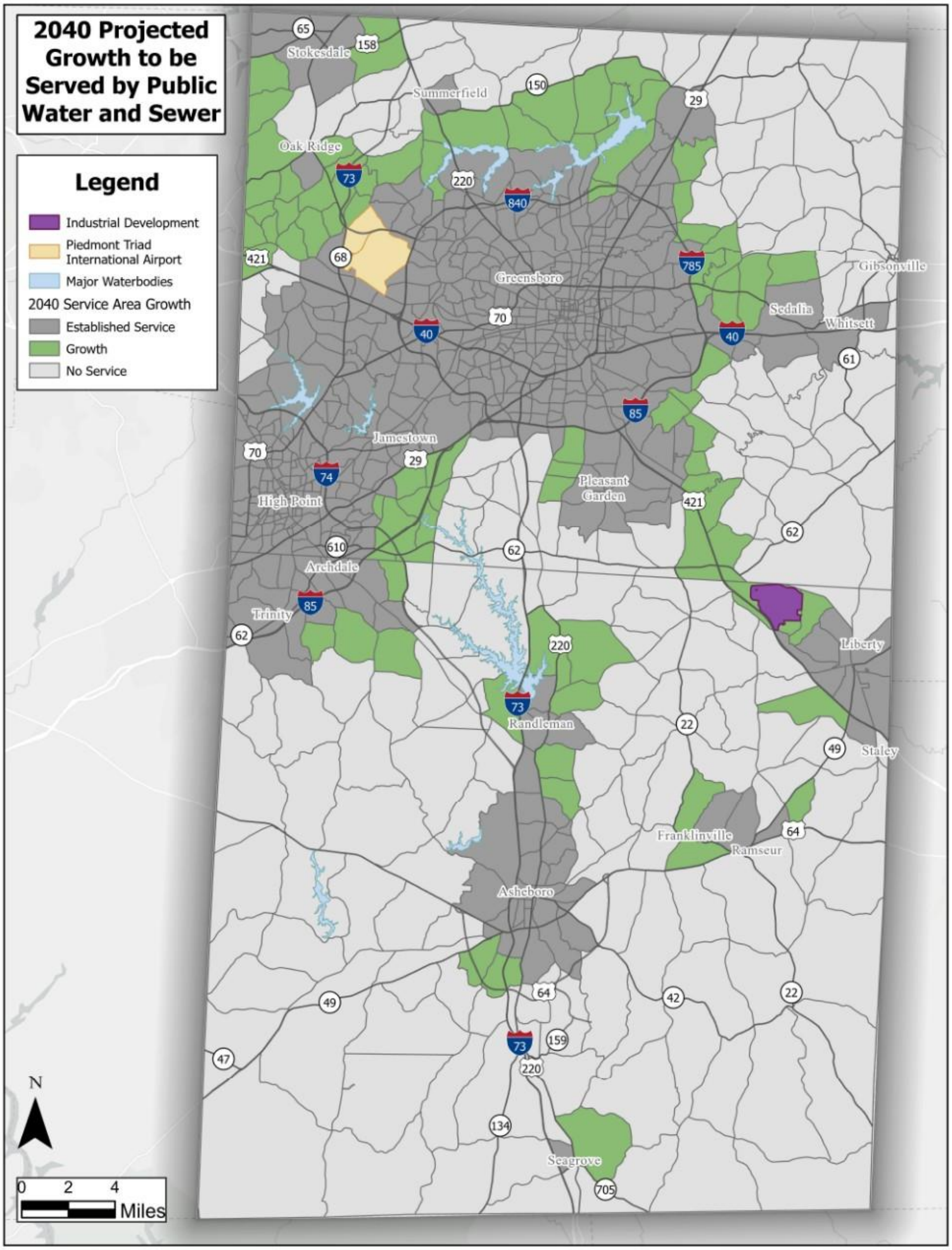


Figure 3-2: Projected 2040 Growth to be Served by Public Water and Wastewater

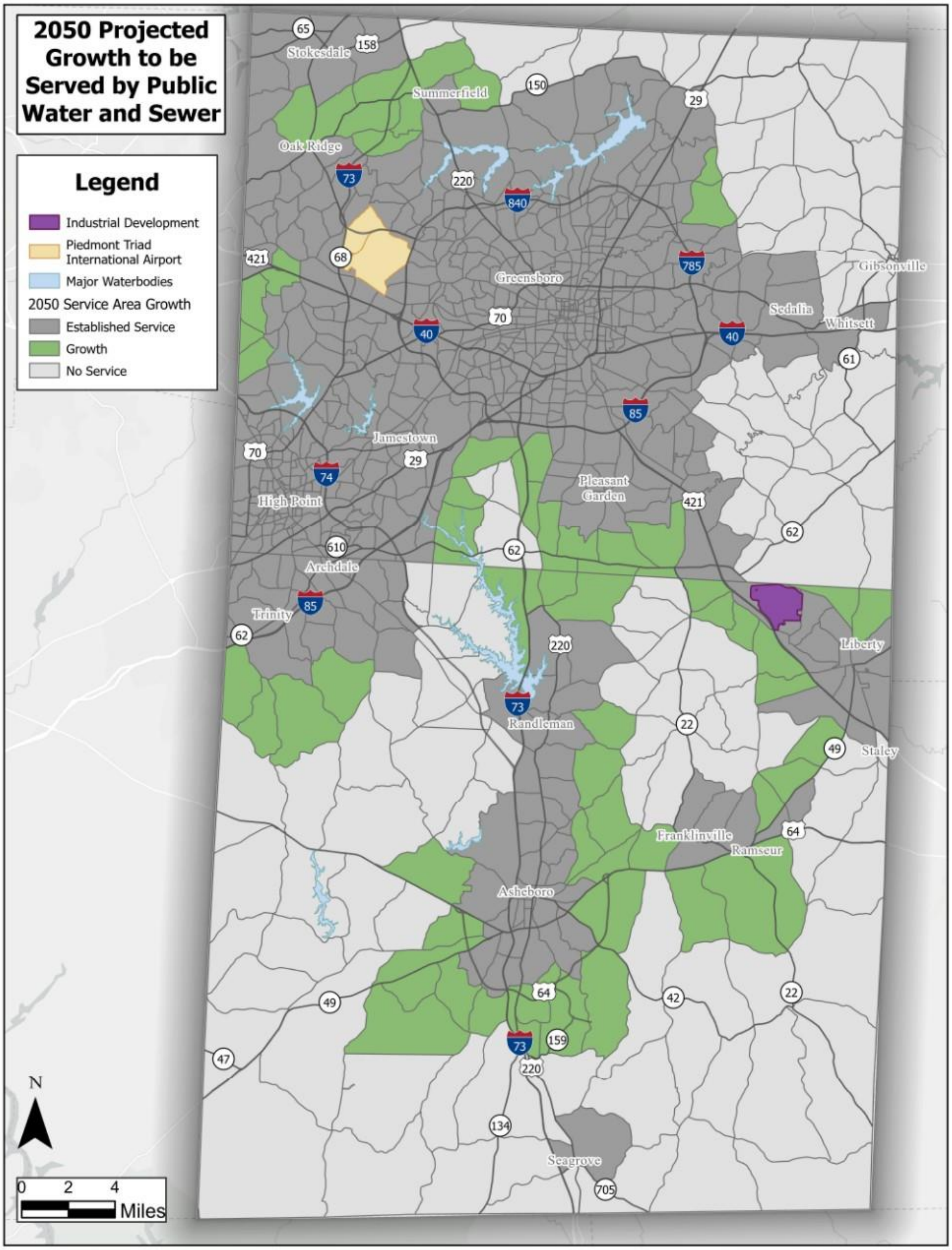


Figure 3-3: Projected 2050 Growth to be Served by Public Water and Wastewater

3.1.5.2 Bulk Industrial Demands

Several municipalities in Guilford and Randolph Counties have specific planned growth for industrial users that will come online during the forecast period. These additions are not dependent on population and therefore are added to the service area demand after it is calculated according to Equation 1. These demands were developed through the stakeholder meetings with each utility and specific understanding of the economic development ongoing and planned.

Table 3-8 summarizes the commercial and industrial growth for the service areas. Most commercial demands are from organic growth as populations increase and towns develop based on conversations with leadership of those areas. Asheboro’s, Greensboro’s, and High Point’s industrial demands specifically account for large economic development sites or customers that are known to need a certain water demand to meet manufacturing or functional requirements.

Table 3-8: Projected Commercial and Industrial Water Demand by Service Area

Service Area	2022 Demand (MGD)	2030 Demand (MGD)	2040 Demand (MGD)	2050 Demand (MGD)
Archdale	-	0.50	1.00	2.00
Asheboro	-	1.50	2.00	2.50
Franklinville	-	-	-	-
Gibsonville	-	0.50	1.00	1.00
Greensboro	-	8.00	10.00	12.00
Guilford NA	-	0.50	0.50	1.00
High Point	-	3.00	4.00	5.00
Jamestown	-	0.25	0.50	0.75
Liberty	-	0.10	0.25	0.50
Oak Ridge	-	0.10	0.15	0.25
Pleasant Garden	-	0.10	0.25	0.50
Ramseur	-	0.10	0.25	0.50
Randleman	-	0.50	1.00	1.25
Randolph NA	-	0.10	0.25	0.50
Seagrove	-	-	-	-
Sedalia	-	-	-	-
Stokesdale	-	0.10	0.15	0.25
Summerfield	-	0.10	0.15	0.25
Trinity	-	0.25	0.25	0.50

3.1.5.3 Sales Outside Study Area

Some current suppliers have contracts for water sales to customers outside of Guilford and Randolph County that increase total ADD as well. These are summarized in Table 3-9 below. Only Archdale and Ramseur have contracts for sales currently that will continue in the future according to LWSPs. These do not account for emergency supply contracts. Archdale is currently the only utility that wholesales to a utility not in the service area, Aqua America.

Table 3-9: Projected Water Sales Outside of the Study Area

Service Area	2022 Demand (MGD)	2030 Demand (MGD)	2040 Demand (MGD)	2050 Demand (MGD)
Archdale	0.04	0.05	0.05	0.05

3.2 Water Demand and Wastewater Flow Projections

The water and wastewater flow projections generated based on the above review and analysis are presented in the sections below for each municipality. The baseline year for this Study is 2022. Water treatment facilities are sized to accommodate the MDDs, and wastewater treatment facilities are sized to accommodate the maximum monthly flows for which NPDES permits are issued. For the purpose of identifying facility needs, the Study generally presents maximum daily water demands and maximum monthly wastewater flows. It is important to note, however, that the ADDs and flows are relied upon for regulatory thresholds for the timing of expansion planning and construction.

The historical average day water demand, maximum day water demand, average day wastewater flow, and maximum month wastewater flow presented in the graphs below were collected from the individual systems available LWSP annual reports. The availability of historical data varied among the individual systems. For municipalities that currently rely on individual or community groundwater well systems and individual or community septic systems, historical water and wastewater data is not known and therefore not presented.

3.2.1 Water and Wastewater Projections for Guilford County

3.2.1.1 Town of Gibsonville

3.2.1.1.1 Water Projections

The Town of Gibsonville operates a water system through an interconnection and purchase agreement with the City of Burlington. Gibsonville's historical average day water demand, historical maximum day water demand, projected average day water demand, and projected maximum day water demand are presented in Table 3-10 and Figure 3-4.

Table 3-10: Gibsonville Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	0.61	1.00	1.46	1.98
Wholesale Demand	-	-	-	-
Total Average Day Demand	0.61	1.00	1.46	1.98
Maximum Day Demand (MGD)				
Service Area Demand	0.73	1.50	2.19	2.97
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	0.73	1.50	2.19	2.97

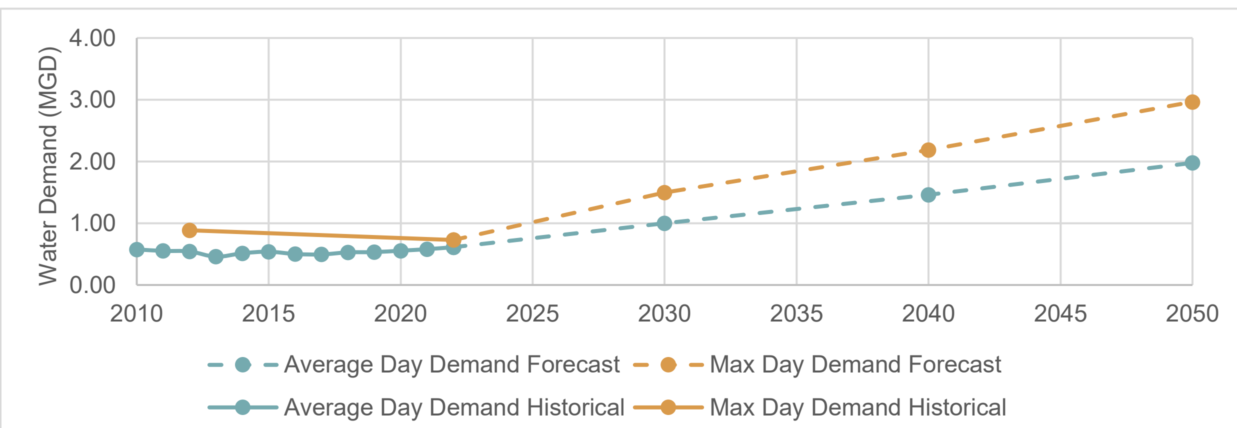


Figure 3-4: Gibsonville Water Demand Projections

3.2.1.1.2 Wastewater Projections

The Town of Gibsonville conveys wastewater to Burlington with a contractual limit of 1.55 MGD. Gibsonville's historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow are presented in Table 3-11 and Figure 3-5.

Table 3-11: Gibsonville Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	0.67	1.29	2.01	2.29
Wholesale Received	-	-	-	-
Total ADF Demand	0.67	1.29	2.01	2.29
Maximum Month (MGD)				
Service Area Demand	0.91	1.74	2.71	3.09
Wholesale Received	-	-	-	-
Total MM Demand	0.91	1.74	2.71	3.09

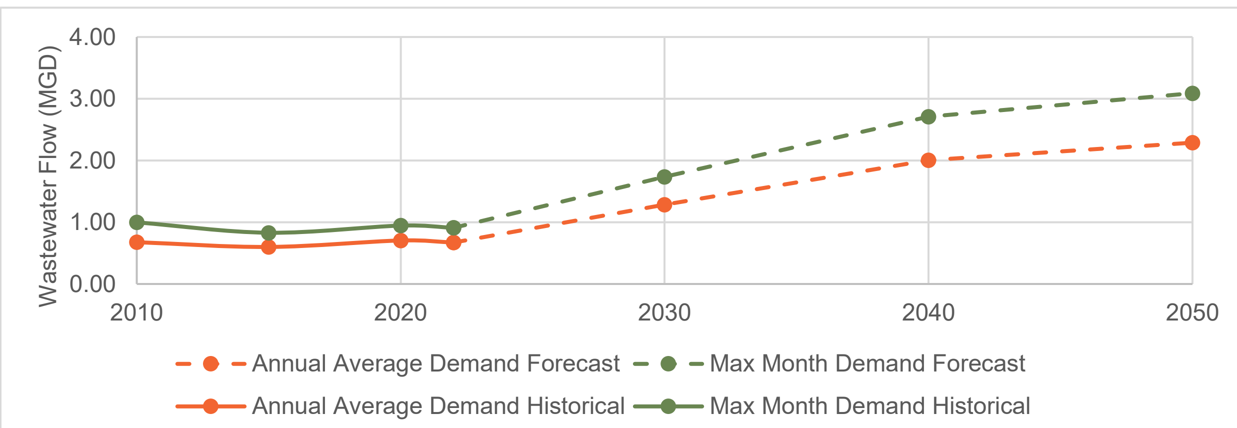


Figure 3-5: Gibsonville Wastewater Capacity Projections

3.2.1.1.3 Gibsonville Projections Summary Table

Table 3-12: Town of Gibsonville Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.61	1.00	1.46	1.98
Max Day Demand (MGD)	0.73	1.50	2.19	2.97
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.67	1.29	2.01	2.29
Maximum Monthly Flow (MGD)	0.91	1.74	2.71	3.09

3.2.1.2 City of Greensboro

3.2.1.2.1 Water Projections

The City of Greensboro owns and operates two water treatment plants, has an ownership stake in the Piedmont Triad Regional Water Authority, and maintains interconnections with the City of Burlington, Reidsville, and Winston-Salem/Forsyth County Utilities.

Greensboro's historical water use has been relatively flat for the last 10 years, however, with the recent economic development success of industrial megasites, such as, Toyota, Boom Supersonic, JetZero and others, the area is anticipating a significant increase in water demands and wastewater production. Additionally, the City of Greensboro has agreed to provide limited water services outside of their jurisdiction to the Towns of Sedalia, Pleasant Garden and Liberty, increasing their anticipated demands over the next few years. The average day water demand, historical maximum day water demand, projected average day water demand, and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-13 and Figure 3-6.

Table 3-13: Greensboro Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	34.79	44.38	50.85	55.36
Wholesale Demand	0.13	0.79	1.36	2.30
Total Average Day Demand	34.92	45.17	52.21	57.66
Maximum Day Demand (MGD)				
Service Area Demand	48.31	66.57	76.27	83.04
Wholesale Demand	0.13	1.13	1.98	3.39
Total Maximum Day Demand	48.43	67.70	78.25	86.43

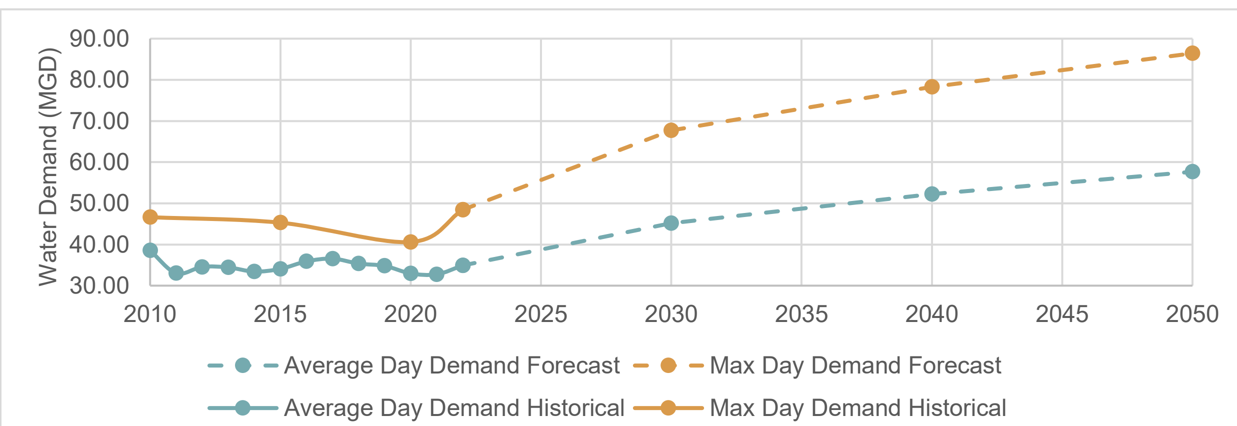


Figure 3-6: Greensboro Water Capacity Projections

3.2.1.2.2 Wastewater Projections

Greensboro owns and operates the 56 MGD T.Z. Osborne WRF. The city's wastewater flows have progressively increased over the last 10 years with a minor dip in flows due to dry periods in recent years. The industrial growth is not anticipated to increase the wastewater flows as much as the water demand due to reuse technologies and consumptive uses at the industrial facilities. Greensboro's historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow to meet the needs of the service area and all contract commitments are presented in Table 3-14 and Figure 3-7.

Table 3-14: Greensboro Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	33.00	39.68	45.05	50.48
Wholesale Received	0.18	1.50	1.98	3.25
Total ADF Demand	33.18	41.19	47.04	53.73
Maximum Month (MGD)				
Service Area Demand	36.61	43.65	49.56	55.52
Wholesale Received	0.22	1.93	2.57	4.17
Total MM Demand	36.83	45.58	52.12	59.70

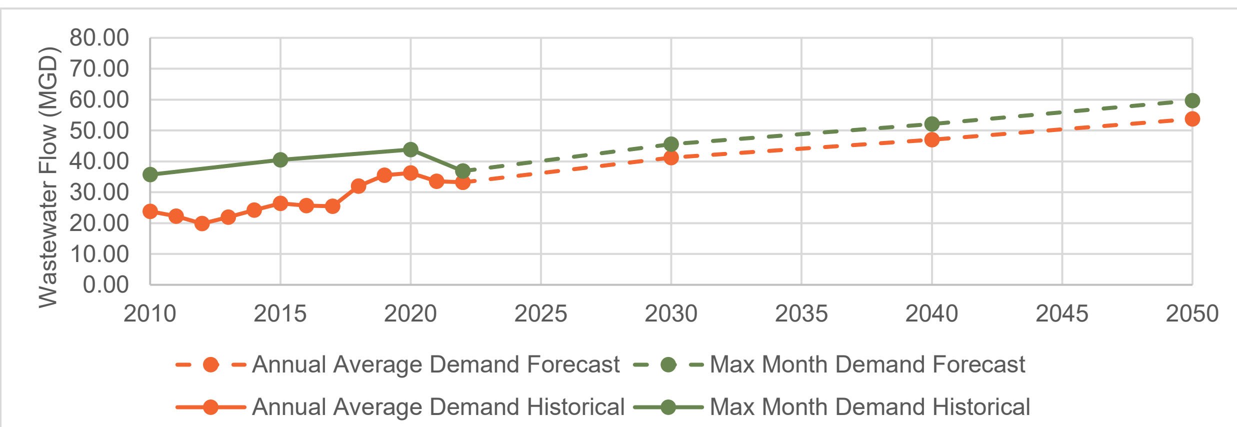


Figure 3-7: Greensboro Wastewater Capacity Projections

3.2.1.2.3 Greensboro Projections Summary Table

Table 3-15: City of Greensboro Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	34.92	45.17	52.21	57.66
Max Day Demand (MGD)	48.43	67.70	78.25	86.43
Wastewater Capacity Projections				
Average Daily Flow (MGD)	33.18	41.19	47.04	53.73
Maximum Monthly Flow (MGD)	36.83	45.58	52.12	59.70

3.2.1.3 City of High Point

3.2.1.3.1 Water Projections

High Point owns and operates the Ward WTP and is a member in the PTRWA. The historical average day water demand, historical maximum day water demand, projected average day water demand, and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-16 and Figure 3-8.

Table 3-16: High Point Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	13.32	14.35	16.35	19.24
Wholesale Demand	0.38	0.88	1.24	1.64
Total Average Day Demand	13.70	15.23	17.59	20.88
Maximum Day Demand (MGD)				
Service Area Demand	15.00	21.53	24.52	28.86
Wholesale Demand	0.91	1.88	2.42	3.02
Total Maximum Day Demand	15.91	23.41	26.94	31.88

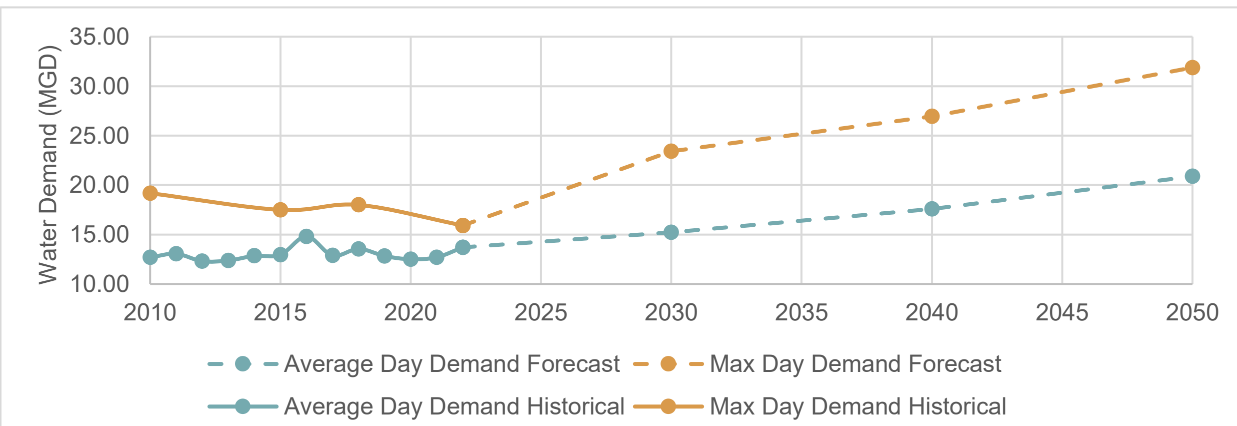


Figure 3-8: High Point Water Capacity Projections

3.2.1.3.2 Wastewater Projections

High Point owns and operates the Eastside WWTP and the Westside WWTP. The Westside WWTP discharges to the Yadkin River Basin and is not included in this analysis. The city has been unsuccessful in previous requests to NCDEQ to discharge more than the allowable 2.0 MGD interbasin transfer limit without an approved certificate. The historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow to meet the needs of the service area and all contract commitments are presented in Table 3-17 and Figure 3-9.

Table 3-17: High Point Wastewater Projection Breakdown (Eastside WWTP)

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	10.98	13.16	15.06	17.36
Wholesale Received	2.41	3.25	4.00	4.88
Total ADF Demand	13.39	16.41	19.06	22.24
Maximum Month (MGD)				
Service Area Demand	16.91	19.74	22.58	26.04
Wholesale Received	2.90	4.16	5.07	6.28
Total MM Demand	19.81	23.92	27.65	32.32

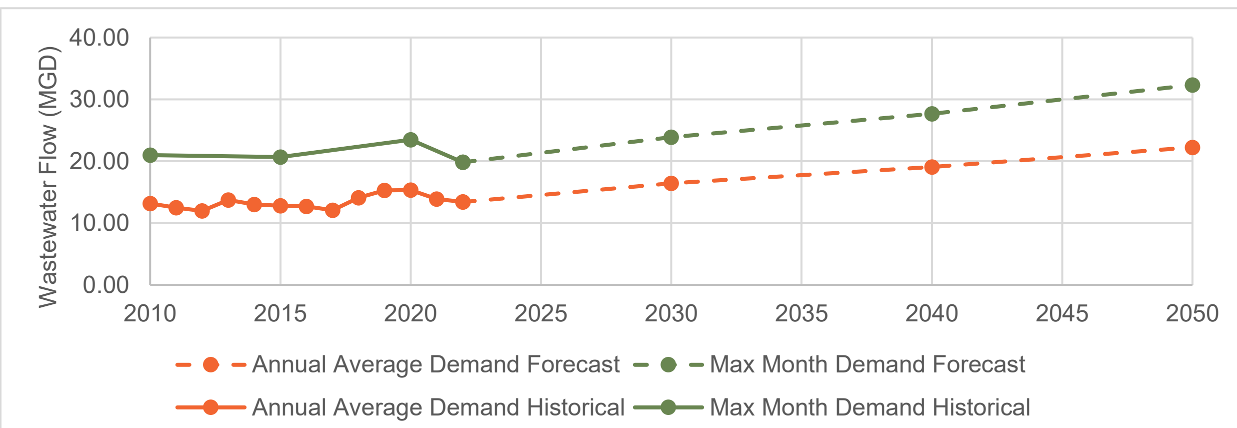


Figure 3-9: High Point Eastside WWTP Wastewater Capacity Projections

3.2.1.3.3 High Point Projections Summary Table

Table 3-18: City of High Point Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	13.70	15.23	17.59	20.88
Max Day Demand (MGD)	15.91	23.41	26.94	31.88
Wastewater Capacity Projections				
Average Daily Flow (MGD)	13.39	16.41	19.06	22.24
Maximum Monthly Flow (MGD)	19.81	23.92	27.65	32.32

3.2.1.4 Town of Jamestown

3.2.1.4.1 Water Projections

The Town of Jamestown purchases water from PTRWA and the City of High Point. Jamestown's historical average day water demand, projected average day water demand, and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-19 and Figure 3-10. Jamestown's historical maximum day water demand was not available through the LWSP data.

Table 3-19: Jamestown Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	0.46	0.93	1.21	1.49
Wholesale Demand	-	-	-	-
Total Average Day Demand	0.46	0.93	1.21	1.49
Maximum Day Demand (MGD)				
Service Area Demand	0.54	1.39	1.82	2.24
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	0.54	1.39	1.82	2.24

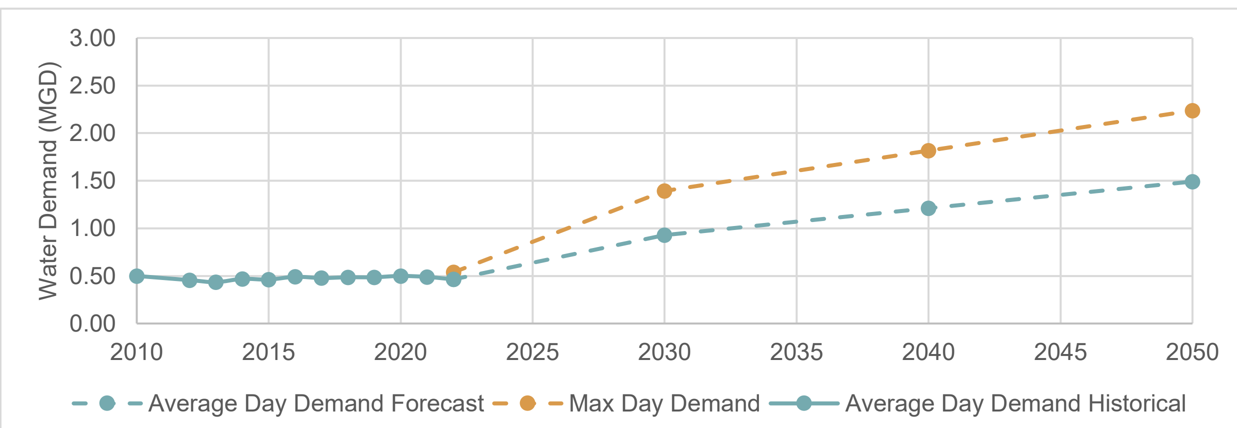


Figure 3-10: Jamestown Water Capacity Projections

3.2.1.4.2 Wastewater Projections

The Town of Jamestown owns 2.0 MGD of the Eastside WWTP in High Point and discharges all their flow into High Point's system. Jamestown's historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow to meet the needs of the service area and all contract commitments are presented in Table 3-20 and Figure 3-11.

Table 3-20: Jamestown Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	0.63	1.00	1.28	1.57
Wholesale Received	0.50	0.50	0.50	0.50
Total ADF Demand	1.13	1.50	1.78	2.07
Maximum Month (MGD)				
Service Area Demand	1.22	1.50	1.92	2.35
Wholesale Received	0.60	0.60	0.60	0.60
Total MM Demand	1.82	2.10	2.52	2.95

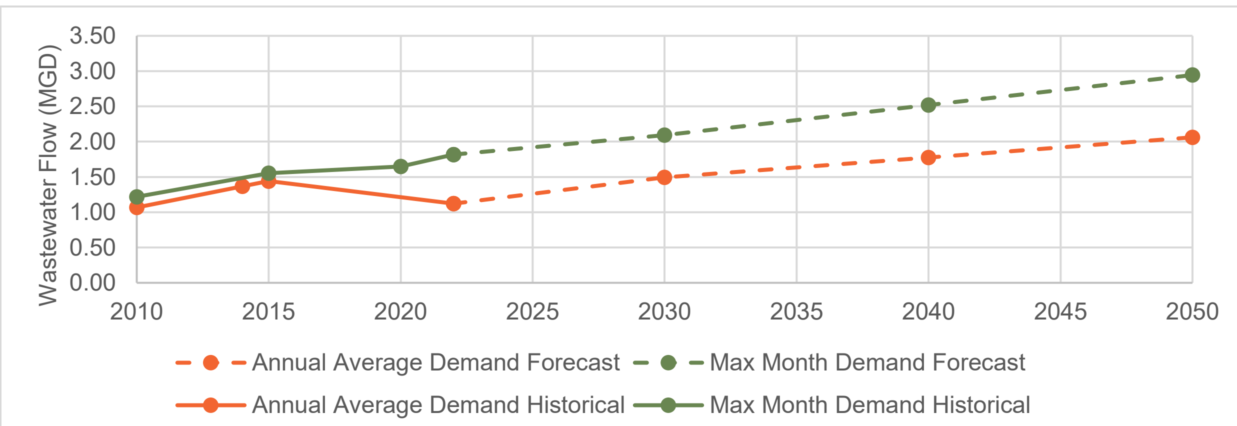


Figure 3-11: Jamestown Wastewater Capacity Projections

3.2.1.4.3 Jamestown Projections Summary Table

Table 3-21: Town of Jamestown Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.46	0.93	1.21	1.49
Max Day Demand (MGD)	0.54	1.39	1.82	2.24
Wastewater Capacity Projections				
Average Daily Flow (MGD)	1.13	1.50	1.78	2.07
Maximum Monthly Flow (MGD)	1.82	2.10	2.52	2.95

3.2.1.5 Town of Oak Ridge

3.2.1.5.1 Water Projections

Oak Ridge's projected average day water demand and projected maximum day water demand are presented in Table 3-22 and Figure 3-12. Oak Ridge does not currently operate a water system; therefore, historical average day demand and historical maximum day demand is not available. Oak Ridge is in the process of installing a water line to connect to Winston-Salem/Forsyth County Utilities. Projections were developed for Oak Ridge to account for future failures of private wells and to accommodate the need for more dense housing development in the suburban and rural areas.

Table 3-22: Oak Ridge Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	-	0.28	0.44	0.63
Wholesale Demand	-	-	-	-
Total Average Day Demand	-	0.28	0.44	0.63
Maximum Day Demand (MGD)				
Service Area Demand	-	0.41	0.66	0.94
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	-	0.41	0.66	0.94

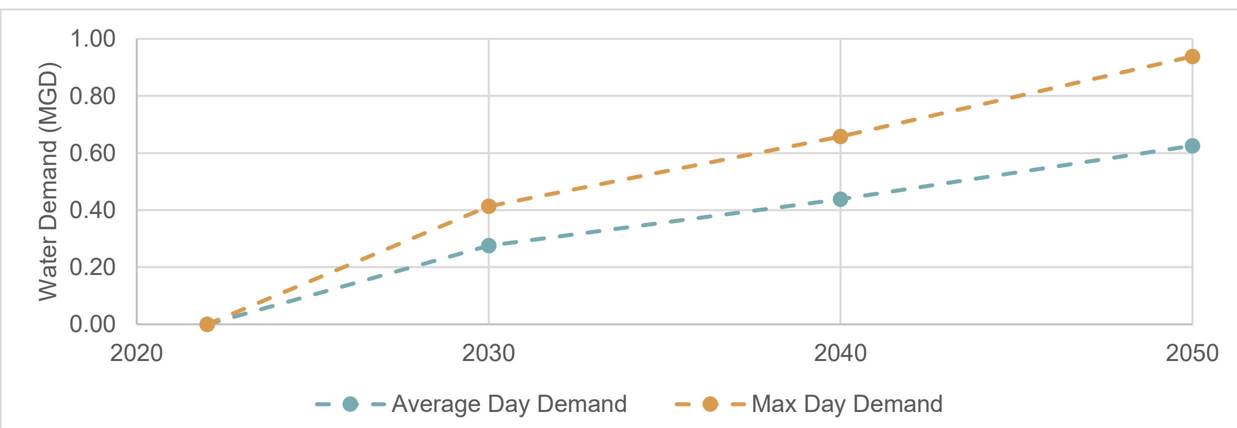


Figure 3-12: Oak Ridge Water Capacity Projections

3.2.1.5.2 Wastewater Projections

Oak Ridge's projected annual average wastewater flow and projected maximum month wastewater flow are presented in Table 3-23 and Figure 3-13. Oak Ridge does not currently operate a sewer system, therefore historical annual average flow and historical maximum month flow is not available. Projections were developed for Oak Ridge to account for future failures of private septic systems and to accommodate the need for more dense housing development in the suburban and rural areas. There is currently no plan for a wastewater system in the town.

Table 3-23: Oak Ridge Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	-	0.04	0.07	0.09
Wholesale Received	-	-	-	-
Total ADF Demand	-	0.04	0.07	0.09
Maximum Month (MGD)				
Service Area Demand	-	0.05	0.09	0.11
Wholesale Received	-	-	-	-
Total MM Demand	-	0.05	0.09	0.11

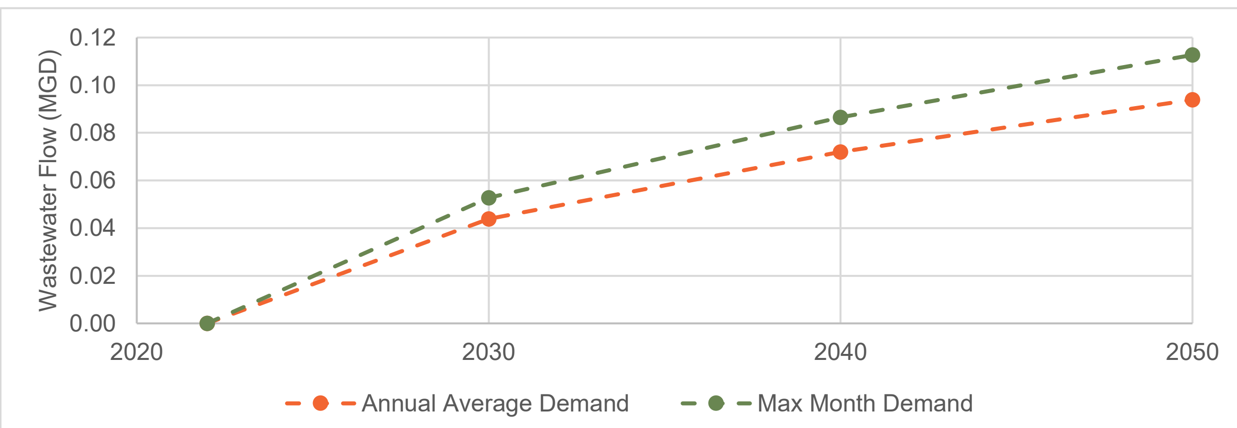


Figure 3-13: Oak Ridge Wastewater Capacity Projections

3.2.1.5.3 Oak Ridge Projections Summary Table

Table 3-24: Town of Oak Ridge Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	0.28	0.44	0.63
Max Day Demand (MGD)	-	0.41	0.66	0.94
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.04	0.07	0.09
Maximum Monthly Flow (MGD)	-	0.05	0.09	0.11

3.2.1.6 Town of Pleasant Garden

3.2.1.6.1 Water Projections

Pleasant Garden's projected average day water demand and projected maximum day water demand are presented in Table 3-25 and Figure 3-14. Pleasant Garden does not currently operate a water system; therefore, historical average day demand and historical maximum day demand is not available. Pleasant Garden will be connected to the City of Greensboro in 2027 to serve industrial and commercial customers. The projections were developed for Pleasant Garden for this use. Additional demand may be needed if residential connections are allowed in the future.

Table 3-25: Pleasant Garden Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	-	0.13	0.27	0.55
Wholesale Demand	-	-	-	-
Total Average Day Demand	-	0.13	0.27	0.55
Maximum Day Demand (MGD)				
Service Area Demand	-	0.20	0.40	0.83
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	-	0.20	0.40	0.83

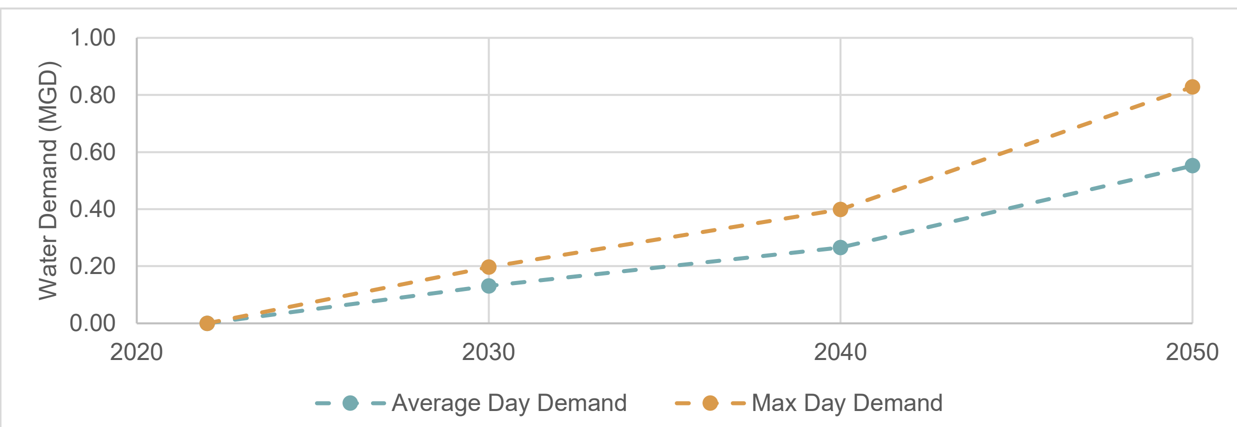


Figure 3-14: Pleasant Garden Water Capacity Projections

3.2.1.6.2 Wastewater Projections

Pleasant Garden's projected annual average wastewater flow and projected maximum month wastewater flow are presented in Table 3-26 and Figure 3-15. Pleasant Garden does not currently operate a sewer system, therefore historical annual average flow and historical maximum month flow is not available. The City of Greensboro operates a collection system for a small area of commercial and industrial customers in the Pleasant Garden area. The existing customers are included in the Greensboro projections. The projections below are to represent future connections in the incorporated limits of Pleasant Garden.

Table 3-26: Pleasant Garden Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	-	0.02	0.05	0.11
Wholesale Received	-	-	-	-
Total ADF Demand	-	0.02	0.05	0.11
Maximum Month (MGD)				
Service Area Demand	-	0.03	0.06	0.14
Wholesale Received	-	-	-	-
Total MM Demand	-	0.03	0.06	0.14

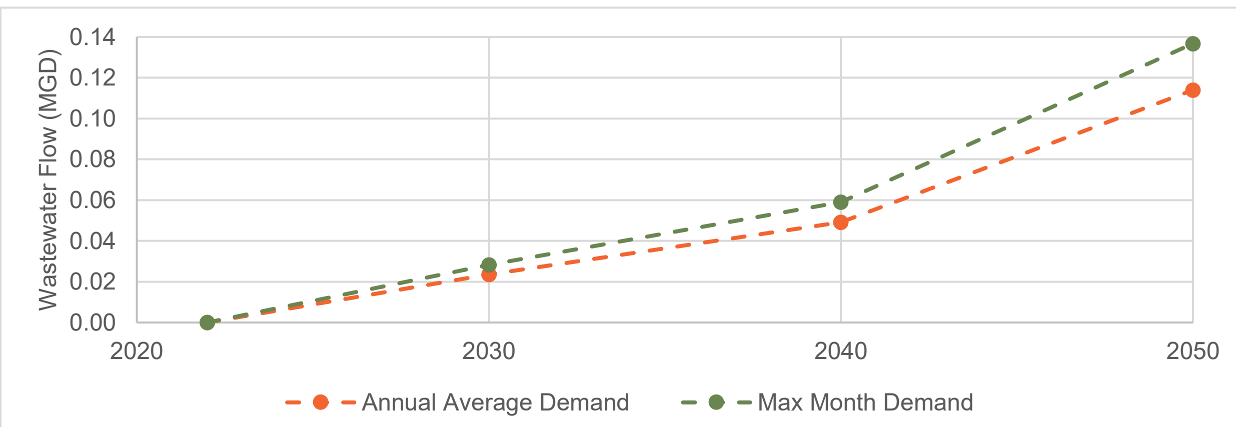


Figure 3-15: Pleasant Garden Wastewater Capacity Projections

3.2.1.6.3 Pleasant Garden Projections Summary Table

Table 3-27: Town of Pleasant Garden Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	0.13	0.27	0.55
Max Day Demand (MGD)	-	0.20	0.40	0.83
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.02	0.05	0.11
Maximum Monthly Flow (MGD)	-	0.03	0.06	0.14

3.2.1.7 Town of Sedalia

3.2.1.7.1 Water Projections

Sedalia's projected average day water demand and projected maximum day water demand are presented in Table 3-28 and Figure 3-16. Sedalia does not currently operate a water system; therefore, historical average day demand and historical maximum day demand is not available. The City of Greensboro will provide water service to the Town of Sedalia in the future. Projections were developed for Sedalia to account for future failures of private wells and to accommodate the need for more dense housing development in the suburban and rural areas.

Table 3-28: Sedalia Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	-	0.04	0.08	0.13
Wholesale Demand	-	-	-	-
Total Average Day Demand	-	0.04	0.08	0.13
Maximum Day Demand (MGD)				
Service Area Demand	-	0.05	0.12	0.20
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	-	0.05	0.12	0.20

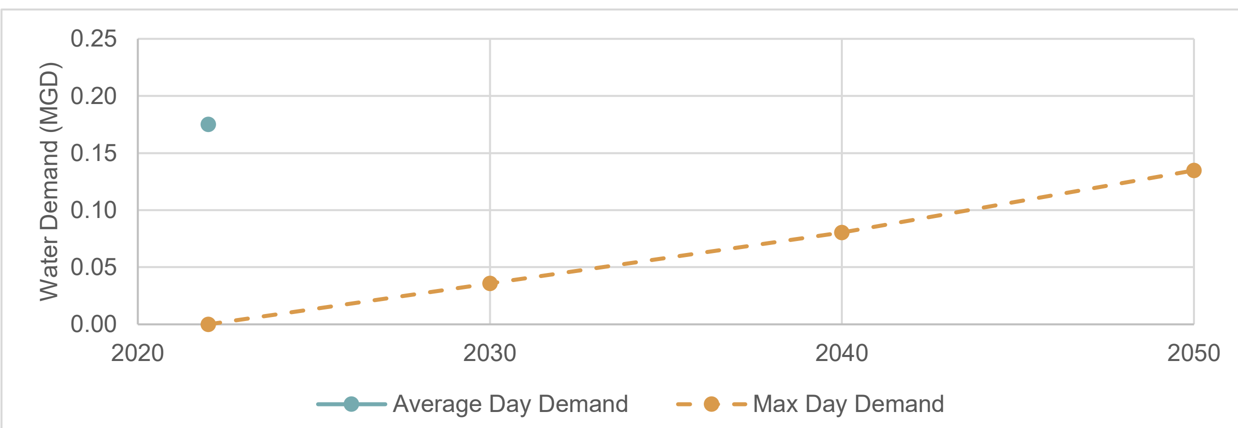


Figure 3-16: Sedalia Water Capacity Projections

3.2.1.7.2 Wastewater Projections

Sedalia's projected annual average wastewater flow and projected maximum month wastewater flow are presented in Table 3-29 and Figure 3-17. Sedalia does not currently operate a sewer system, therefore historical annual average flow and historical maximum month flow is not available. The City of Greensboro is expected to operate the sewer system inside of Sedalia. Projections were developed for Sedalia to account for future failures of private septic systems and to accommodate the need for more dense housing development in the suburban and rural areas.

Table 3-29: Sedalia Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	-	0.02	0.04	0.07
Wholesale Received	-	-	-	-
Total ADF Demand	-	0.02	0.04	0.07
Maximum Month (MGD)				
Service Area Demand	-	0.02	0.05	0.08
Wholesale Received	-	-	-	-
Total MM Demand	-	0.02	0.05	0.08

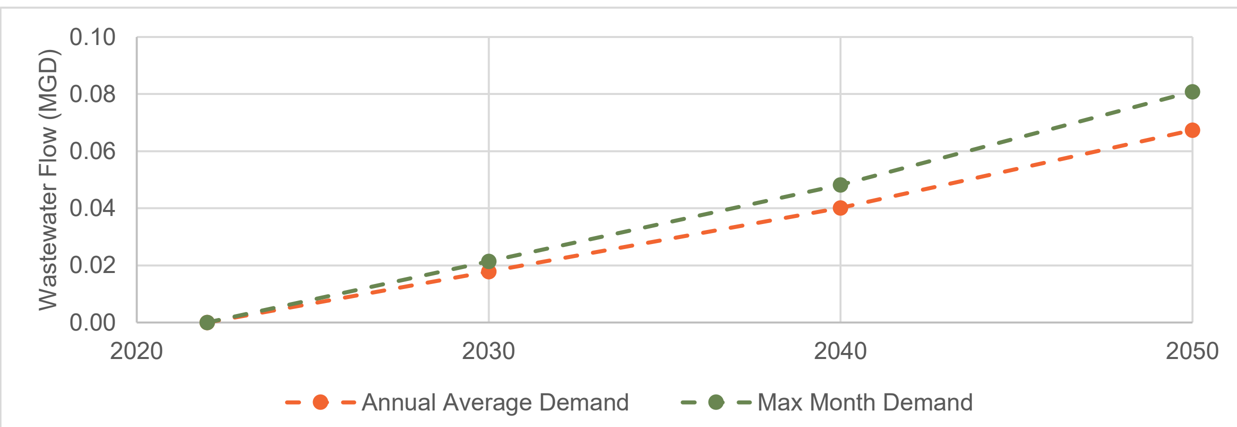


Figure 3-17: Sedalia Wastewater Capacity Projections

3.2.1.7.3 Sedalia Projections Summary Table

Table 3-30: Town of Sedalia Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	0.04	0.08	0.13
Max Day Demand (MGD)	-	0.05	0.12	0.20
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.02	0.04	0.07
Maximum Monthly Flow (MGD)	-	0.02	0.05	0.08

3.2.1.8 Town of Stokesdale

3.2.1.8.1 Water Projections

The Town of Stokesdale installed a water system in 2003 to replace wells that were impacted by contamination of the groundwater aquifer via a connection to the Winston-Salem/Forsyth County Utility system. The system is mostly expanded by developers to serve new residential neighborhoods and limited commercial development. Stokesdale's historical average day water demand, projected average day water demand, and projected maximum day water demand are presented in Table 3-31 and Figure 3-18. Stokesdale's historical maximum day demand was not available through the LWSP data.

Table 3-31: Stokesdale Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	0.15	0.21	0.32	0.50
Wholesale Demand	-	-	-	-
Total Average Day Demand	0.15	0.21	0.32	0.50
Maximum Day Demand (MGD)				
Service Area Demand	0.26	0.36	0.55	0.85
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	0.26	0.36	0.55	0.85

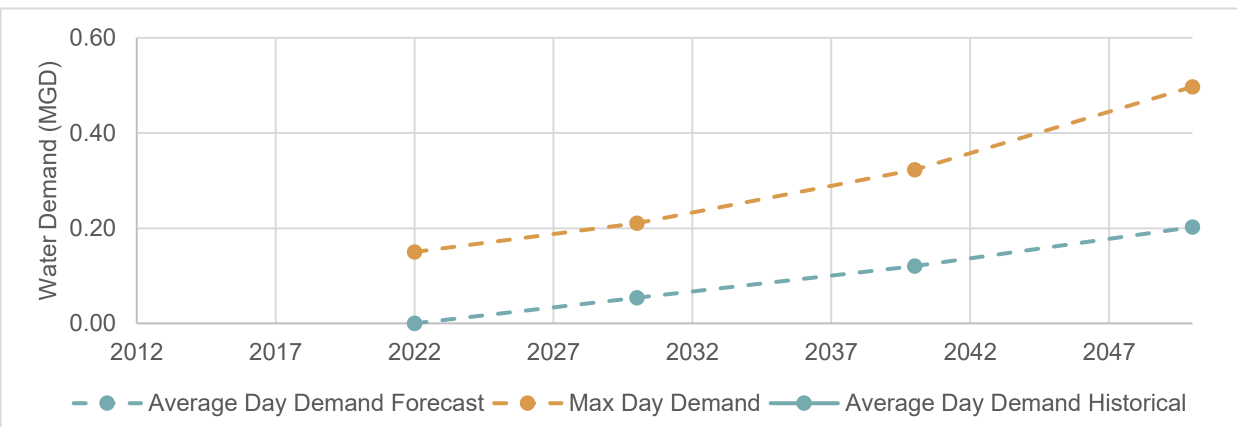


Figure 3-18: Stokesdale Water Capacity Projections

3.2.1.8.2 Wastewater Projections

Stokesdale's projected annual average wastewater flow and projected maximum month wastewater flow are presented in Table 3-32 and Figure 3-19. Stokesdale does not currently operate a sewer system, therefore historical annual average flow and historical maximum month flow is not available. There is no current plan to install a public sewer system in this region, however, projections were developed for Stokesdale to account for future failures of private septic systems and to accommodate the need for more dense housing development in the suburban and rural areas should a regional system be installed in the future.

Table 3-32: Stokesdale Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	-	0.02	0.02	0.03
Wholesale Received	-	-	-	-
Total ADF Demand	-	0.02	0.02	0.03
Maximum Month (MGD)				
Service Area Demand	-	0.02	0.03	0.04
Wholesale Received	-	-	-	-
Total MM Demand	-	0.02	0.03	0.04

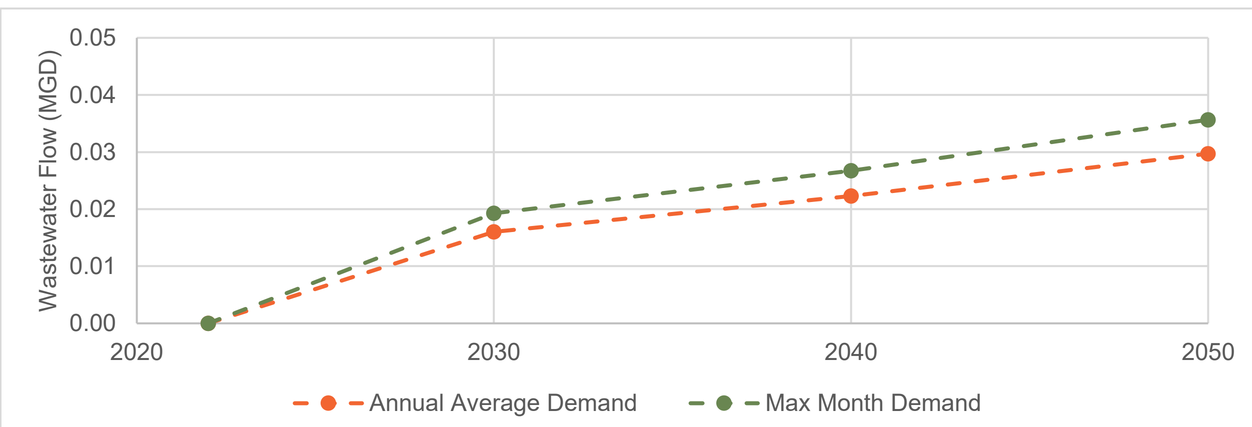


Figure 3-19: Stokesdale Wastewater Capacity Projections

3.2.1.8.3 Stokesdale Projections Summary Table

Table 3-33: Town of Stokesdale Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.15	0.21	0.32	0.50
Max Day Demand (MGD)	0.26	0.36	0.55	0.85
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.02	0.02	0.03
Maximum Monthly Flow (MGD)	-	0.02	0.03	0.04

3.2.1.9 Town of Summerfield

3.2.1.9.1 Water Projections

Summerfield's projected average day water demand and projected maximum day water demand are presented in Table 3-34 and Figure 3-20. Summerfield does not currently operate a water system; therefore, historical average day demand and historical maximum day demand is not available. The Town of Summerfield is currently planning a water system for fire protection only, however, the projections below were developed for Summerfield to account for the planned development of the Summerfield Holdings properties, the future failures of private wells and to accommodate the need for more dense housing development in the suburban and rural areas.

Table 3-34: Summerfield Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	-	0.27	0.44	0.67
Wholesale Demand	-	-	-	-
Total Average Day Demand	-	0.27	0.44	0.67
Maximum Day Demand (MGD)				
Service Area Demand	-	0.41	0.66	1.00
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	-	0.41	0.66	1.00

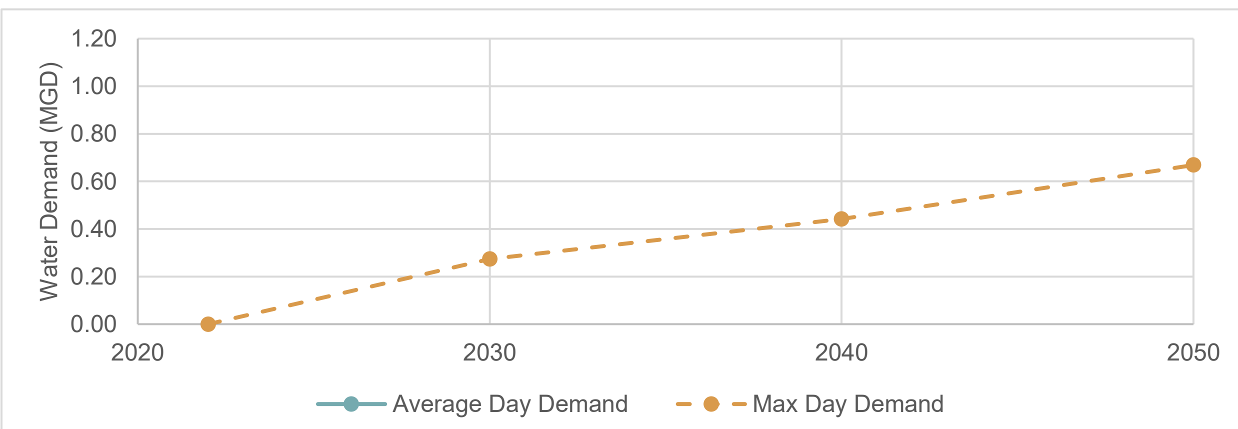


Figure 3-20: Summerfield Water Capacity Projections

3.2.1.9.2 Wastewater Projections

Summerfield's projected annual average wastewater flow and projected maximum month wastewater flow are presented in Table 3-35 and Figure 3-21. Summerfield does not currently operate a sewer system, therefore historical annual average flow and historical maximum month flow is not available. The wastewater projections were developed for the Summerfield Holdings properties to accommodate the need for more dense housing development in the suburban and rural areas.

Table 3-35: Summerfield Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	-	0.23	0.36	0.53
Wholesale Received	-	-	-	-
Total ADF Demand	-	0.23	0.36	0.53
Maximum Month (MGD)				
Service Area Demand	-	0.28	0.43	0.64
Wholesale Received	-	-	-	-
Total MM Demand	-	0.28	0.43	0.64

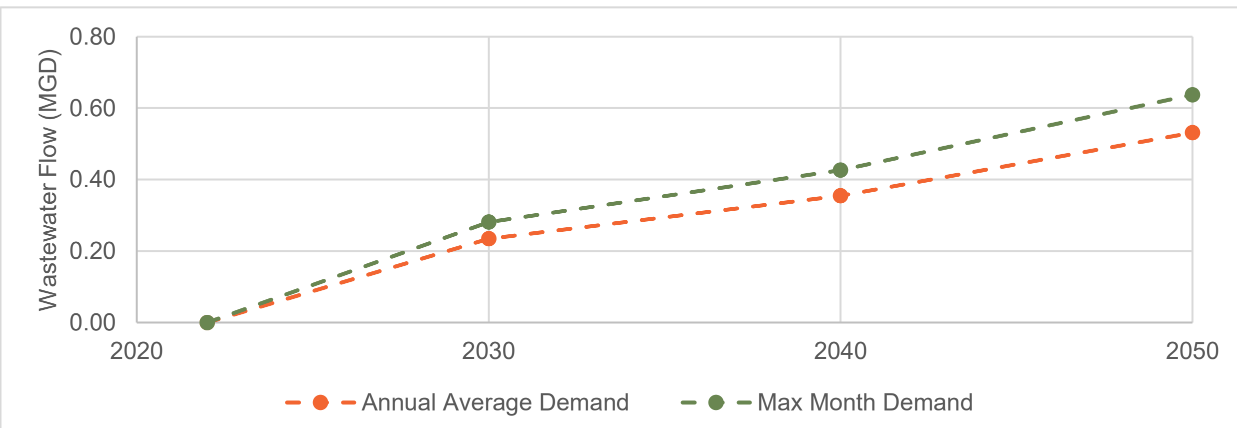


Figure 3-21: Summerfield Wastewater Capacity Projections

3.2.1.9.3 Summerfield Projections Summary Table

Table 3-36: Town of Summerfield Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	0.27	0.44	0.67
Max Day Demand (MGD)	-	0.41	0.66	1.00
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.23	0.36	0.53
Maximum Monthly Flow (MGD)	-	0.28	0.43	0.64

3.2.1.10 Unincorporated Guilford County

3.2.1.10.1 Water Projections

Unincorporated Guilford County's projected average day water demand and projected maximum day water demand are presented in Table 3-37 and Figure 3-22. Unincorporated Guilford County does not currently operate a water system; therefore, historical average day demand and historical maximum day demand is not available. The projections below were developed for the areas that will remain in the unincorporated region of Guilford County to account for future failures of private wells and to accommodate the need for more dense housing development in the suburban and rural areas.

Table 3-37: Unincorporated Guilford County Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	-	0.30	0.60	1.09
Wholesale Demand	-	-	-	-
Total Average Day Demand	-	0.30	0.60	1.09
Maximum Day Demand (MGD)				
Service Area Demand	-	0.46	0.90	1.64
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	-	0.46	0.90	1.64

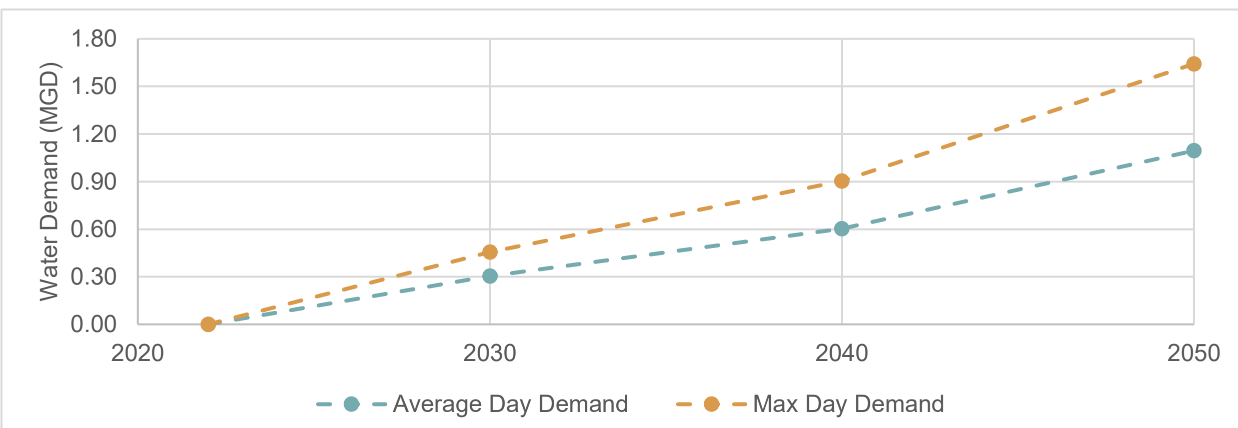


Figure 3-22: Unincorporated Guilford County Water Capacity Projections

3.2.1.10.2 Wastewater Projections

Unincorporated Guilford County's projected annual average wastewater flow and projected maximum month wastewater flow are presented in Table 3-38 and Figure 3-23. Unincorporated Guilford County does not currently operate a sewer system, therefore historical annual average flow and historical maximum month flow is not available. The projections below were developed for the development that will remain in the unincorporated areas of Guilford County to account for future failures of private septic systems and to accommodate the need for more dense housing development in the suburban and rural areas.

Table 3-38: Unincorporated Guilford County Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	-	0.59	0.68	1.36
Wholesale Received	-	-	-	-
Total ADF Demand	-	0.59	0.68	1.36
Maximum Month (MGD)				
Service Area Demand	-	0.71	0.82	1.63
Wholesale Received	-	-	-	-
Total MM Demand	-	0.71	0.82	1.63

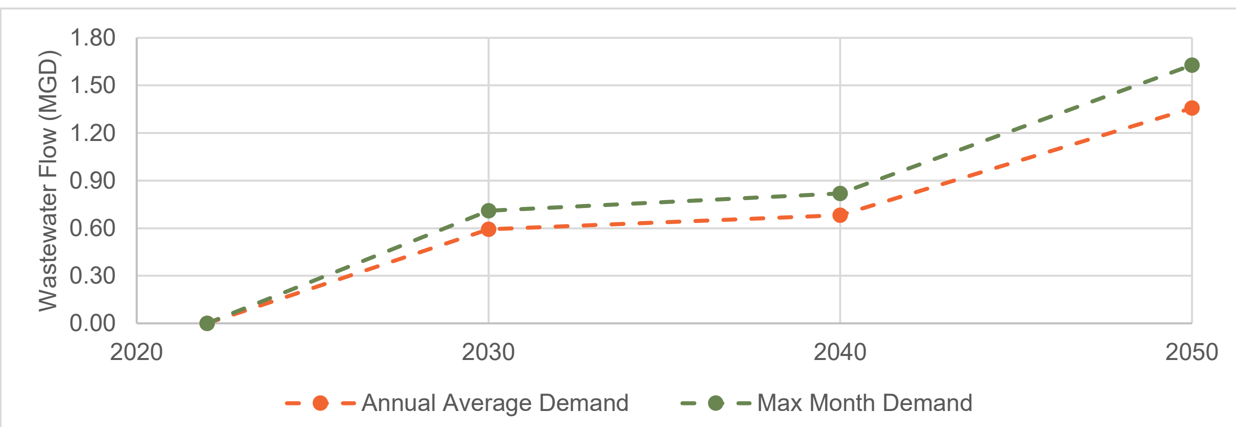


Figure 3-23: Unincorporated Guilford County Wastewater Capacity Projections

3.2.1.10.3 Unincorporated Guilford County Projections Summary Table

Table 3-39: Unincorporated Guilford County Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	0.30	0.60	1.09
Max Day Demand (MGD)	-	0.46	0.90	1.64
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.59	0.68	1.36
Maximum Monthly Flow (MGD)	-	0.71	0.82	1.63

3.2.2 Water and Wastewater Projections for Randolph County

3.2.2.1 City of Archdale

3.2.2.1.1 Water Projections

Archdale is a member in PTRWA, where they purchase the bulk of their water. Archdale's historical average day water demand, historical maximum day water demand, projected average day water demand, and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-40 and Figure 3-24.

Table 3-40: Archdale Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	0.89	1.30	1.66	2.28
Wholesale Demand	0.06	0.05	0.05	0.05
Total Average Day Demand	0.95	1.35	1.71	2.32
Maximum Day Demand (MGD)				
Service Area Demand	1.81	2.59	3.32	4.57
Wholesale Demand	0.06	0.06	0.06	0.06
Total Maximum Day Demand	1.87	2.65	3.38	4.63

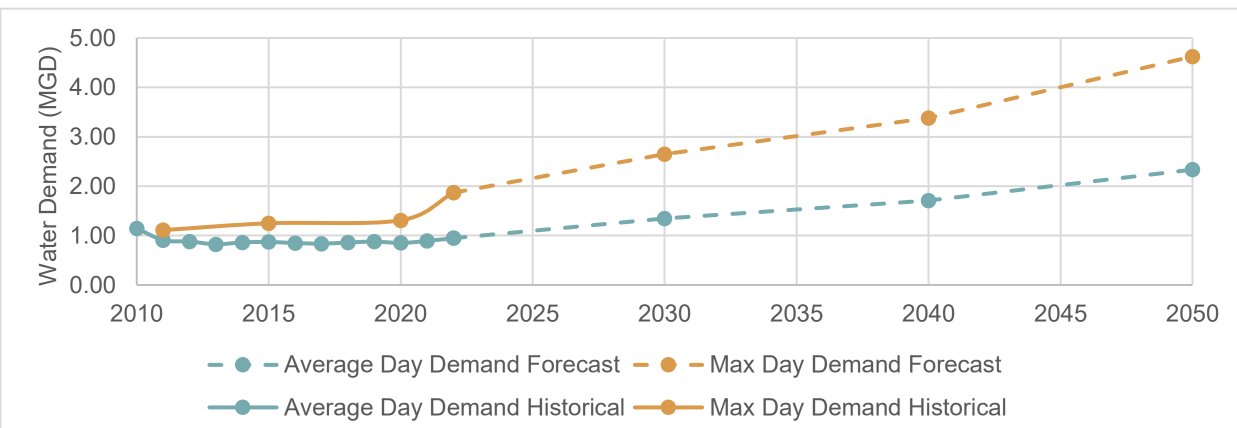


Figure 3-24: Archdale Water Capacity Projections

3.2.2.1.2 Wastewater Projections

Archdale owns 2.5 MGD capacity in the Eastside WWTP and discharges in the Richland Creek outfall near the facility. Archdale's historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow to meet the needs of the service area and all contract commitments are presented in Table 3-41 and Figure 3-25. The City of Archdale experiences higher wastewater flow than water flow. We believe this is due to higher-than-average inflow and infiltration rates and potentially some issues with metering at their interconnects.

Table 3-41: Archdale Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	0.96	1.40	1.77	2.41
Wholesale Received	-	-	-	-
Total ADF Demand	0.96	1.40	1.77	2.41
Maximum Month (MGD)				
Service Area Demand	1.20	1.68	2.13	2.89
Wholesale Received	-	-	-	-
Total MM Demand	1.20	1.68	2.13	2.89

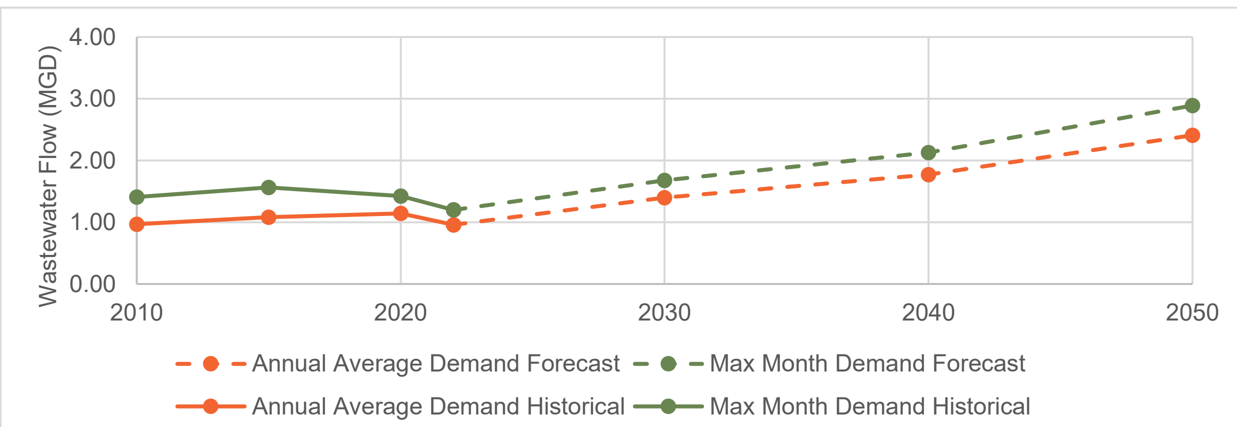


Figure 3-25: Archdale Wastewater Capacity Projections

3.2.2.1.3 Archdale Projections Summary Table

Table 3-42: City of Archdale Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.95	1.35	1.71	2.32
Max Day Demand (MGD)	1.87	2.65	3.38	4.63
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.96	1.40	1.77	2.41
Maximum Monthly Flow (MGD)	1.20	1.68	2.13	2.89

3.2.2.2 City of Asheboro

3.2.2.2.1 Water Projections

Asheboro owns and operates a water treatment plant in the city, with a supply from the Yadkin River Basin. The city is limited on the amount of water they can transfer from the Yadkin River Basin to the Deep River subbasin outfall due to interbasin transfer rules. Asheboro's historical average day water demand, historical maximum day water demand, projected average day water demand, and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-43 and Figure 3-26.

Table 3-43: Asheboro Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	4.97	5.60	6.57	7.55
Wholesale Demand	0.30	1.69	2.25	2.40
Total Average Day Demand	5.27	7.29	8.82	9.95
Maximum Day Demand (MGD)				
Service Area Demand	7.02	8.40	9.86	11.32
Wholesale Demand	0.30	2.97	3.21	3.44
Total Maximum Day Demand	7.32	11.37	13.07	14.76

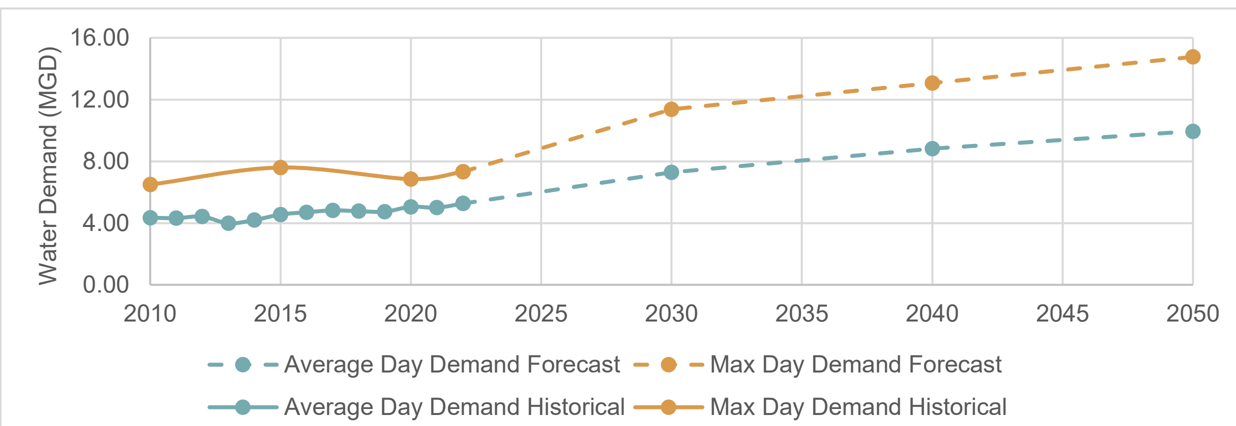


Figure 3-26: Asheboro Water Capacity Projections

3.2.2.2.2 Wastewater Projections

Asheboro operates a wastewater treatment facility that discharges to Haskins Creek in the Deep River subbasin. The city's historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow to meet the needs of the service area and all contract commitments are presented in Table 3-44 and Figure 3-27.

Table 3-44: Asheboro Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	3.54	5.05	5.95	6.85
Wholesale Received	0.03	0.28	0.63	1.15
Total ADF Demand	3.57	5.33	6.58	8.00
Maximum Month (MGD)				
Service Area Demand	4.61	6.56	7.73	8.91
Wholesale Received	0.03	0.25	0.66	1.29
Total MM Demand	4.64	6.81	8.39	10.20

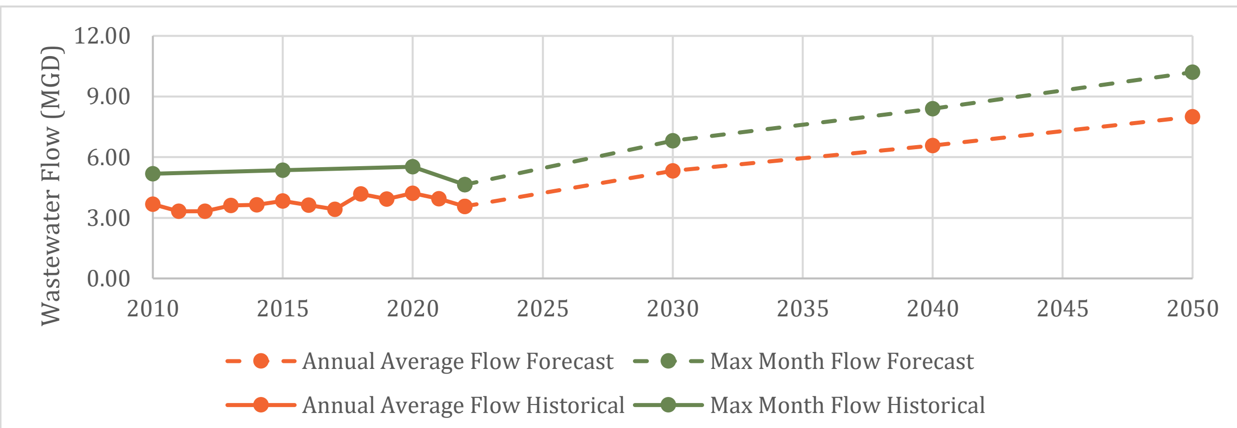


Figure 3-27: Asheboro Wastewater Capacity Projections

3.2.2.2.3 Asheboro Projections Summary Table

Table 3-45: City of Asheboro Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	5.27	7.29	8.82	9.95
Max Day Demand (MGD)	7.32	11.37	13.07	14.76
Wastewater Capacity Projections				
Average Daily Flow (MGD)	3.57	5.33	6.58	8.00
Maximum Monthly Flow (MGD)	4.64	6.81	8.39	10.20

3.2.2.3 Town of Franklinville

3.2.2.3.1 Water Projections

Franklinville purchases their water from the City of Ramseur. Franklinville's historical average day water demand, historical maximum day water demand, projected average day water demand, and projected maximum day water demand are presented in Table 3-46 and Figure 3-28.

Table 3-46: Franklinville Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	0.11	0.11	0.12	0.13
Wholesale Demand	-	-	-	-
Total Average Day Demand	0.11	0.11	0.12	0.13
Maximum Day Demand (MGD)				
Service Area Demand	0.12	0.17	0.18	0.19
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	0.12	0.17	0.18	0.19

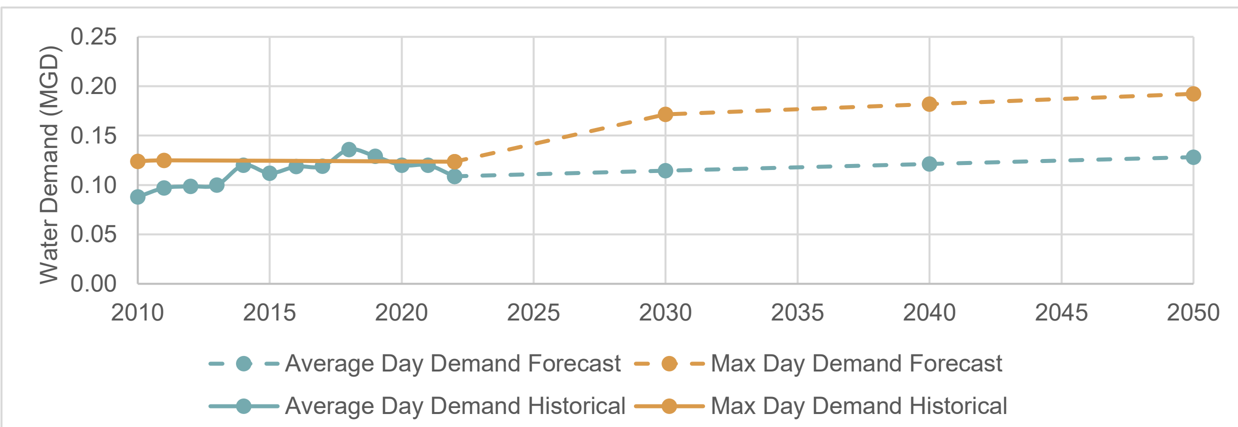


Figure 3-28: Franklinville Water Capacity Projections

3.2.2.3.2 Wastewater Projections

Franklinville operates a small WWTP in the town, their historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow are presented in Table 3-47 and Figure 3-29.

Table 3-47: Franklinville Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	0.04	0.07	0.07	0.08
Wholesale Received	-	-	-	-
Total ADF Demand	0.04	0.07	0.07	0.08
Maximum Month (MGD)				
Service Area Demand	0.05	0.08	0.09	0.09
Wholesale Received	-	-	-	-
Total MM Demand	0.05	0.08	0.09	0.09

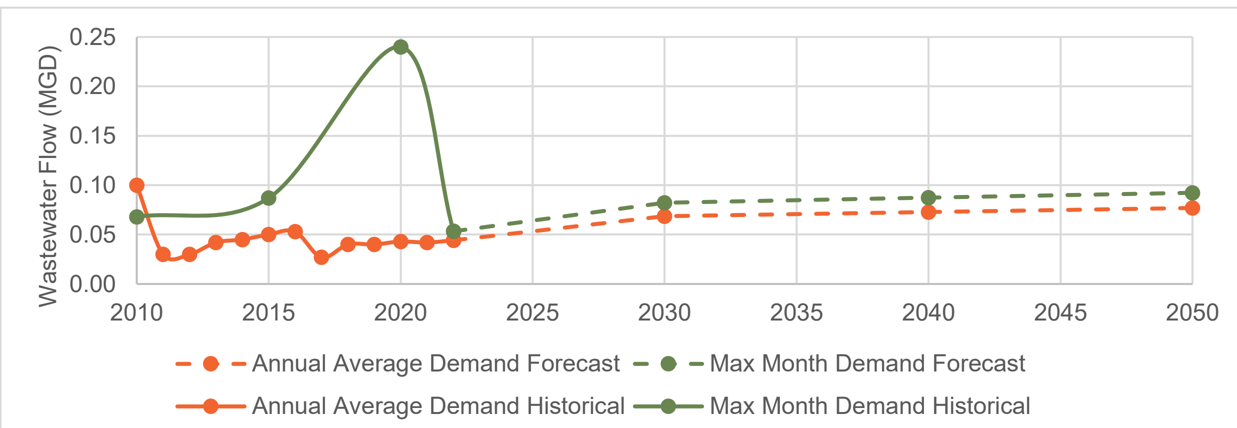


Figure 3-29: Franklinville Wastewater Capacity Projections

3.2.2.3.3 Franklinville Projections Summary Table

Table 3-48: Town of Franklinville Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.11	0.11	0.12	0.13
Max Day Demand (MGD)	0.12	0.17	0.18	0.19
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.04	0.07	0.07	0.08
Maximum Monthly Flow (MGD)	0.05	0.08	0.09	0.09

3.2.2.4 Town of Liberty

3.2.2.4.1 Water Projections

The Town of Liberty currently operates a well system. The system is experiencing problems due to aging wells such as decreased production and concern over emerging contaminants. The town will soon connect to the City of Greensboro and will likely utilize Randolph County's allocation in PTRWA. Liberty's historical average day water demand, historical maximum day water demand, projected average day water demand, and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-49 and Figure 3-30.

Table 3-49: Liberty Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	0.26	0.39	0.52	0.66
Wholesale Demand	-	-	-	-
Total Average Day Demand	0.26	0.39	0.52	0.66
Maximum Day Demand (MGD)				
Service Area Demand	0.31	0.58	0.79	0.99
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	0.31	0.58	0.79	0.99

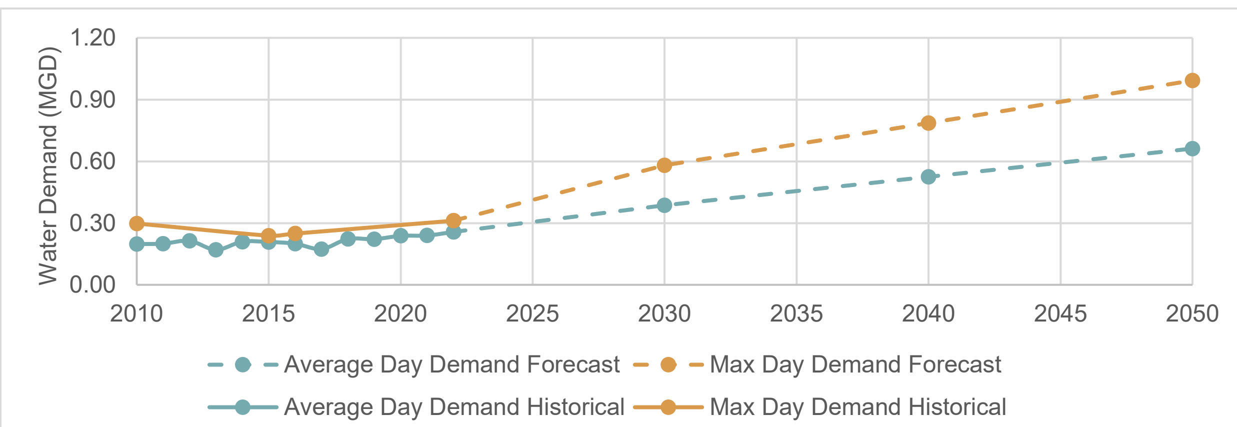


Figure 3-30: Liberty Water Capacity Projections

3.2.2.4.2 Wastewater Projections

The Town of Liberty currently owns a WWTP with sprayfields. The Town is anticipating growth and the WWTP is experiencing deteriorating performance due to aging infrastructure. Due to these concerns, the Town is discussing the opportunity to connect to the City of Greensboro to convey all wastewater flow to the T.Z. Osborne WRF. Liberty's historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow to meet the needs of the service area and all contract commitments are presented in Table 3-50 and Figure 3-31.

Table 3-50: Liberty Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	0.32	0.42	0.61	0.90
Wholesale Received	-	-	-	-
Total ADF Demand	0.32	0.42	0.61	0.90
Maximum Month (MGD)				
Service Area Demand	0.51	0.62	0.91	1.35
Wholesale Received	-	-	-	-
Total MM Demand	0.51	0.62	0.91	1.35

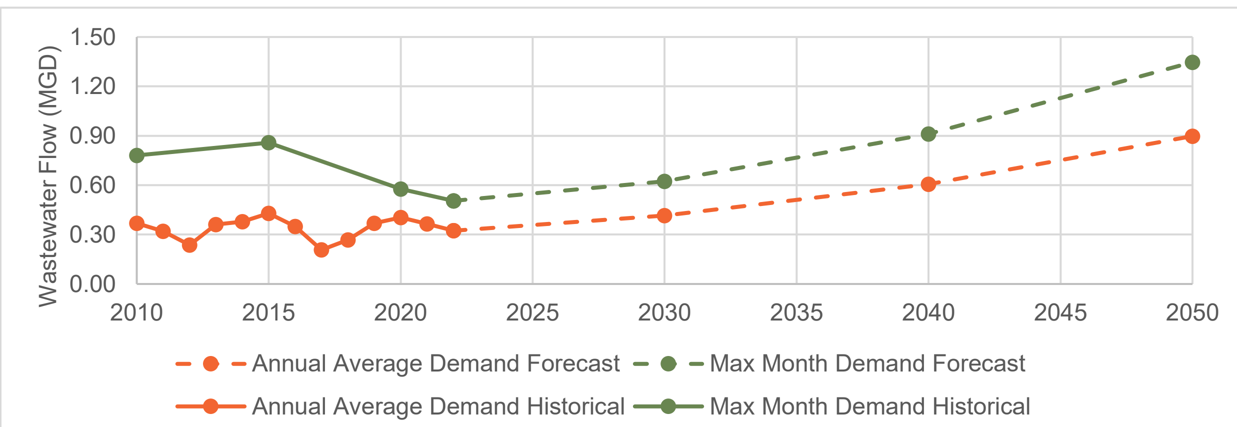


Figure 3-31: Liberty Wastewater Capacity Projections

3.2.2.4.3 Liberty Projections Summary Table

Table 3-51: Town of Liberty Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.26	0.39	0.52	0.66
Max Day Demand (MGD)	0.31	0.58	0.79	0.99
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.32	0.42	0.61	0.90
Maximum Monthly Flow (MGD)	0.51	0.62	0.91	1.35

3.2.2.5 Town of Ramseur

3.2.2.5.1 Water Projections

The Town operates a water treatment plant to serve Ramseur and the Town of Franklinville. Ramseur's historical average day water demand, historical maximum day water demand, projected average day water demand, and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-52 and Figure 3-32.

Table 3-52: Ramseur Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	0.50	0.60	0.74	0.87
Wholesale Demand	0.11	0.11	0.12	0.13
Total Average Day Demand	0.61	0.71	0.86	1.00
Maximum Day Demand (MGD)				
Service Area Demand	1.51	1.66	2.03	2.40
Wholesale Demand	0.12	0.17	0.18	0.19
Total Maximum Day Demand	1.63	1.83	2.21	2.59

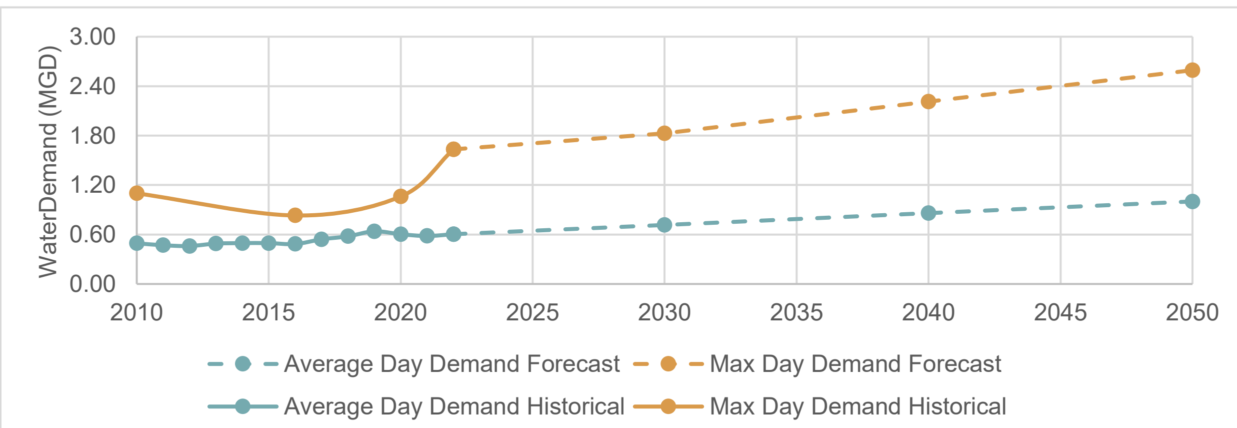


Figure 3-32: Ramseur Water Capacity Projections

3.2.2.5.2 Wastewater Projections

The town operates a WWTP with a discharge to the Deep River. Ramseur's historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow to meet the needs of the service area and all contract commitments are presented in Table 3-53 and Figure 3-33.

Table 3-53: Ramseur Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	0.18	0.30	0.57	0.59
Wholesale Received	-	-	0.07	0.08
Total ADF Demand	0.18	0.30	0.64	0.67
Maximum Month (MGD)				
Service Area Demand	0.28	0.45	0.86	0.89
Wholesale Received	-	-	0.09	0.09
Total MM Demand	0.28	0.45	0.95	0.98

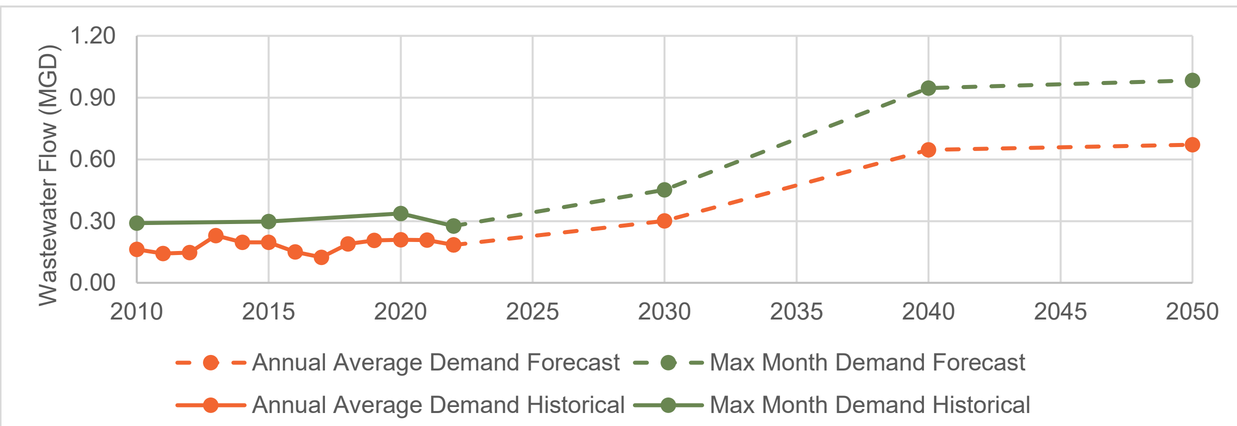


Figure 3-33: Ramseur Wastewater Capacity Projections

3.2.2.5.3 Ramseur Projections Summary Table

Table 3-54: Town of Ramseur Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.61	0.71	0.86	1.00
Max Day Demand (MGD)	1.63	1.83	2.21	2.59
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.18	0.30	0.64	0.67
Maximum Monthly Flow (MGD)	0.28	0.45	0.95	0.98

3.2.2.6 City of Randleman

3.2.2.6.1 Water Projections

Randleman is a member in PTRWA and purchases the bulk of their water supply from the facility. The City's historical average day water demand, historical maximum day water demand, projected average day water demand, and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-55 and Figure 3-34.

Table 3-55: Randleman Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	0.55	0.87	1.21	1.54
Wholesale Demand	-	-	-	-
Total Average Day Demand	0.55	0.87	1.21	1.54
Maximum Day Demand (MGD)				
Service Area Demand	1.04	1.74	2.41	3.08
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	1.04	1.74	2.41	3.08

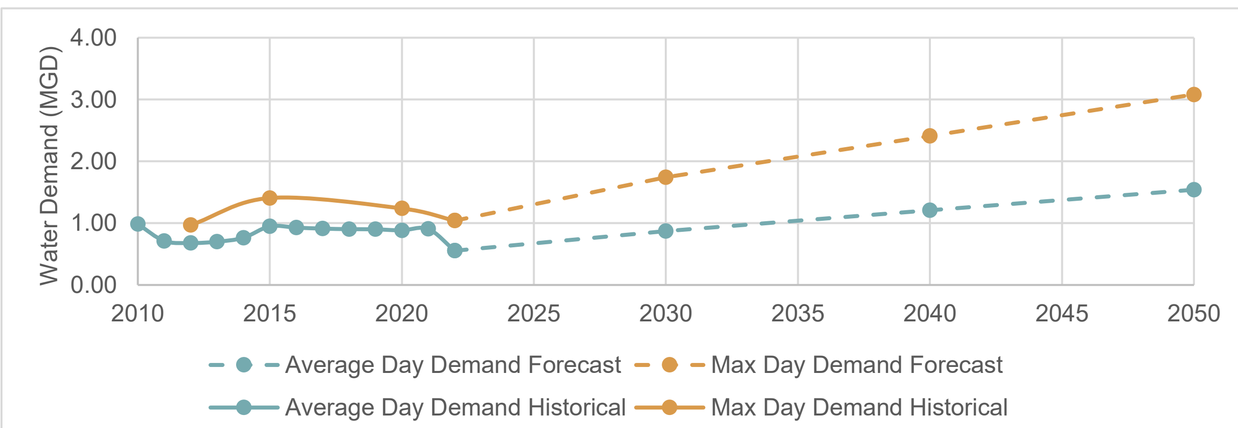


Figure 3-34: Randleman Water Capacity Projections

3.2.2.6.2 Wastewater Projections

The city operates a 1.75 MGD wastewater treatment plant with aging infrastructure. Randleman's historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow to meet the needs of the service area and all contract commitments are presented in Table 3-56 and Figure 3-35.

Table 3-56: Randleman Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	0.51	0.77	1.09	1.41
Wholesale Received	-	-	-	-
Total ADF Demand	0.51	0.77	1.09	1.41
Maximum Month (MGD)				
Service Area Demand	0.77	0.93	1.31	1.70
Wholesale Received	-	-	-	-
Total MM Demand	0.77	0.93	1.31	1.70

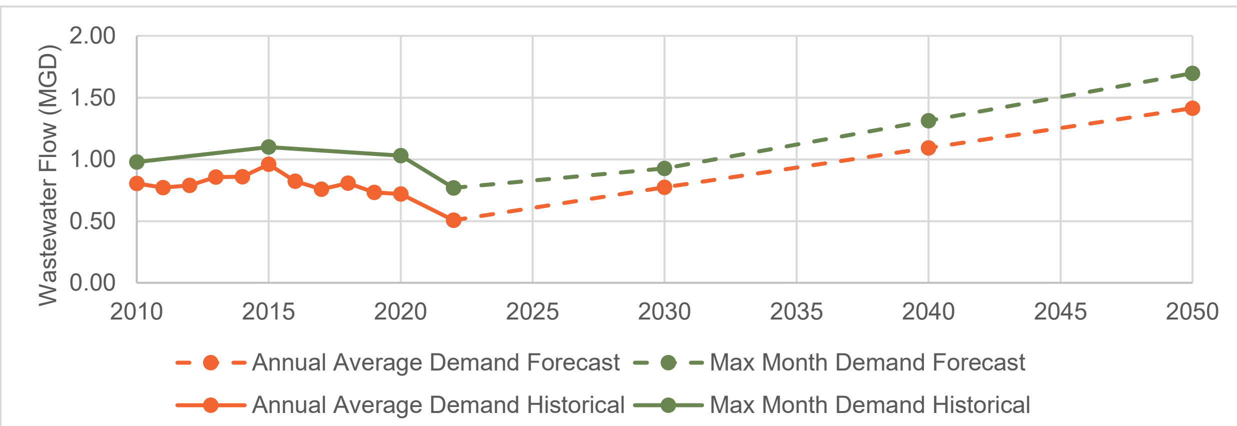


Figure 3-35: Randleman Wastewater Capacity Projections

3.2.2.6.3 Randleman Projections Summary Table

Table 3-57: City of Randleman Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.55	0.87	1.21	1.54
Max Day Demand (MGD)	1.04	1.74	2.41	3.08
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.51	0.77	1.09	1.41
Maximum Monthly Flow (MGD)	0.77	0.93	1.31	1.70

3.2.2.7 Seagrove-Ulah Metropolitan Water District

3.2.2.7.1 Water Projections

The Seagrove-Ulah MWD purchases their water from the City of Asheboro and has a historical average day water demand, projected average day water demand, and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-58 and Figure 3-36. Seagrove's historical maximum day water demand was not available through the LWSP data.

Table 3-58: Seagrove-Ulah MWD Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	0.18	0.18	0.20	0.22
Wholesale Demand	-	-	-	-
Total Average Day Demand	0.18	0.18	0.20	0.22
Maximum Day Demand (MGD)				
Service Area Demand	0.21	0.27	0.30	0.32
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	0.21	0.27	0.30	0.32

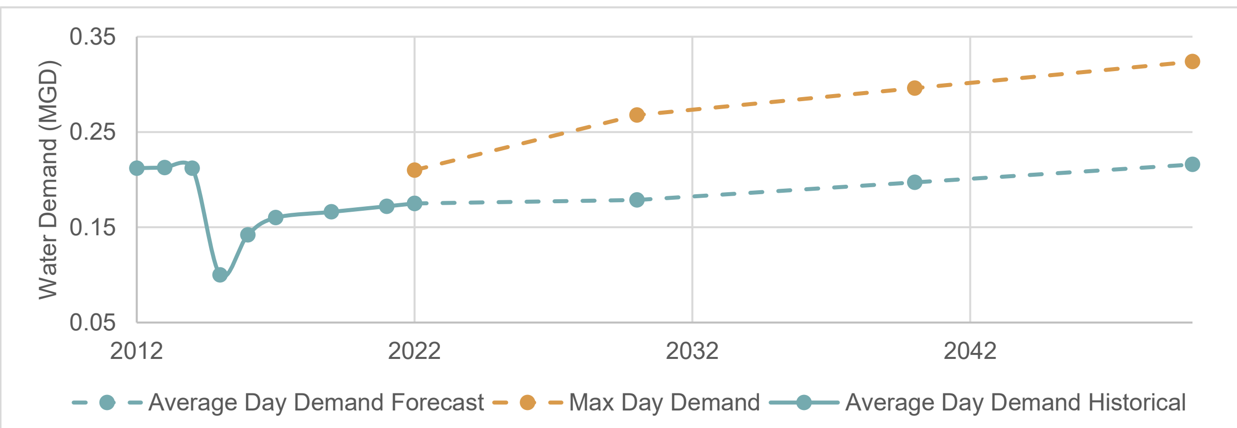


Figure 3-36: Seagrove-Ulah MWD Water Capacity Projections

3.2.2.7.2 Wastewater Projections

Seagrove-Ulah MWD operates a small package plant in the town with a historical annual average flow, historical maximum month flow, projected annual average flow, and projected maximum month flow to meet the needs of the service area and all contract commitments are presented in Table 3-59 and Figure 3-37.

Table 3-59: Seagrove-Ulah MWD Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	0.02	0.07	0.08	0.09
Wholesale Received	-	-	-	-
Total ADF Demand	0.02	0.07	0.08	0.09
Maximum Month (MGD)				
Service Area Demand	0.03	0.11	0.12	0.13
Wholesale Received	-	-	-	-
Total MM Demand	0.03	0.11	0.12	0.13

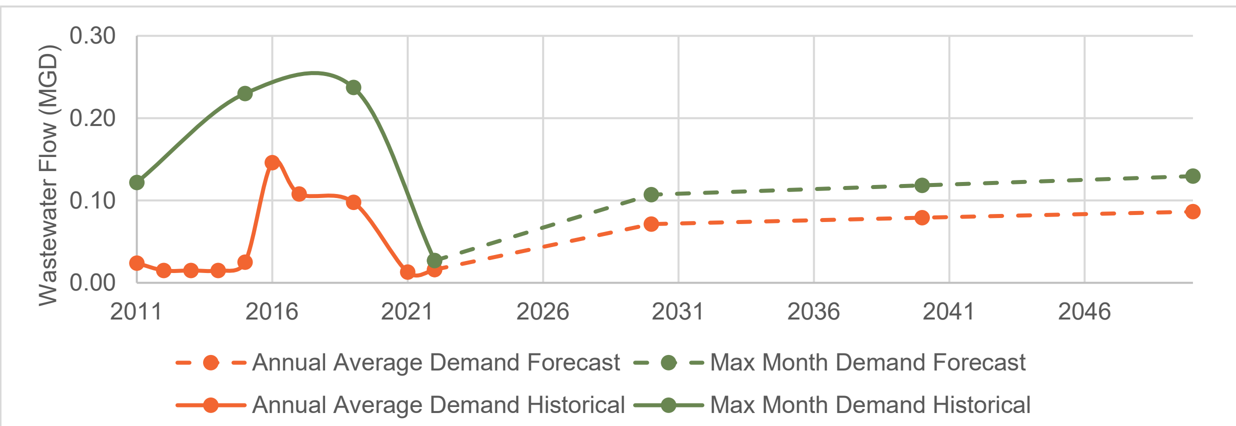


Figure 3-37: Seagrove-Ulah MWD Wastewater Capacity Projections

3.2.2.7.3 Seagrove-Ulah MWD Projections Summary Table

Table 3-60: Seagrove-Ulah MWD Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.18	0.18	0.20	0.22
Max Day Demand (MGD)	0.21	0.27	0.30	0.32
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.02	0.07	0.08	0.09
Maximum Monthly Flow (MGD)	0.03	0.11	0.12	0.13

3.2.2.8 Town of Trinity

3.2.2.8.1 Water Projections

Trinity's projected average day water demand and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-61 and Figure 3-38. Trinity's historical water demand/purchases from Davidson Water, Inc was not available through the LWSP data, and the demands represented below are a representation from the TAZ parcel projections.

Table 3-61: Trinity Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	1.57	1.69	1.82	1.95
Wholesale Demand	-	-	-	-
Total Average Day Demand	1.57	1.69	1.82	1.95
Maximum Day Demand (MGD)				
Service Area Demand	2.36	2.53	2.73	2.93
Wholesale Demand	-	-	-	-
Total Maximum Day Demand	2.36	2.53	2.73	2.93

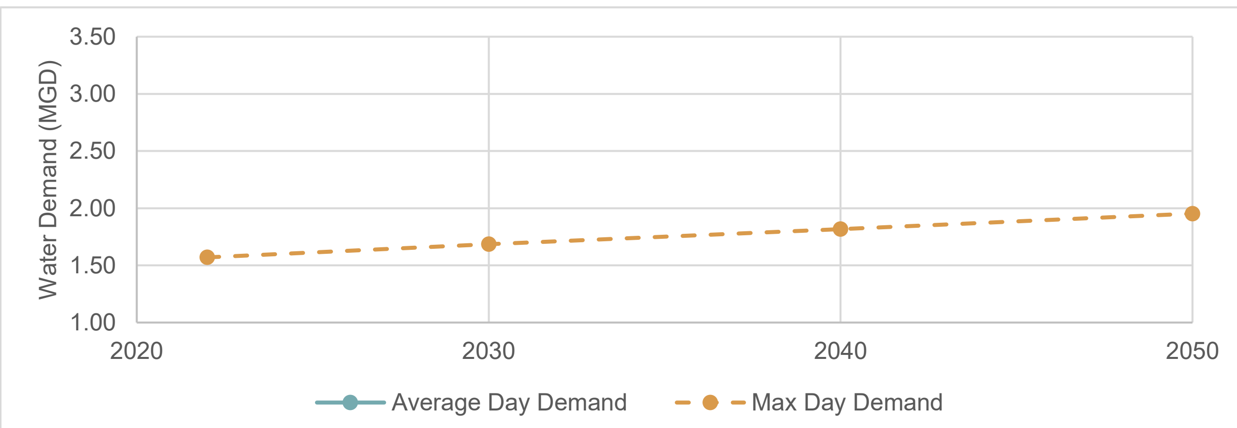


Figure 3-38: Trinity Water Capacity Projections

3.2.2.8.2 Wastewater Projections

Trinity's historical annual average flow, projected annual average flow, and projected maximum month flow are to meet the needs of the service area and all contract commitments presented in presented in Table 3-62 and Figure 3-39. Trinity's historical maximum month wastewater discharge to Thomasville was not available through the LWSP data, thus, this is a projection from the TAZ parcel populations. The City of Trinity is currently installing a wastewater conveyance system to reroute their flows to the City of High Point's Westside WWTP.

Table 3-62: Trinity Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	0.22	0.95	0.97	0.99
Wholesale Received	-	-	-	-
Total ADF Demand	0.22	0.95	0.97	0.99
Maximum Month (MGD)				
Service Area Demand	0.27	1.14	1.17	1.19
Wholesale Received	-	-	-	-
Total MM Demand	0.27	1.14	1.17	1.19

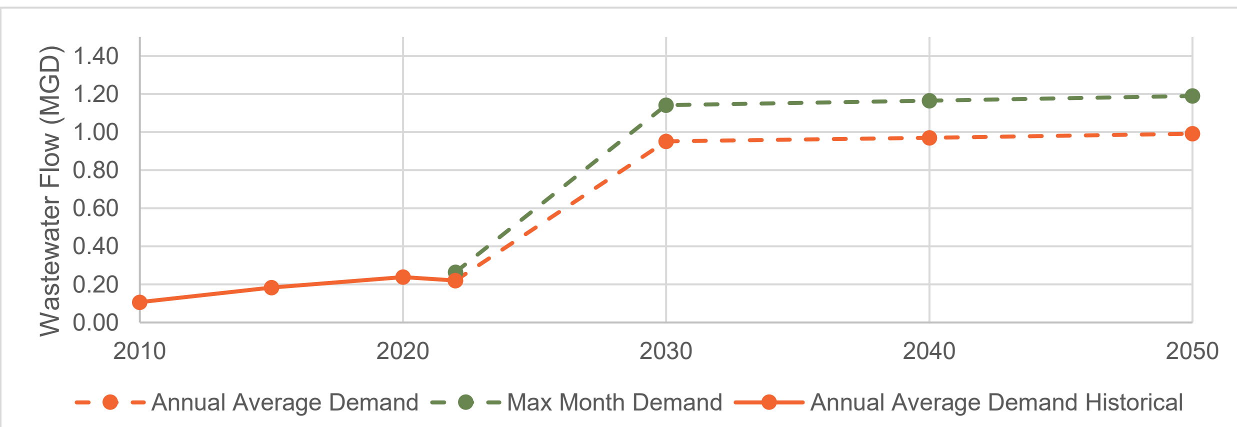


Figure 3-39: Trinity Wastewater Capacity Projections

3.2.2.8.3 Trinity Projections Summary Table

Table 3-63: City of Trinity Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	1.57	1.69	1.82	1.95
Max Day Demand (MGD)	2.36	2.53	2.73	2.93
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.22	0.95	0.97	0.99
Maximum Monthly Flow (MGD)	0.27	1.14	1.17	1.19

3.2.2.9 Unincorporated Randolph County

3.2.2.9.1 Water Projections

Unincorporated Randolph County's projected average day water demand and projected maximum day water demand to meet the needs of the service area and all contract commitments are presented in Table 3-64 and Figure 3-40. Unincorporated Randolph County does not currently operate a water system; therefore, historical average day demand and historical maximum day demand is not available. Projections were developed for Unincorporated Randolph County to account for the allocation of Randolph County's PTRWA allocation, the future failures of private wells and to accommodate the need for more dense housing development in the suburban and rural areas.

Table 3-64: Unincorporated Randolph County Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	-	0.32	0.64	1.18
Wholesale Demand	-	1.25	1.33	1.67
Total Average Day Demand	-	1.57	1.97	2.85
Maximum Day Demand (MGD)				
Service Area Demand	-	0.48	0.96	1.77
Wholesale Demand	-	2.63	4.99	7.36
Total Maximum Day Demand	-	3.11	5.95	9.13

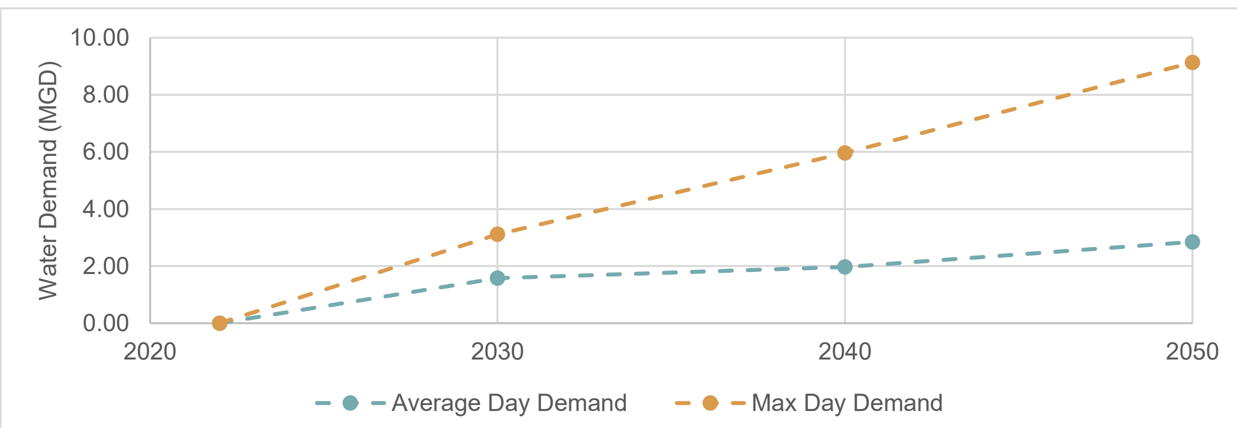


Figure 3-40: Randolph County Water Capacity Projections

3.2.2.9.2 Wastewater Projections

Unincorporated Randolph County's projected annual average wastewater flow and projected maximum month wastewater flow to meet the needs of the service area and all contract commitments are presented in Table 3-65 and Figure 3-41. Unincorporated Randolph County does not currently operate a sewer system, therefore historical annual average flow and historical maximum month flow is not available. Projections were developed for Unincorporated Randolph County to account for future failures of private septic systems and to accommodate the need for more dense housing development in the suburban and rural areas.

Table 3-65: Unincorporated Randolph County Wastewater Projection Breakdown

	2022	2030	2040	2050
Average Daily Flow (MGD)				
Service Area Demand	-	0.11	0.42	0.94
Wholesale Received	-	-	-	-
Total ADF Demand	-	0.11	0.42	0.94
Maximum Month (MGD)				
Service Area Demand	-	0.13	0.51	1.13
Wholesale Received	-	-	-	-
Total MM Demand	-	0.13	0.51	1.13

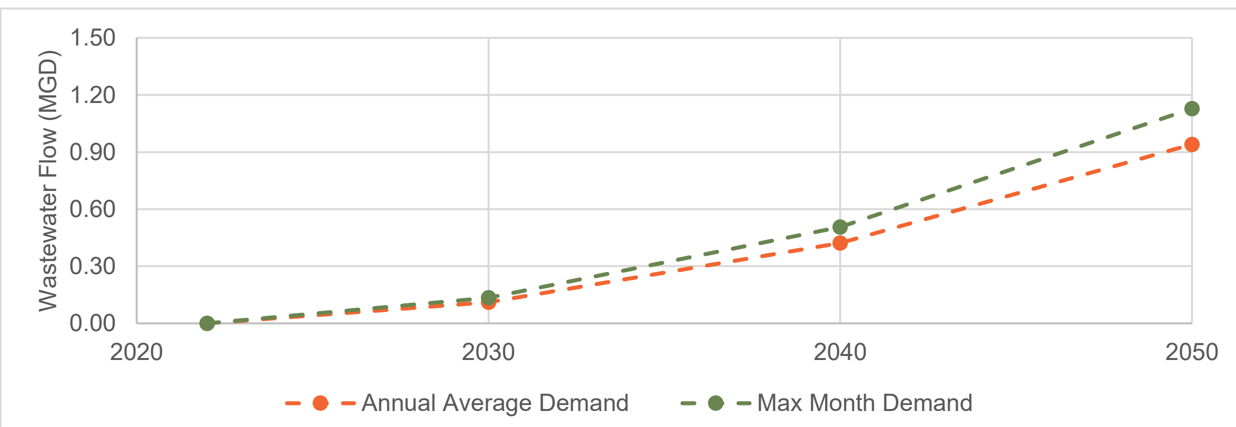


Figure 3-41: Randolph County Wastewater Capacity Projections

3.2.2.9.3 Unincorporated Randolph County Projections Summary Table

Table 3-66: Unincorporated Randolph County Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	1.57	1.97	2.85
Max Day Demand (MGD)	-	3.11	5.95	9.13
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.11	0.42	0.94
Maximum Monthly Flow (MGD)	-	0.13	0.51	1.13

3.2.3 Water and Wastewater Projections Summary

Table 3-67 and Table 3-68 summarize the 2022 demand and the 2050 demand from the graphs above for each municipality and the growth that was projected for each utility in the planning scenarios.

Table 3-67: Summary of Water Demand Projections per Municipality

Water Demand Projections by Area	2022 Avg Day Water Demand (MGD)	2050 Avg Day Water Demand (MGD)	Difference Average Day Demand (MGD)	2022 Max Day Water Demand (MGD)	2050 Max Day Water Demand (MGD)	Difference Maximum Day Water Demand (MGD)
Archdale	0.89	2.28	+1.39	1.81	4.57	+2.76
Asheboro	4.97	7.55	+2.58	7.02	11.32	+4.30
Franklinville	0.11	0.13	+0.02	0.12	0.19	+0.07
Gibsonville	0.61	1.98	+1.37	0.73	2.97	+2.24
Greensboro	34.79	55.36	+20.57	48.31	83.04	+34.73
Guilford County	-	1.09	+1.09	-	1.64	+1.64
High Point	13.32	19.24	+5.92	15.00	28.86	+13.86
Jamestown	0.46	1.49	+1.03	0.54	2.24	+1.70
Liberty	0.26	0.66	+0.40	0.31	0.99	+0.68
Oak Ridge	-	0.63	+0.63	-	0.94	+0.94
Pleasant Garden	-	0.55	+0.55	-	0.83	+0.83
Ramseur	0.50	0.87	+0.37	1.51	2.40	+0.89
Randleman	0.55	1.54	+0.99	1.04	3.08	+2.04
Randolph County	-	1.18	+1.18	-	1.77	+1.77
Seagrove	0.18	0.22	+0.04	0.21	0.32	+0.11
Sedalia	-	0.13	+0.13	-	0.20	+0.20
Stokesdale	0.15	0.50	+0.35	0.26	0.85	+0.59
Summerfield	-	0.67	+0.67	-	1.00	+1.00
Trinity	1.57	1.95	+0.38	2.36	2.93	+0.57
Total	**58.36**	**98.02**	**+39.66**	**79.22**	**150.15**	**+70.93**

Table 3-68: Summary of Wastewater Flow Projections per Municipality

Wastewater Flow Projections by Area	2022 Annual Avg WW Flow (MGD)	2050 Annual Avg WW Flow (MGD)	Difference in Annual Avg WW Flow (MGD)	2022 Max Month WW Flows (MGD)	2050 Max Month WW Flows (MGD)	Difference in Max Month WW Flows (MGD)
Archdale	1.00	2.41	+1.41	1.20	2.89	+1.69
Asheboro	3.54	6.85	+3.31	4.61	8.91	+4.30
Franklinville	0.04	0.08	+0.04	0.05	0.09	+0.04
Gibsonville	0.67	2.29	+1.62	0.91	3.09	+2.18
Greensboro	33.18	50.48	+17.30	36.61	55.52	+18.91
Guilford County	-	1.36	+1.36	-	1.63	+1.63
High Point	11.17	17.36	+6.19	16.91	26.04	+9.13
Jamestown	0.63	1.57	+0.94	1.22	2.35	+1.13
Liberty	0.32	0.90	+0.57	0.51	1.35	+0.84
Oak Ridge	-	0.09	+0.09	-	0.11	+0.11
Pleasant Garden	-	0.11	+0.11	-	0.14	+0.14
Ramseur	0.18	0.59	+0.41	0.28	0.89	+0.61
Randleman	0.51	1.41	+0.90	0.77	1.70	+0.93
Randolph County	-	0.94	+0.94	-	1.13	+1.13
Seagrove	0.02	0.09	+0.07	0.03	0.13	+0.10
Sedalia	-	0.07	+0.07	-	0.08	+0.08
Stokesdale	-	0.03	+0.03	-	0.04	+0.04
Summerfield	-	0.53	+0.53	-	0.64	+0.64
Trinity	-	0.99	+0.99	-	1.19	+1.19
Total	**51.26**	**88.15**	**+36.89**	**63.09**	**107.91**	**+44.82**

3.2.3.1 Water Projections for PTRWA

PTRWA operates the John F. Kime WTP on Randleman Reservoir. Six members are invested in the facility, Greensboro, High Point, Jamestown, Randleman, Archdale, and Randolph County. The maximum day demand projections assume that all members are experiencing their maximum day scenario simultaneously, which is a conservative assumption for this facility. PTRWA's historical average day water production, historical maximum day water production, projected average day water production, and projected maximum day water production based on the PTRWA members' water demand are presented in Table 3-69 and Figure 3-42.

Table 3-69: PTRWA Water Projection Breakdown

	2022	2030	2040	2050
Average Day Demand (MGD)				
Service Area Demand	0.66	0.83	0.91	0.97
Wholesale Demand	11.09	16.28	17.57	19.07
Total Average Day Demand	11.75	17.11	18.48	20.04
Maximum Day Demand (MGD)				
Service Area Demand	0.74	1.25	1.36	1.46
Wholesale Demand	11.84	21.31	31.67	44.37
Total Maximum Day Demand	12.58	22.56	33.03	45.83

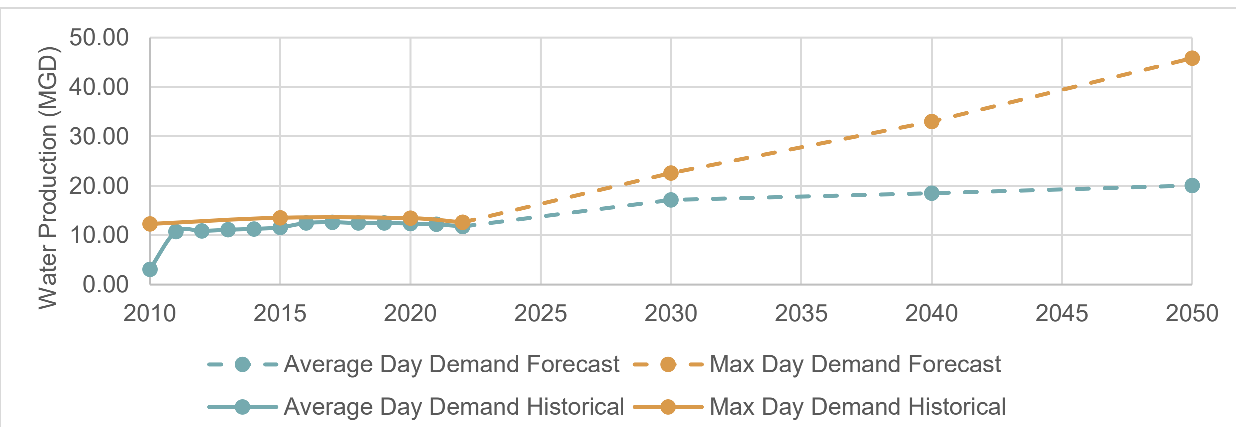


Figure 3-42: PTRWA Water Capacity Projections

4. Water and Watewater Treatment Requirements

4.1 Water Treatment Considerations

4.1.1 Conventional Treatment

Conventional water treatment includes processes to ensure the removal of contaminants and the delivery of safe drinking water to customers that complies with state and federal regulations. These processes generally consist of coagulation and flocculation, sedimentation, filtration, disinfection, pH adjustment and disinfection. A variety of chemicals are added during conventional treatment to facilitate each of the processes. Conventional treatment achieves the removal of suspended solids, pathogens, organic matter, chemical contaminants, turbidity and color.

Conventional water treatment plants in North Carolina adhere to regulations set by the EPA and to ensure the quality and safety of drinking water. Regular testing and monitoring ensure that the water meets all regulatory standards before it reaches consumers.

4.1.2 Advanced Treatment for Removal of Compounds of Emerging Concern

Advanced water treatment methods are being utilized in addition to conventional treatment to address the presence of PFAS, 1,4-Dioxane, and other emerging contaminants in water sources. PFAS are often referred to as "forever chemicals" because they are persistent in the environment, do not degrade naturally and have been shown to bioaccumulate. These contaminants are known to be harmful to human health and the environment. Recent data indicate that North Carolina's exposure to 1,4-dioxane is more than twice the national average. EPA's UCMR3 monitoring (2013–2015) showed that 1,4-dioxane detections in North Carolina were most prevalent in the Cape Fear River Basin, and the state ranked among the top four nationally for both highest concentrations and number of affected drinking water systems.

Source reduction measures at industrial discharge points are the most cost-effective way to reduce emerging compounds in drinking water sources and minimize the burden of treatment at drinking water plants. Techniques such as granular activated carbon (GAC) filtration, reverse osmosis (RO), ion exchange and advanced oxidation processes (AOPs) are being employed to effectively remove PFAS and 1,4-Dioxane from water sources. These processes are also effective at removing other emerging contaminants.

GAC filtration involves passing water through a bed of activated carbon where PFAS or other compounds can adsorb to the surface of the media and be removed. Ion exchange is another method where ions in the water are exchanged with ions in a resin to remove contaminants. AOPs use powerful oxidants called hydroxyl radicals to break down contaminants into harmless byproducts. Membrane treatment is also an option for the removal of contaminants from water through filtration that are not effectively removed by conventional treatment. Each advanced treatment approach has advantages and disadvantages and requires site-specific evaluations to define the most appropriate application based on the contaminants present.

These advanced treatment methods are being implemented in water treatment plants across North Carolina to ensure customers have clean drinking water that meets EPA standards. The City of Greensboro Mitchell and Townsend WTPs, Cape Fear Public Utility Authority's Sweeney Water Treatment Plant, Lower Cape Fear Water and Sewer Authority's Bladen Bluffs Water Treatment Plant, and Pender County Utilities' Surface WTP are utilizing GAC filtration to remove PFAS. Brunswick County Water System and PTRWA are undergoing upgrades to include RO membranes for the removal of PFAS and 1,4-Dioxane. Increased monitoring and testing are required to ensure the effectiveness of these treatment processes in removing PFAS and 1,4-Dioxane from water sources, increasing the operational costs for all drinking water facilities.

Regulation of PFAS in finished drinking water is authorized under the Safe Drinking Water Act, and EPA has enacted enforceable MCLs for certain PFAS, including; PFOA, PFOS, perfluorohexane sulfonic acid (PFHxS), perfluorononanoic acid (PFNA), and hexafluoropropylene oxide dimer acid (HFPO-DA) as well as a hazard index (HI) based approach of PFAS mixtures which includes perfluorobutanesulfonic acid (PFBS). Table 4-1 summarizes the PFAS MCLs that were finalized in 2024.

Table 4-1: 2024 USEPA PFAS MCLs

Compound	Individual MCL	PQL[1]	Hazard Index
PFOA	4.0 ng/L	4 ng/L	NA
PFOS	4.0 ng/L	4 ng/L	NA
PFHxS	10 ng/L	3 ng/L	1 (unitless)
HFPO-DA (GenX)	10 ng/L	5 ng/L	
PFNA	10 ng/L	4 ng/L	
PFBS	NA	3 ng/L	

[1]Practical quantitation limit

The HI is a quantifier used to "establish simultaneous exposure to mixtures of certain chemicals"[1]. The HI relies on Health Based Water Concentrations (HBWC) for each of the four compounds, which is the level below which no health effects are expected for that PFAS. [1] In this case, the total hazard from combined exposure to the four PFAS compounds is defined below.

Hazard Index calculation

$$HI\ MCL = \left(\frac{[HFPO\text{-}DA_{water}\,ng/L]}{[10\ ng/L]}\right) + \left(\frac{[PFBS_{water}\,ng/L]}{[2000\ ng/L]}\right) + \left(\frac{[PFNA_{water}\,ng/L]}{[10\ ng/L]}\right) + \left(\frac{[PFHxS_{water}\,ng/L]}{[10\ ng/L]}\right)$$

Compliance sampling for surface water systems will be conducted quarterly and contribute to a calculated annual running average for each PFAS. Finished water entry points with PFAS levels exceeding at least one MCL will need to install treatment or take other actions to comply with the rule. Entry points with PFAS levels below the MCLS will be eligible for reduced monitoring requirements. On May 14, 2025, the EPA announced its intention to provide utilities with additional regulatory flexibility to address PFAS in drinking water with the following planned changes to the regulation:

[1] Federal Register. (2024, June 11). PFAS National Primary Drinking Water Regulation; Correction. Federal Register.

- EPA intends to rescind the regulations and reconsider the regulatory determinations for PFHxS, PFNA, HFPO-DA (commonly known as GenX), and the HI mixture of these three plus PFBS.
- EPA plans to develop rulemaking to provide an additional 2 years for compliance, extending the deadline to comply with the MCLs to April 2031. EPA also announced plans to provide flexibility on compliance through the use of exemptions.

EPA will need to issue revised draft and final regulations in the Federal Register to finalize these intended changes. A proposed rulemaking to revise the compliance timeline for the PFOA and PFOS MCLs was scheduled for Fall 2025 with a final rule potentially issued in early 2026, however, this timeline is uncertain at the time of this report.

The PFAS National Primary Drinking Water Regulation is also currently subject to a Petition for Judicial Review filed by American Water Works Association (AWWA), Association of Metropolitan Water Agencies (AMWA), and chemical manufacturing organizations.

4.1.3 Description of Existing Treatment Systems and Improvement Projects Underway

The following projects are underway to address contaminants of emerging concern at water treatment facilities in the study area:

- The City of Greensboro is under contract with a consultant to design a PFAS treatment system at the Mitchell WTP. This project will use GAC for removal/reduction of PFAS. The City of Greensboro will begin the design of an advanced treatment system at Townsend WTP in 2026.
- PTRWA is under contract with a Design/Build team to reduce the effluent concentrations of 1,4-Dioxane and PFAS in the potable water by Reverse Osmosis.
- The City of Asheboro is starting a PFAS Evaluation and Assessment Study for the Asheboro WTP to understand how best to address PFAS in the City's source water. The Study will involve pilot testing and is expected to be complete by the end of 2026. Asheboro is expected to begin the design of an advanced treatment system following the Study.

4.2 Wastewater Treatment Considerations

4.2.1 Conventional Treatment

Conventional wastewater treatment removes solids, organic matter, nutrients, and pollutants from wastewater using a combination of physical, chemical, and biological processes and operations. These processes are broken down into pre-treatment, primary treatment, secondary treatment and tertiary treatment. Conventional wastewater treatment plants in North Carolina adhere to regulations set by the EPA and NCDEQ. All wastewater discharges to surface waters must receive a permit to control water pollution through the NPDES program. Compliance with the NPDES permit is tracked through the submittal of discharge monitoring reports (DMRs).

4.2.2 Environmental Assessment of Receiving Streams

Cape Fear River Basin: Deep and Upper Cape Fear Sub-basins

Water quality data collected in the Deep and Upper Cape Fear sub-basins indicate that the waterbodies located in these sub-basins are impacted by excess nutrients. To protect water quality and designated uses in the basin, NCDEQ adopted a "hold the load" strategy for the central portion of the Cape Fear River basin. The strategy is intended to limit additional loading of nitrogen and phosphorus, with the understanding that a reduction in nutrient loading will likely be needed throughout this section of the basin until water quality modeling can show otherwise. Tools to assist with NPDES management decisions are underway and include a watershed nutrient response model and a Nutrient Criteria Development Plan (NCDP) process which will be followed by a TMDL and/or nutrient management strategy to control nitrogen and phosphorus loading in this portion of the basin. The model currently being developed by EPA will play a critical role in supporting future permitting and management strategies to protect not only this portion of the basin but downstream as well.

Cape Fear River Basin: Haw River Sub-basin

The EPA approved a TMDL for the Jordan Lake watershed in September 2007. The approved TMDL estimated the allowable pollutant load for TN and TP in the lake, and it allocated the loads to known sources. Portions of the Jordan Lake Nutrient Rules (15A NCAC 02B .0263-.0273) went into effect in August 2009. The purpose of the rule is to "establish minimum nutrient control requirements for point source wastewater discharges in the Jordan Lake watershed in order to restore and maintain water quality in the reservoir and its tributaries and protect their designated uses, including water supply" [15A NCAC 02B .0270 (1)]. The point source dischargers in the Haw River arm of Jordan lake currently have an allocation of nitrogen and phosphorus based on these management programs. Each discharger has a certain amount of nitrogen and phosphorus that they are permitted to use. They can sell their nitrogen or phosphorus to another facility within the Haw River arm, but there is no additional load that can be added to this watershed.

The Study recognizes an effort by the Nonpoint Source (NPS) planning division of NCDEQ to implement the Phase 2 Jordan Lake Nutrient Strategy rules designed to restore water quality in Jordan Lake by further reducing the mass of TN and TP by approximately 30% from upstream point sources. Recognizing this effort is not complete with NCDEQ and the result will likely change multiple variables such as transport factors and ultimate pollutant discharge load targets, a decision was made to move forward with the current allocations for the facilities discharging to the Haw River in this analysis.

4.2.2.1 Nutrient Management

Building off the nutrient assessment that Hazen performed in the NCDEQ US HWY 421 Corridor Study, this Study updated the assessment of nutrient impacts on receiving streams within the Deep River sub-basin of the Cape Fear River basin by collecting more recent historical data, where available. The current TN and TP effluent discharge loadings reported by the wastewater utility providers were summarized to understand the current load in the basin that would need to be maintained or reduced with any future wastewater facility projects. The Greensboro T.Z. Osborne WRF was not included in the TN/TP loadings assessment because that facility discharges into the Haw River sub-basin. With the mass loading of the

Jordan Lake Watershed completely allocated, the Study recognizes that future capacity for the City of Greensboro will need to be located outside of the Haw River drainage basin, with the Deep River sub-basin proposed to be the best available option, therefore this assessment will assess the nutrient allocation in the Deep River sub-basin.

In this Study, the assumed limits of technology for conventional wastewater treatment for TN removal is 3 mg/L, and the assumed limits of technology for TP removal is generally 0.5 mg/L.

The following summarizes the basis for determining existing TN and TP effluent discharge loading by the wastewater treatment facilities within the sub-basin:

- For treatment facilities that have TN and/or TP discharge limits, either concentration or load based, in their current NPDES permit, the annual load (lbs/yr) used in this Study's nutrient assessment was based on the facility's permitted maximum month capacity. High Point Eastside WWTP is currently the only facility discharging to the Deep River sub-basin in the study area that has TN and TP discharge limits.
- For treatment facilities that do not have TN or TP discharge limits in their current NPDES permit, historical effluent data was used to estimate the facility's average effluent annual TN and TP load (lbs/yr) over the years 2022-2024 or 2021-2023 depending on the available data. This estimated historical load was used as the facility's theoretical nutrient load for this Study's nutrient assessment. In the scenario where a facility's estimated historical annual load resulted in a TN or TP concentration less than the assumed limits of technology at the facility's permitted maximum month capacity, then a theoretical TN concentration of 3 mg/L and a TP concentration of 0.5 mg/L were used to assign an annual nutrient load (lbs/yr) based on the facility's permitted maximum month capacity.
    - The sources for the historical effluent data include:
        - DMRs provided to NCDEQ for January 2022 through October 2024
        - EPA – Enforcement and Compliance History Online (ECHO) website for 2021 data and November/December 2024 data
    - An average summer and an average winter TN and TP load were calculated based on three years of data, either 2022-2024 or 2021-2023. For facilities that report load (lbs) values in their DMRs, an average annual load from 2022-2024 or 2021-2023 was the discharge loading assigned for that facility as part of this Study. For facilities that only report TN and TP concentrations (mg/L), the average concentration from the summer sample dates (the summer season defined as April 1 – October 31 to match the NPDES permit definition) was multiplied by the total summer flow to estimate the summer nutrient load (lbs/summer). The summer nutrient load for the three years 2022-2024 or 2021-2023 was then averaged to generate the estimated summer load for that facility. The same procedure was used to calculate the estimated winter load (the winter season defined as January 1-March 31 and November 1-December 31 to match the NPDES permit definition). The average summer nutrient load and the average winter nutrient load were added together for an average annual nutrient load.

A summary of the estimated summer nutrient load and winter nutrient load for the treatment facilities that do not have TN or TP discharge limits in their current NPDES permit is presented in Table 4-2.

- The facilities in the study area that had 2024 TN and TP concentration data readily available on the ECHO website were Asheboro WWTP, Randleman WWTP, Liberty WWTP and Seagrove-Ulah WWTP.

- The facilities in the study area that did not have 2024 TN and TP concentration data readily available on the ECHO website were Ramseur WWTP and Franklinville WWTP. For these facilities, data from 2021-2023 was used.

- There is a range in the frequency of TN and TP concentration samples by the various facilities within the study area. The frequency ranged from weekly samples, monthly samples and quarterly samples. For the facilities that only take quarterly TN and TP concentration samples, the estimated annual nutrient load values calculated for those facilities are only based on one winter sample and three summer samples. In order to refine the estimated annual nutrient loads presented in this Study, it is recommended that facilities increase the frequency in which they take TN and TP samples.

- For non-discharge, spray irrigation treatment facilities that do not have TN or TP load allocations, a theoretical TN concentration of 3 mg/L and a TP concentration of 0.5 mg/L were used to assign an annual nutrient load (lbs/yr) based on the facility's permitted maximum month capacity for use in this Study's nutrient assessment.

The existing TN and TP effluent discharge loads for the wastewater treatment facilities discharging to the Deep River sub-basin within the study area based on the above methodology are summarized in Table 4-3.

Table 4-2: Summary of Historical Discharge Values (Flow, TN Concentration, TP Concentration) and Estimated Nutrient Load

Utility / Facility Name	Capacity (MGD)[1]	Discharge Values Reported (2021-2023 or 2022-2024)										Estimated Annual Load [5]	
		Summer (Apr. 1 – Oct 31)					Winter (Nov. 1 – Mar. 31)						
		Flow [2]	TN		TP		Flow [2]	TN		TP		TN	TP
		MGD	mg/L[3]	lbs/ season [4]	mg/L [3]	lbs/ season [4]	MGD	mg/L [3]	lbs/ season [4]	mg/L [3]	lbs/ season [4]	lbs/yr	lbs/yr
Liberty – Town of Liberty WWTP	0.55	0.35	18.08	11,209	2.61	1,620	0.40	22.72	11,338	2.99	1,492	22,547	3,111
Ramseur – Ramseur WWTP	0.48	0.17	10.22	3,068	4.00	1,202	0.21	12.14	3,187	3.60	946	6,255	2,148
Franklinville – Franklinville WWTP	0.1	0.04	14.26	1,062	6.94	517	0.04	31.29	1,733	14.34	794	2,795	1,311
Asheboro – Asheboro WWTP	9	3.46	20.03	123,583	0.53	3,288	3.75	18.62	87,991	0.39	1,863	211,574	5,151
Randleman – Randleman WWTP	1.745	0.47	7.34	6,119	3.19	2,658	0.50	7.71	4,821	2.39	1,497	10,940	4,155
Seagrove/Ulah Metro Water District WWTP	0.036	0.03	53.43	2,788	6.66	348	0.03	54.89	1,844	7.22	242	4,632	590

[1]Maximum Month Facility Capacity from NPDES Permit.
[2]The average flow during the season (Summer or Winter) over the 3-year reporting period.
[3]The average concentration of TN or TP during the specified season (Summer or Winter) over the 3-year reporting period.
[4]TN and TP load per season calculated based on the average reported TN/TP concentration and average reported flow.
[5]The estimated annual TN and TP load is the sum of the calculated Summer and Winter season loads.

Table 4-3: Existing TN and TP Effluent Loads in the Deep River Sub-Basin from Facilities Within the Study Area

Utility / Facility Name	Capacity (MGD)[1]	Current Permit Limits				Theoretical / Permitted Loads	
		TN		TP		TN	TP
		mg/L	lbs/yr	mg/L	lbs/yr	lbs/yr	lbs/yr
High Point - Eastside WWTP	26	6	474,865	0.5	39,420	474,865	39,420
Liberty - Town of Liberty WWTP	0.55	Non-discharge / irrigation facility				5,023 [2]	837 [2]
Ramseur - Ramseur WWTP	0.48	M&R	-	M&R	-	6,255	2,148
Franklinville - Franklinville WWTP	0.1	M&R	-	M&R	-	2,795	1,311
Asheboro - Asheboro WWTP	9	M&R	-	M&R	-	211,574	13,698 [2]
Randleman - Randleman WWTP	1.745	M&R	-	M&R	-	15,936 [2]	4,974
Seagrove/Ulah Metro Water District WWTP	0.036	Non-discharge / irrigation facility				329 [2]	55 [2]

[1]Maximum Month Facility Capacity from NPDES Permit.
[2]The theoretical TN or TP load is based on assumed limits of technology concentrations (TN = 3 mg/L, TP = 0.5 mg/L) at maximum month facility capacity.

4.2.2.2 Summary of Impairments

The federal Clean Water Act (CWA) requires states to report biennially to the EPA on the quality of the waters in their state. To determine how well waterbodies meet their best-intended use, chemical, physical and biological parameters are regularly assessed by DWR. Where enough samples exist, waterbodies are determined to meet or exceed criteria based on a five-year dataset, assigned waterbody classification and existing water quality standards. Impaired waters are waterbodies where water quality samples exceed water quality standards for a particular parameter. Procedures used to evaluate water quality and assign categories are explained in detail in the Integrated Report (IR) methodology.

Figure 4-1 illustrates the listed impairments within the study area. The impairment criteria are as stated in the 2022 303(d) Listing and Delisting Methodology (DEQ, 2021), which was approved by the Environmental Management Commission (EMC) on May 13, 2021. While all impairments reflect concerns, impairments due to chlorophyll a, dissolved oxygen (DO) and benthos are common concerns when considering a waterbody's ability to assimilate a new or increased discharge of treated wastewater. The water quality conditions also influence the constituent limits imposed in NPDES permits for discharges.

4.2.2.3 Contaminants of Emerging Concern

PFAS and 1,4-Dioxane are currently the primary contaminants of emerging concern in the Cape Fear River basin. The presence of these contaminants has been documented through sampling and widely publicized in the basin. NCDEQ has prioritized actions statewide to reduce the presence of PFAS and 1,4-Dioxane and address concerns of the downstream public water and wastewater providers and communities.

As detailed in Section 4.1.2, the EPA is finalizing national drinking water standards for multiple PFAS compounds. The standards apply to all drinking water systems.

Wastewater treatment has an impact on drinking water supplies and aquatic life as they discharge into surface waters. Public water supply systems provide drinking water to over 9 million North Carolinians. Approximately 459 of the 2,200 systems obtain their source water from surface water supplies. When these source waters are contaminated with pollutant concentrations above state or federal drinking water standards, the systems are required to install and operate treatment systems. The water quality of surface water discharges from industrial and other direct sources plays an important role in the level of treatment required at drinking water systems. NCDEQ maintains the delegated authority to ensure pollutant discharges from direct dischargers and pretreatment operations comply with the federal Clean Water Act.

4.2.3 Advanced Treatment

If the regulatory drivers in the Cape Fear River basin include removing nitrogen to less than concentrations reliably achieved with conventional treatment (e.g., ≤ 3 mg/L TN), PFAS removal and 1,4 Dioxane removal. Table 4-4 provides a description of these regulatory drivers and the recommended treatment technology.

Table 4-4: Summary of Regulatory Drivers in the Cape Fear River Basin

Regulatory Driver	Description	Possible Treatment Technologies
TN	• Future NPDES permits may require treatment facilities to meet effluent TN targets less than the current limits of technology as flows increase. • nbDON concentrations in the effluent may limit the ability for some facilities to meet lower TN concentration targets with only conventional activated sludge technology. • Advanced nbDON removal technology may be needed for additional flow allocations so that additional wasteload allocation can be redistributed amongst the basin.	• Optimized Biological Nutrient Removal Systems. • Ozone or Ozone + H2O2 • Nitrifying filters • Denitrifying filters • Granular activated carbon • Nanofiltration (NF)/Reverse Osmosis (RO)
TP	• Future NPDES Permits and additional flow needed to meet the demands for future development may require lower TP limits than the current limits of technology	• Optimization of biological phosphorus removal may be required. • Additional chemical facilities on secondary and tertiary treatment.
1,4-Dioxane	• Used primarily as a stabilizer for chlorinated solvents. • Included in new NPDES permits as monthly monitoring and reporting. • Regulatory drivers in the Cape Fear River basin are moving towards monitoring and minimization at upstream SIUs and possibly at WWTPs to address uncontrollable constituents.	• Source Reduction • Ozone + H_2O_2 • Reverse Osmosis • Advanced Oxidation • Ion exchange resin
PFAS	• Common uses include non-stick cookware, water-repellent and stain-resistant fabrics, cosmetics and firefighting foams. • Included in current NPDES permits as quarterly monitoring and reporting. • Regulatory drivers in the Cape Fear River basin are moving towards monitoring and minimization at upstream SIUs and possibly at WWTPs to address uncontrollable constituents.	• Source Reduction • Granular activated carbon • Reverse Osmosis • Ion Exchange

There is commonality in the advanced treatment technologies needed for each pollutant of concern to include AOP and GAC. Additionally, biologically active filters will be needed for nitrification and denitrification to achieve additional TN removal. Future studies will be required for facilities requiring limits below conventional technology.

Industry knowledge of the available advanced treatment technologies for emerging contaminants continues to evolve. Prior to design of any facility, the Study recommends piloting advanced treatment processes to confirm treatment efficiency and selection of site-specific design criteria for facility sizing.

4.2.4 Description of Existing Treatment Systems and Improvement Projects Underway

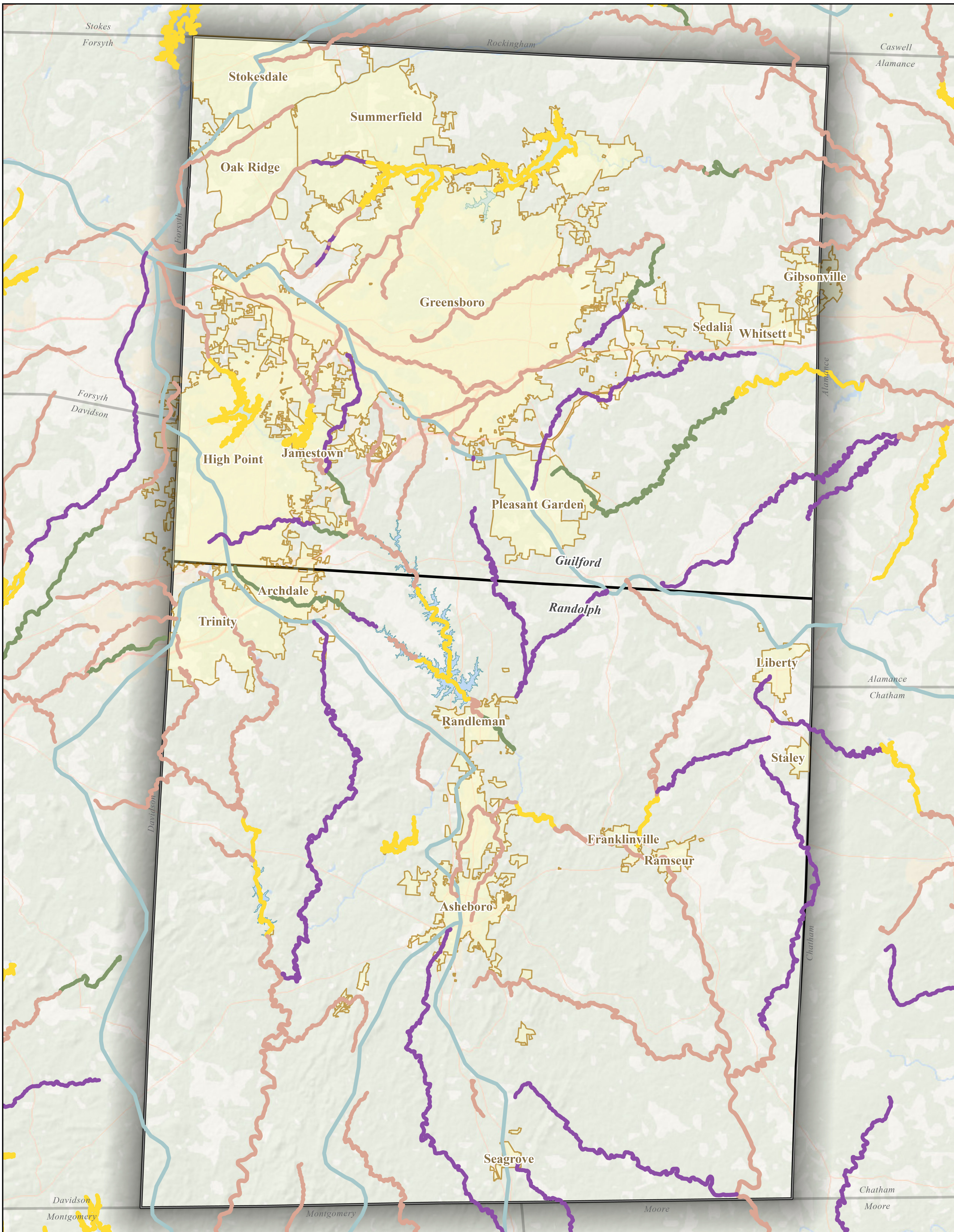
Below is a summary of actions completed or underway for addressing contaminants of emerging concern at wastewater treatment facilities in the study area:

- The City of Greensboro completed the requirements set in a Special Order by Consent (SOC) with NC DEQ to reduce the concentrations of 1,4-Dioxane in their discharge at the TZO WRF.

This effort was deemed successful and the city continues to monitor their effluent for any future contributors.

- The City of High Point is working to identify industries and sources to reduce the discharge concentrations to the Eastside WWTP facility.
- The City of Asheboro is contesting a 1,4 – Dioxane limit imposed by NCDEQ in the WWTPs latest permit renewal. The Office of Administrative Hearings determined that adding a permit limit without a formally adopted regulation was rulemaking by enforcement and created a major cost and liability for municipal utilities and their customers. The EPA challenged the removal of the limit from the permit and held a public hearing in October 2025 as required by their objection to the NCDEQ permit. As of the date of this report, there has been no official decision from the EPA.

  The outcome of this decision could set the course of action for all utilities in the State regarding the discharge of 1,4-Dioxane and other contaminants of concern.



Legend

N

- Guilford and Randolph County
- Major Waterbodies

Impaired Streams (2022)

- Dissolved Oxygen
- Chlorophyll a
- Benthos
- Other
- NCDEQ Regulated Inter-Basin Transfer Boundaries
- Municipal Boundary

Impaired Streams Within Study Area

0 5 10 Miles

Figure 4-1

December 2025

Piedmont Triad Regional Water Authority

PATH: O:\GIS\Projects\31645\31645-002\ArcGISPro\PTRWA_SB\PTRWA_SB.aprx; Layout: PTRWA Basemap Impaired Streams; User: SBailey

5. Water Supply, Water and Wastewater Treatment Capacity, Condition and Needs Summary

5.1 Guilford County Utilities

5.1.1 Town of Gibsonville

A summary of the Town of Gibsonville's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-1.

Table 5-1: Town of Gibsonville Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.61	1.00	1.46	1.98
Max Day Demand (MGD)	0.73	1.50	2.19	2.97
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.67	1.29	2.01	2.29
Maximum Monthly Flow (MGD)	0.91	1.74	2.71	3.09

5.1.1.1 Water Supply and Treatment

The Town of Gibsonville currently contracts with the City of Burlington for their water service, no change is anticipated as a result of this Study. The Town will require an adjustment to their contract with Burlington in 2043. The water needs for the Town of Gibsonville will not be included in the regional solutions.

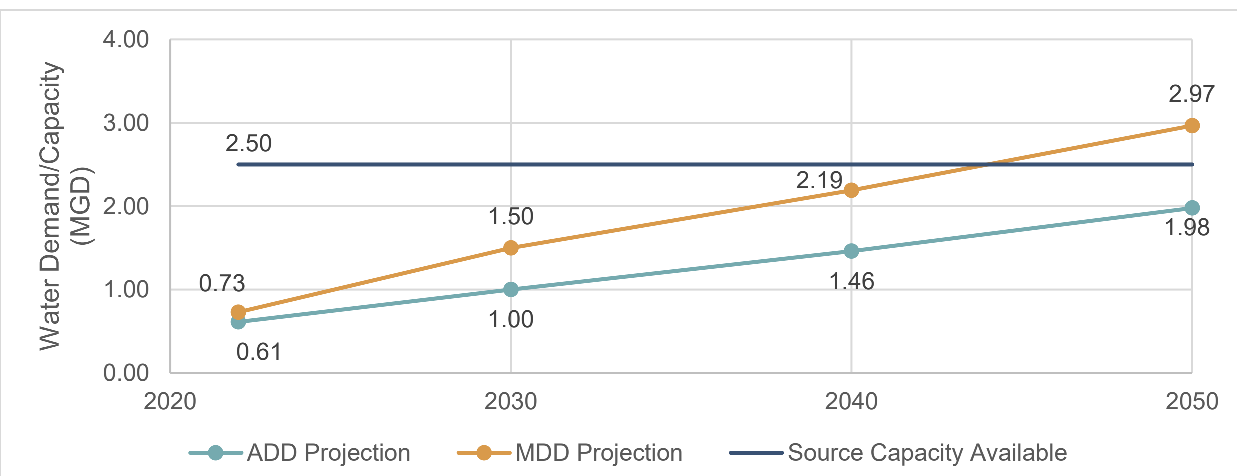


Figure 5-1: Gibsonville Water Demand Projections Versus Capacity Available

5.1.1.2 Wastewater Treatment

The Town of Gibsonville contracts with the City of Burlington to treat their wastewater and no change is anticipated as a result of this Study. The Town will require an adjustment to their contract with Burlington in 2026 to meet the projected growth. The wastewater needs for the Town of Gibsonville will not be included in the regional solutions.

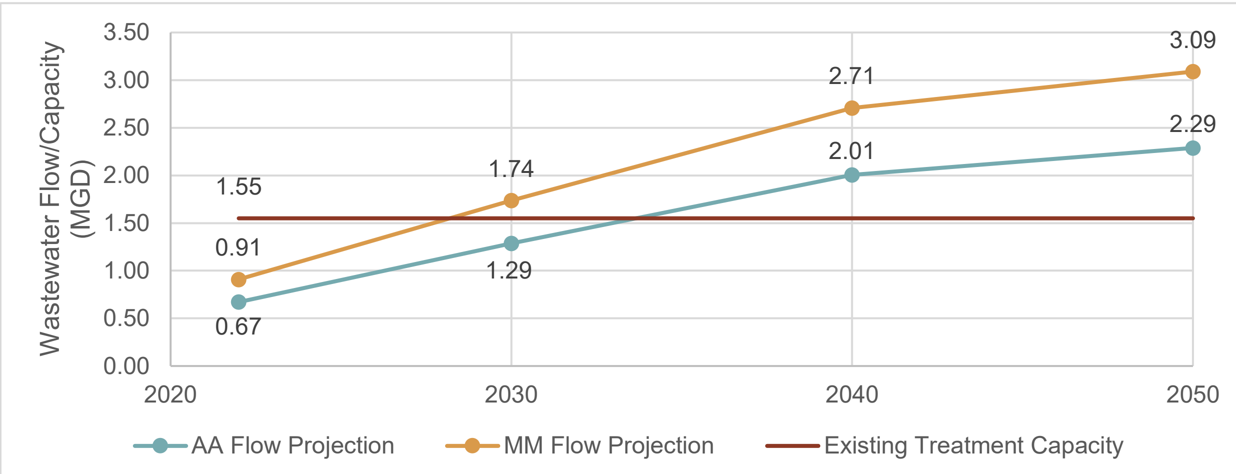


Figure 5-2: Gibsonville Wastewater Capacity and Capacity Needs

5.1.1.3 Town of Gibsonville Worksheet

Worksheet can be found on the following page.

TOWN OF GIBSONVILLE

Water Details	Wastewater Details
Source: N/A **Safe Yield: N/A** **WTP Capacity: N/A MGD** **Purchase Contracts Available .... 2.5 MGD** • Burlington .... 2.5 MGD **Sales Contract Obligations .... 0 MGD** • N/A	**NPDES Discharge Point: N/A** **Treatment Capacity (MM): N/A MGD** **Permit Conditions:** N/A **Receives Contracts Commitments.......... 0 MGD** • N/A **Discharging Contracts Available.......... 1.55 MGD** • Burlington .... 1.55 MGD

Demand (2022)		Capacity (2022)	
2022 Average Day (MGD)	2022 Max Day (MGD)	2022 Average Day (MGD)	2022 Max Day (MGD)
Produced 0	**Produced 0**	**Treated 0**	**Treated 0**
Purchased.......... 0.61	**Purchased.......... 0.73**	**Discharged.......... 0.67**	**Discharged.......... 0.91**
• Burlington 0.61	• Burlington 0.73	• Burlington 0.67	• Burlington 0.91
Sold 0	**Sold 0**	**Received.......... 0**	**Received 0**
• N/A	• N/A	• N/A	• N/A

5.1.2 City of Greensboro

A summary of the City of Greensboro's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow are presented in Table 5-2.

Table 5-2: City of Greensboro Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	34.92	45.17	52.21	57.66
Max Day Demand (MGD)	48.43	67.70	78.25	86.43
Wastewater Capacity Projections				
Average Daily Flow (MGD)	33.18	41.19	47.04	53.73
Maximum Monthly Flow (MGD)	37.51	45.58	52.12	59.70

5.1.2.1 Water Supply and Treatment

The City of Greensboro owns and operates two water treatment facilities, Townsend WTP and Mitchell WTP, with a series of three reservoirs, Lake Higgins, Brandt and Townsend. The Townsend WTP is a 30 MGD facility located on the Lake Townsend reservoir, however, staff have indicated Townsend is limited to 26 MGD with one filter out of service. Mitchell WTP is a 24 MGD facility with an intake on Lake Brandt but is limited to 18 MGD with one filter out of service. This report anticipates the two WTPs can provide a combined capacity of 54 MGD on a peak day in 2050 with the required improvements completed. City staff noted that they have projects planned in their CIP to address their existing capacity restrictions at the treatment plants.

The Mitchell WTP is currently undertaking a design to reduce PFAS concentrations with the installation of a Granular Activated Carbon (GAC) facility and should be online in the next few years. The City of Greensboro will begin the design of an advanced treatment system at Townsend WTP in 2026.

Greensboro has purchase agreements with PTRWA, the City of Burlington, and the City of Reidsville. The current PTRWA purchase capacity is 7.84 MGD but the capacity will increase to 18.52 MGD by 2028 with the PTRWA JFK WTP Expansion project that is currently under construction. Greensboro has a total available reservoir allocation of 25.5 MGD from PTRWA that can be accessed through future expansion of the PTRWA WTP. The current Burlington purchase capacity is 5.0 MGD with plans to maintain that rate. The current Reidsville purchase capacity is 1.0 MGD with plans to increase to 5.0 MGD by year 2040 if needed.

Greensboro has an emergency contract with Winston-Salem/Forsyth County Utilities (WSFCU) for 3.0 MGD of water capacity. Greensboro and WSFCU have different disinfection processes for their drinking water, with Greensboro using chloramine and WSFCU using free chlorine. Greensboro is therefore required to isolate sections of their distribution system when receiving water from WSFCU or install facilities to add ammonia. Due to this operational constraint, WSFCU supply to Greensboro will not be included as a long-term solution in the regional alternatives.

Figure 5-3 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the City of Greensboro. An additional 7 MGD of water capacity is required to meet the needs of Greensboro through 2050.

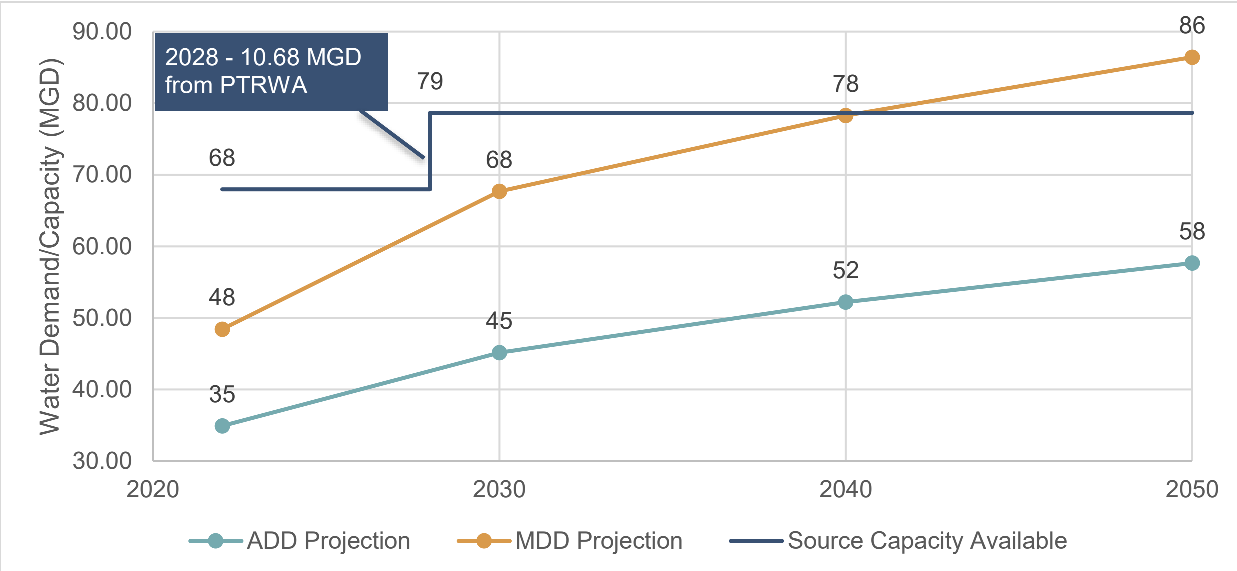


Figure 5-3: Greensboro Water Demand Projections Versus Capacity Available

5.1.2.2 Wastewater Treatment

The City of Greensboro owns and operates the T.Z. Osborne (TZO) WRF, a 56 MGD facility discharging to South Buffalo Creek in the Haw River sub-basin. The facility was recently upgraded to a five-stage facility capable of removing nitrogen and phosphorus to meet their permit levels. TZO WRF is potentially capable of expanding to 60 MGD with minimal. As a result of an SOC agreement with NCDEQ and the EMC, the facility is reducing their 1,4-Dioxane discharge concentrations through source reduction measures by working with their significant industrial users.

Figure 5-4 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the capacity available for the City of Greensboro. The figure also shows 90% of the capacity available because North Carolina Administrative Code (NCAC) rule 15A NCAC 02T .0118 prevents any sewer line extensions once 90% of the treatment system capacity is exceeded, unless permits have been obtained for an expansion. Additional wastewater capacity is required to meet the needs of Greensboro through 2050.

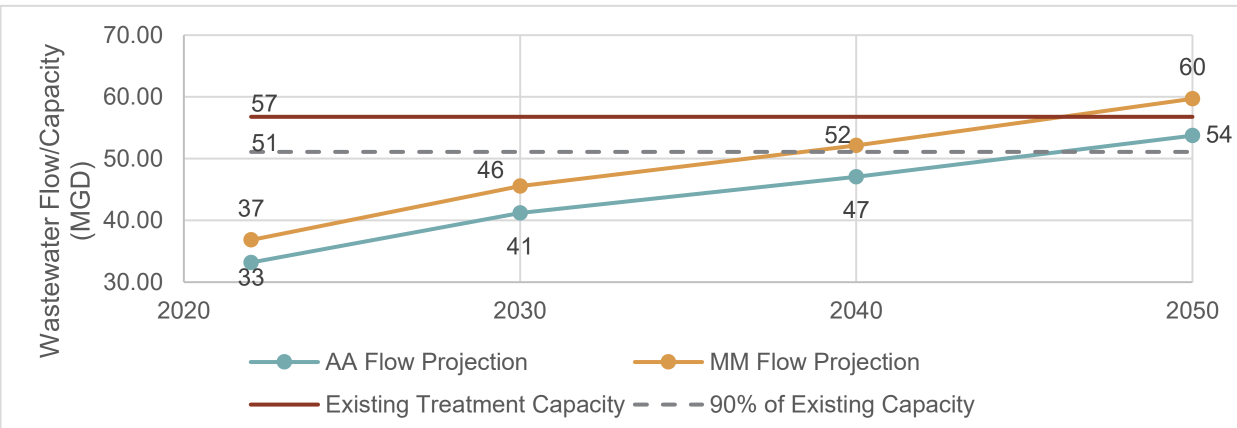


Figure 5-4: Greensboro Wastewater Flow Projections Versus Capacity Available

5.1.2.3 City of Greensboro Worksheet

Worksheet can be found on the following page.

CITY OF GREENSBORO

Water – Mitchell WTP	Water – Townsend WTP	Wastewater – T.Z. Osborne WRF
		

Mitchell and Townsend WTP Details

Source: Lake Brandt, Lake Townsend, Lake Higgins
Safe Yield: 40 MGD
Mitchell WTP Capacity: 24 MGD
Townsend WTP Capacity: 30 MGD
Purchase Contracts Available .... 13.965 MGD

- Burlington.. 5.0 MGD
- Reidsville .... 1.0 MGD
- PTRWA.. 7.84 MGD
- PTRWA (for Jamestown)..................... 0.125 MGD

Sales Contract Obligations............................ 3.625 MGD

- Jamestown via PTRWA....................... 0.125 MGD
- Pleasant Garden........................ 1.0 MGD (Future)
- Sedalia....................................... 0.2 MGD (Future)
- Liberty....................................... 1.0 MGD (Future)

T.Z. Osborne WRF Permit Details

NPDES Discharge Point: South Buffalo Creek – Cape Fear River Basin
Treatment Capacity (MM): 56 MGD
Permit Conditions:

		Monthly	Weekly
BOD			
Summer	mg/L	4.0	6.0
Winter	mg/L	8.0	12.0
TSS	mg/L	30.0	45.0
NH_3-N			
Summer	mg/L	0.82	2.46
Winter	mg/L	1.64	4.92
TN	lb/yr	891,272	
TP	lb/yr	112,044	
1,4-Dioxane	µg/L	M&R	
PFAS	µg/L	N/A	

Receives Contracts Commitments.................. 3.1 MGD

- Burlington .... 0.9 MGD
- Pleasant Garden.........................1.0 MGD (Future)
- Sedalia..0.2 MGD (Future)
- Liberty..1.0 MGD (Future)

Discharging Contracts Available.................. 0.775 MGD

- Jamestown .... 0.775 MGD
- High Point..Not Typical

Demand (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Produced 24.72	**Produced 38.24**
Purchased............... 10.20	**Purchased 10.20**
• Burlington 2.3	• Burlington..............2.3
• Reidsville.............. 1.0	• Reidsville 1.0
• PTRWA 6.74	• PTRWA...............6.74
Sold 0.125	**Sold 0.125**
• Jamestown via PTRWA 0.125	• Jamestown via PTRWA.............0.125

Capacity (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Treated.....................32.55	**Treated 36.07**
Discharged 0.63	**Discharged 0.76**
• High Point 0.14	• High Point...........0.16
• Jamestown............0.5	• Jamestown 0.6
Received 0.18	**Received....................0.22**
• Burlington............0.18	• Burlington 0.22

5.1.3 City of High Point

A summary of the City of High Point's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-3.

Table 5-3: City of High Point Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	13.70	15.23	17.59	20.88
Max Day Demand (MGD)	15.91	23.41	26.94	31.88
Wastewater Capacity Projections				
Average Daily Flow (MGD)	13.39	16.41	19.06	22.24
Maximum Monthly Flow (MGD)	19.81	23.92	27.65	32.32

5.1.3.1 Water Supply and Treatment

The City of High Point owns and operates Ward WTP with a treatment capacity of 24 MGD. The raw water comes from City Lake and Oak Hollow Lake and totals a safe yield of approximately 22.4 MGD. High Point also purchases water from PTRWA and has a current purchase capacity of 2.73 MGD. High Point has a total available reservoir allocation of 9.1 MGD from PTRWA that can be accessed through future expansion of the PTRWA WTP.

Figure 5-5 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the City of High Point. An additional 5 MGD of water capacity is required to meet the needs of High Point through 2050.

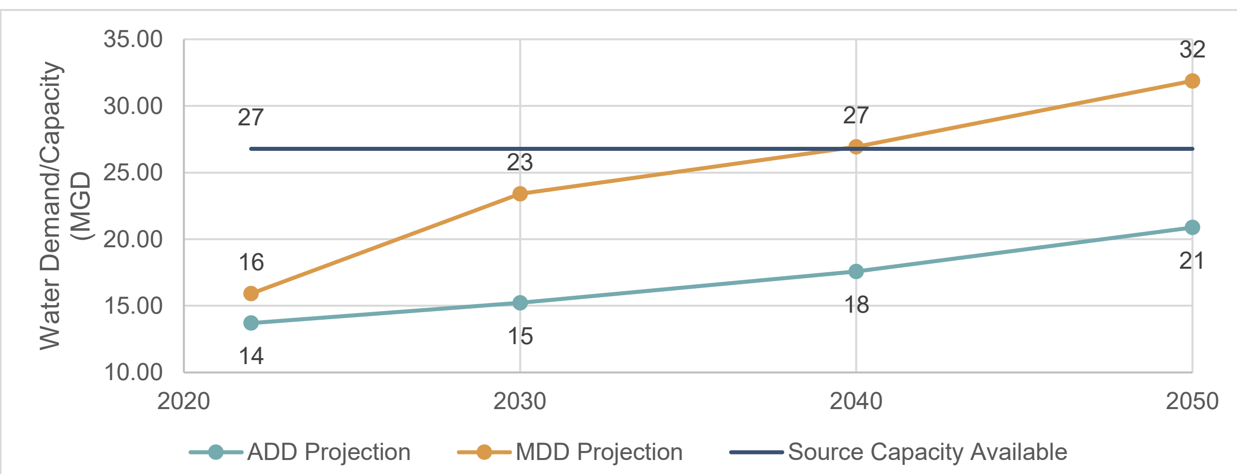


Figure 5-5: High Point Water Demand Projections Versus Capacity Available

5.1.3.2 *Wastewater Treatment*

The City of High Point owns and operates two wastewater treatment facilities, Eastside WWTP in the Deep River sub-basin and Westside WWTP in the Yadkin River basin. Eastside WWTP is a 26 MGD facility discharging to Randleman Lake. Westside WWTP is a 10 MGD facility discharging to Rich Fork Creek. Both facilities have the ability to reduce TN and TP and are operating successfully. The last major facility upgrade at Eastside WWTP was completed in the early 2000s, and there are various structures and pieces of equipment that are nearing the end of its useful life. High Point is currently undergoing a condition assessment of the Eastside WWTP and developing a list of capital improvement projects to address aging infrastructure.

Eastside WWTP facility received speculative limits in 2023 for expansion to 32 MGD. However, Randleman Lake, the downstream effluent water body, is a water supply lake for PTRWA and if possible, strategies should be explored to minimize the opportunity of emerging contaminant discharges where possible.

Figure 5-6 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the treatment capacity available for the City of High Point at the Eastside WWTP. The figure also shows 90% of the source capacity available to document when permits will need to be obtained for expansion. Additional wastewater capacity is required to meet the needs of High Point through 2050.

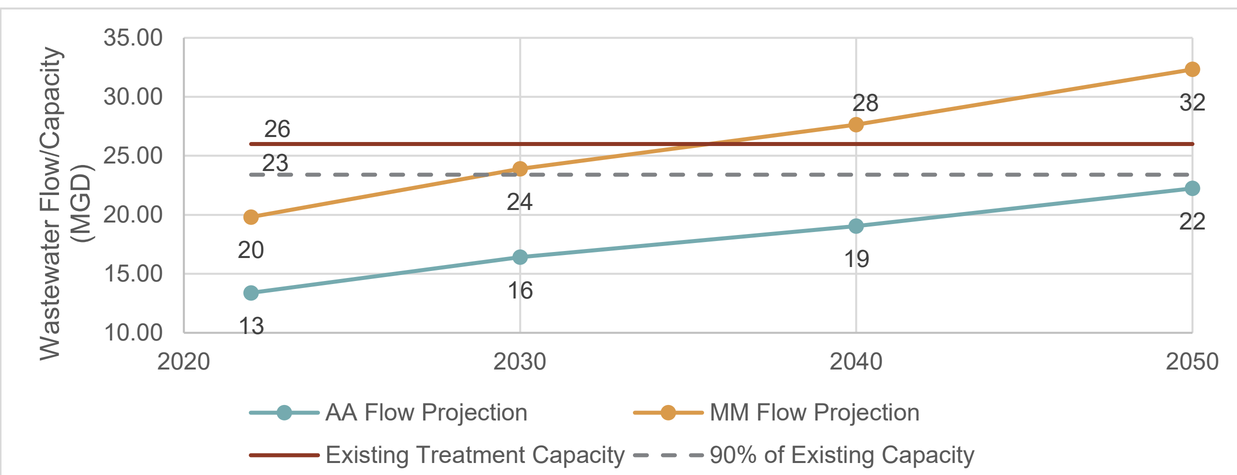


Figure 5-6: High Point Eastside Wastewater Flow Projections Versus Capacity Available

5.1.3.3 *City of High Point Worksheet*

Worksheet can be found on the following page.

CITY OF HIGH POINT

Water – Frank L. Ward WTP	Wastewater – Eastside WWTP	Wastewater – Westside WWTP
		

Frank L. Ward WTP Details

Source: Oak Hollow Lake & City Lake
Safe Yield: 22.4 MGD
WTP Capacity: 24 MGD
Purchase Contracts Available .... 2.78 MGD

- PTRWA .... 2.28 MGD
- PTRWA (for Jamestown) .... 0.5 MGD
- Davidson Water, Inc. .... Not Typical

Sales Contract Obligations .... 2.0 MGD

- Archdale .... 0.5 MGD
- Jamestown .... 1.0 MGD
- Jamestown via PTRWA .... 0.5 MGD

Eastside WWTP Permit Details

NPDES Discharge Point: Richland Creek & Deep River – Cape Fear River Basin
Treatment Capacity (MM): 26 MGD
Permit Conditions:

		Monthly	Weekly
BOD			
Summer	mg/L	5.0	7.5
Winter	mg/L	10.0	15.0
TSS	mg/L	30.0	45.0
NH_3-N			
Summer	mg/L	1.0	3.0
Winter	mg/L	2.0	6.0
TN			
Summer	mg/L	6.0	-
	lb/day	1,301	-
Winter	mg/L	-	-
TP	mg/L	0.5	-
	lb/day	108	-
1,4-Dioxane	µg/L	M&R	
PFAS	µg/L	N/A	

Receives Contracts Commitments .... 4.725 MGD

- Archdale .... 2.5 MGD
- Jamestown .... 2.0 MGD
- Sedgefield .... 0.225 MGD
- Greensboro .... Not typical

Discharging Contracts Available .... 0 MGD

- N/A

Demand (2022)

2022 Average Day (MGD)

Produced 11.0
Purchased 2.7

- PTRWA 2.28
- PTRWA (Jamestown) 0.38
- Davidson Water 0.04

Sold 0.38

- Jamestown via PTRWA 0.38

2022 Max Day (MGD)

Produced 13.8
Purchased 2.74

- PTRWA 2.28
- PTRWA (Jamestown) 0.41
- Davidson Water 0.04

Sold 0.91

- Archdale – 0.5
- Jamestown via PTRWA 0.38

Capacity (2022)

2022 Average Day (MGD)

Treated 13.39
Discharged 0

- N/A

Received 2.41

- Archdale 0.96
- Jamestown 1.12
- Sedgefield 0.2
- Greensboro 0.14

2022 Max Day (MGD)

Treated 19.82
Discharged 0

- N/A

Received 2.90

- Archdale 1.2
- Jamestown 1.35
- Sedgefield 0.2
- Greensboro 0.16

5.1.4 Town of Jamestown

A summary of the Town of Jamestown's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-4.

Table 5-4: Town of Jamestown Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.46	0.93	1.21	1.49
Max Day Demand (MGD)	0.54	1.39	1.82	2.24
Wastewater Capacity Projections				
Average Daily Flow (MGD)	1.13	1.50	1.78	2.07
Maximum Monthly Flow (MGD)	1.82	2.10	2.52	2.95

5.1.4.1 Water Supply and Treatment

Jamestown has purchase agreements with PTRWA and High Point. The current PTRWA purchase capacity is 0.775 MGD but the capacity will increase to 1.2 MGD by 2028 with the PTRWA JFK-WTP expansion project that is currently in construction. The PTRWA water is delivered to Jamestown through both the Greensboro and High Point water distribution systems. In addition to the PTRWA purchase agreement, Jamestown's current High Point purchase capacity is 1.0 MGD with plans to maintain that rate.

Figure 5-7 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the Town of Jamestown. No additional water capacity is projected to be required to meet the needs of Jamestown through 2050.

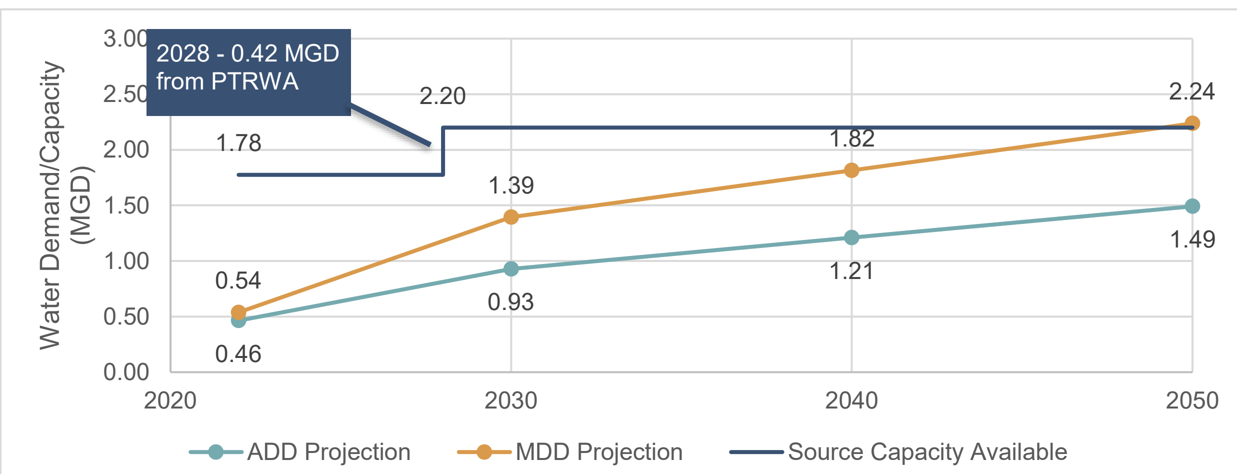


Figure 5-7: Jamestown Water Demand Projections Versus Capacity Available

5.1.4.2 Wastewater Treatment

Jamestown owns 2 MGD of capacity in High Point Eastside WWTP and sends all of the town's wastewater to the facility.

Figure 5-8 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the source capacity available for the Town of Jamestown. The figure also shows 90% of the source capacity available to document when permits will need to be obtained for expansion. Additional wastewater capacity is required to meet the needs of Jamestown through 2050.

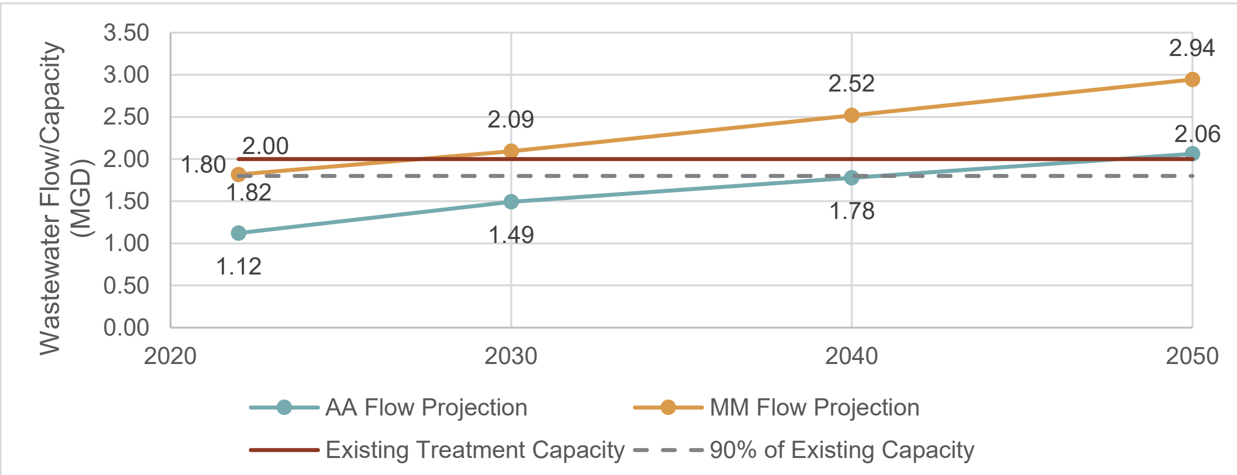
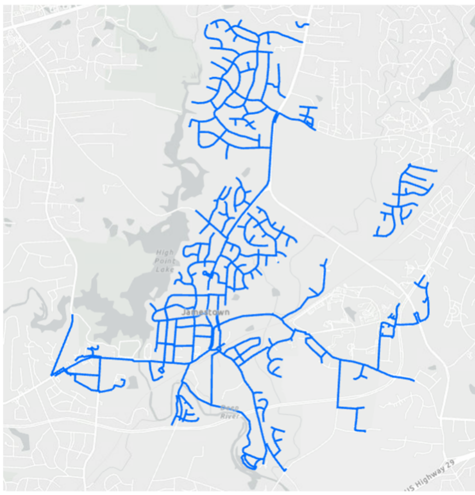
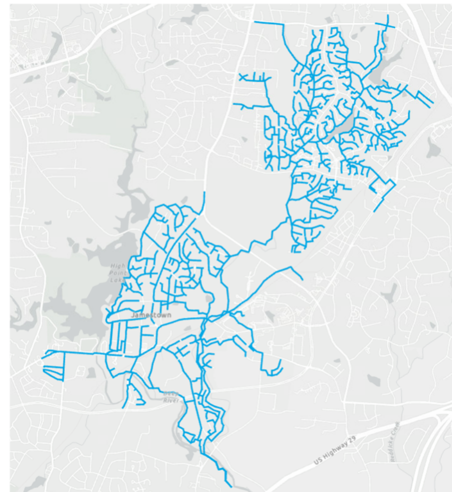


Figure 5-8: Jamestown Wastewater Flow Projections Versus Capacity Available

5.1.4.3 Town of Jamestown Worksheet

Worksheet can be found on the following page.

TOWN OF JAMESTOWN

Water Distribution System	Wastewater Collection System
	

Water Details	Wastewater Details
Source: N/A **Safe Yield: N/A** **WTP Capacity: 0.775 MGD (PTRWA JFK WTP Partner)** **Purchase Contracts Available....................... 1.775 MGD** • PTRWA ○ Via Greensboro....................... 0.125 MGD ○ Via High Point............................. 0.5 MGD ○ Excess .... 0.15 MGD • High Point .... 1 MGD **Sales Contract Obligations .... 0 MGD** • N/A	**NPDES Discharge Point: N/A** **Treatment Capacity (MM): 2.0 MGD (Eastside WWTP Partner)** **Permit Conditions:** N/A **Receives Contracts Commitments................0.775 MGD** • Greensboro ....0.775 MGD **Discharging Contracts Available.......................2.0 MGD** • High Point..2 MGD

Demand (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Produced 0	**Produced 0**
Purchased............... 0.465	**Purchased............... 0.535**
• PTRWA via GSO 0.125	• PTRWA via GSO 0.125
• PTRWA via HP .. 0.34	• PTRWA via HP... 0.41
Sold 0	**Sold 0**
• N/A	• N/A

Capacity (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Treated 0	**Treated 0**
Discharged................ 1.12	**Discharged................ 1.82**
• High Point........... 1.12	• High Point........... 1.12
Received...................... 0.5	**Received 0.6**
• Greensboro........... 0.5	• Greensboro 0.5

5.1.5 Town of Oak Ridge

A summary of the Town of Oak Ridge's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-5.

Table 5-5: Town of Oak Ridge Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	0.28	0.44	0.63
Max Day Demand (MGD)	-	0.41	0.66	0.94
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.04	0.07	0.09
Maximum Monthly Flow (MGD)	-	0.05	0.09	0.11

5.1.5.1 Water Supply and Treatment

The Town of Oak Ridge has recently started working on a public water system. A 250,000-gallon tank is being constructed as well as approximately 18,000 ft of 12" water line along Highway 150 and Linville Rd. The source of their water will be WSFCU Commission where Highway 150 crosses the Forsyth-Guilford County line. The Town has an agreement for purchase of up to 0.25 MGD. There are currently very few customers, but the Town is actively securing customers and is extending the water line to serve the Town Commons Shopping area and some of Highway 68.

Figure 5-9 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the Town of Oak Ridge. Additional water capacity is required to meet the needs of Oak Ridge through 2050 but is not included in the regional solution.

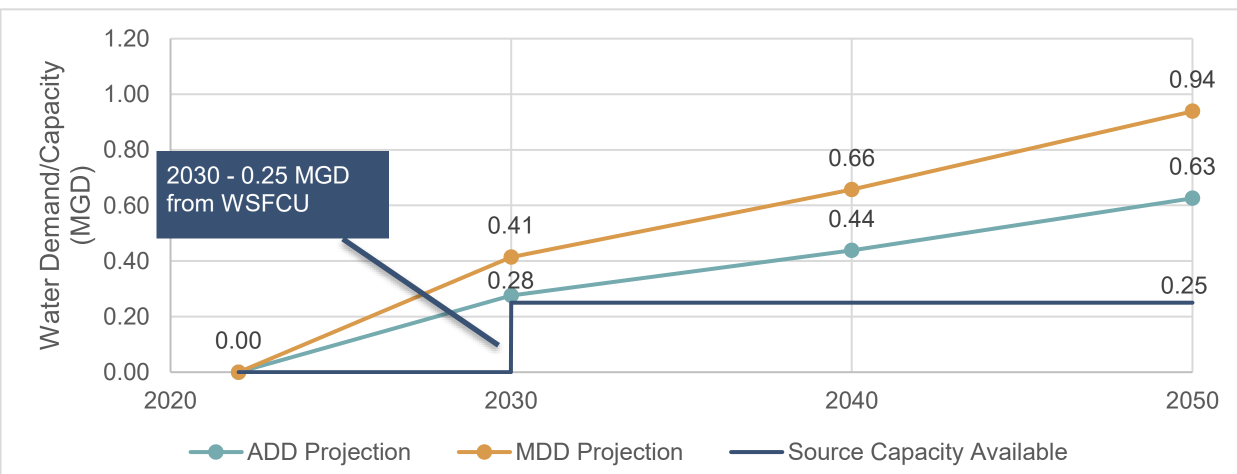


Figure 5-9: Oak Ridge Water Demand Projections Versus Capacity Available

5.1.5.2 Wastewater Treatment

The Town of Oak Ridge does not have a central wastewater treatment system or interconnects with other utilities. All wastewater is treated by private on-site sewer systems and septic tanks. The town does not currently have plans for wastewater service to customers but will need to do so if higher density construction is desired.

5.1.5.3 Town of Oak Ridge Worksheet

Worksheet can be found on the following page.

TOWN OF OAK RIDGE

OAK RIDGE *North Carolina*

Water Details

Source: Groundwater Well System
Safe Yield: N/A
WTP Capacity: N/A MGD
Purchase Contracts Available .... 0.35 MGD

- WSFC Utilities Commission .... 0.35 MGD

Sales Contract Obligations .... 0 MGD

- N/A

Wastewater Details

NPDES Discharge Point: Individual or Community Systems
Treatment Capacity (MM): N/A MGD
Permit Conditions: N/A
Receives Contracts Commitments .... 0 MGD

- N/A

Discharging Contracts Available .... 0 MGD

- N/A

Demand (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Produced 0	**Produced 0**
Purchased 0	**Purchased 0**
• N/A	• N/A
Sold 0	**Sold 0**
• N/A	• N/A

Capacity (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Treated 0	**Treated 0**
Discharged 0	**Discharged 0**
• N/A	• N/A
Received 0	**Received 0**
• N/A	• N/A

5.1.6 Town of Pleasant Garden

A summary of the Town of Pleasant Garden's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-6.

Table 5-6: Town of Pleasant Garden Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	0.13	0.27	0.55
Max Day Demand (MGD)	-	0.20	0.40	0.83
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.02	0.05	0.11
Maximum Monthly Flow (MGD)	-	0.03	0.06	0.14

5.1.6.1 Water Supply and Treatment

Pleasant Garden does not currently have a water distribution system, and all water is currently provided by community or individual groundwater wells. In 2024, the City of Greensboro and the Town of Pleasant Garden signed an Interlocal Agreement (ILA) for water and sewer, which will allocate 1.0 MGD of water to the town for commercial and industrial customers. A new 16" water line from Greensboro to Pleasant Garden is currently in design and expected to start construction in 2026.

Figure 5-10 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the Town of Pleasant Garden. No additional water capacity is required to meet the needs of Pleasant Garden through 2050.

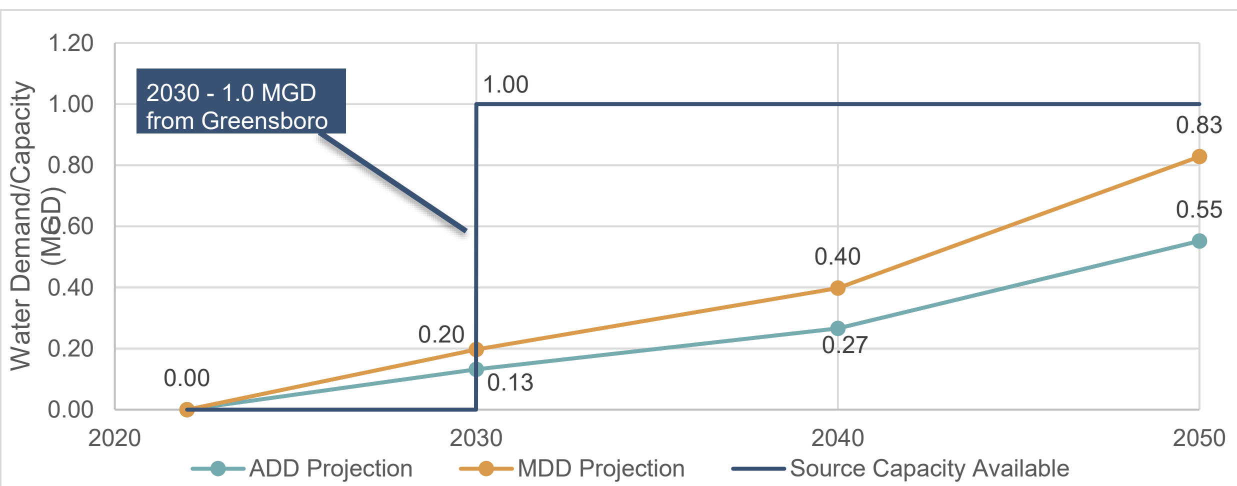


Figure 5-10: Pleasant Garden Water Demand Projections Versus Capacity Available

5.1.6.2 Wastewater Treatment

Portions of Pleasant Garden have gravity sewer mains owned by the City of Greensboro; however, many properties rely on private septic systems. With the new ILA between Greensboro and Pleasant Garden, it is expected that sewer lines will be extended to additional properties throughout the Town.

Figure 5-11 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the source capacity available for the Town of Pleasant Garden. No additional wastewater capacity is required to meet the needs of Pleasant Garden through 2050.

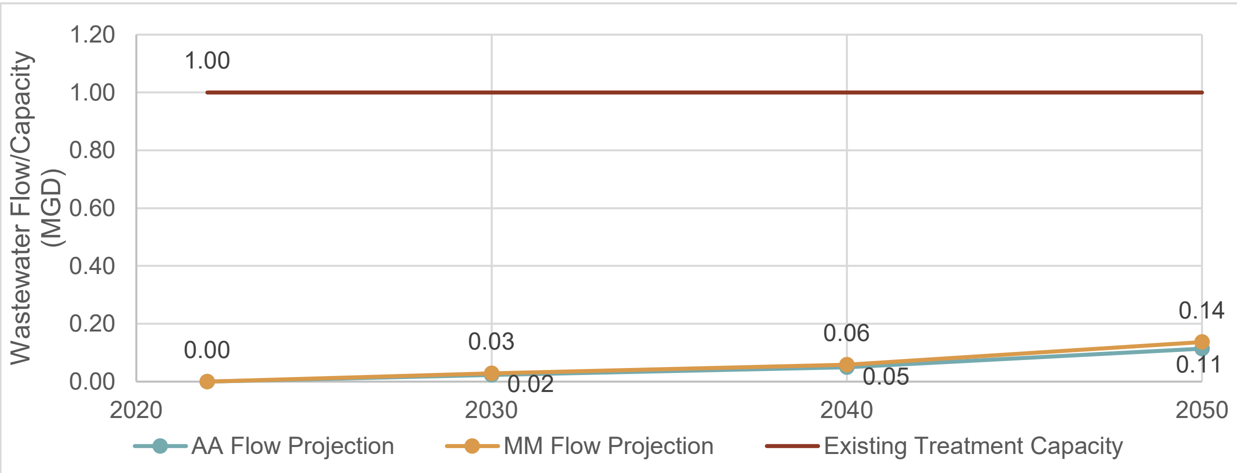


Figure 5-11: Pleasant Garden Wastewater Flow Projections Versus Capacity Available

5.1.6.3 Town of Pleasant Garden Worksheet

Worksheet can be found on the following page.

TOWN OF PLEASANT GARDEN

Water Details

Source: N/A
Safe Yield: N/A
WTP Capacity: N/A MGD
Purchase Contracts Available............................. 1 MGD

- Greensboro.................................. 1 MGD (Future)

Sales Contract Obligations.................................. 0 MGD

- N/A

Wastewater Details

NPDES Discharge Point: N/A
Treatment Capacity (MM): N/A MGD
Permit Conditions: N/A
Receives Contracts Commitments.......................0 MGD

- N/A

Discharging Contracts Available..........................0 MGD

- Greensboro (Future)

Demand (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Produced **0**	**Produced** **0**
Purchased...................... **0**	**Purchased**...................... **0**
• N/A	• N/A
Sold **0**	**Sold** **0**
• N/A	• N/A

Capacity (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Treated **0**	**Treated** **0**
Discharged..................... **0**	**Discharged**..................... **0**
• N/A	• N/A
Received......................... **0**	**Received** **0**
• N/A	• N/A

5.1.7 Town of Sedalia

A summary of the Town of Sedalia's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-7.

Table 5-7: Town of Sedalia Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	0.04	0.08	0.13
Max Day Demand (MGD)	-	0.05	0.12	0.20
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.02	0.04	0.07
Maximum Monthly Flow (MGD)	-	0.02	0.05	0.08

5.1.7.1 Water Supply and Treatment

Sedalia does not currently have a water distribution system, and all water is currently provided by community or individual groundwater wells. The City of Greensboro and the Town of Sedalia have entered an ILA for water and sewer, which will allocate 0.2 MGD of water to the Town.

Figure 5-12 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the Town of Sedalia. No additional water capacity is required to meet the needs of Sedalia through 2050.

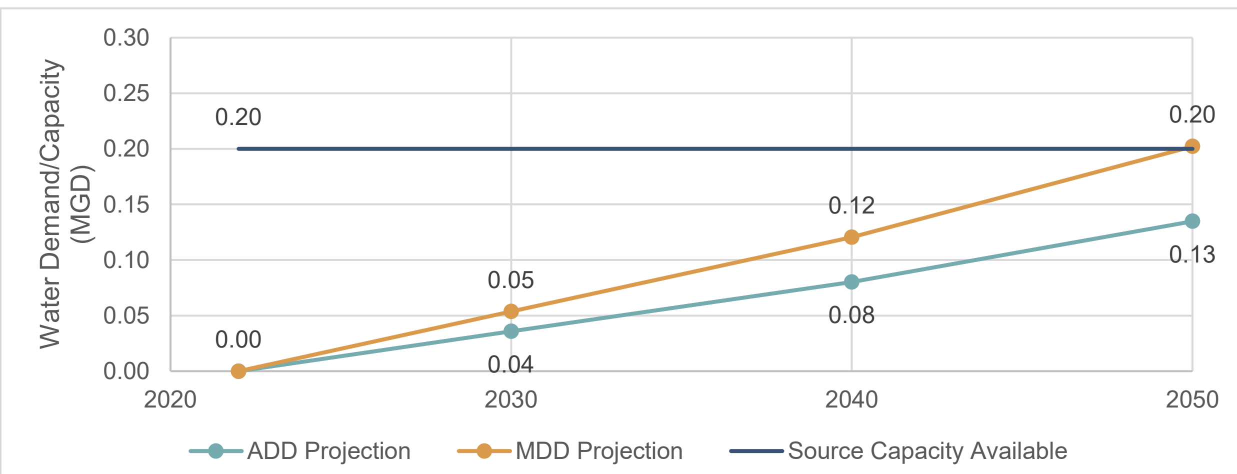


Figure 5-12: Sedalia Water Demand Projections Versus Capacity Available

5.1.7.2 Wastewater Treatment

Sedalia does not currently have a wastewater treatment system, and all wastewater is treated by private on-site sewer systems and septic tanks. The City of Greensboro and the Town of Sedalia have entered an ILA for water and sewer, which will allocate 0.2 MGD of sewer to the Town.

Figure 5-13 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the source capacity available for the Town of Sedalia. No additional wastewater capacity is required to meet the needs of Sedalia through 2050.

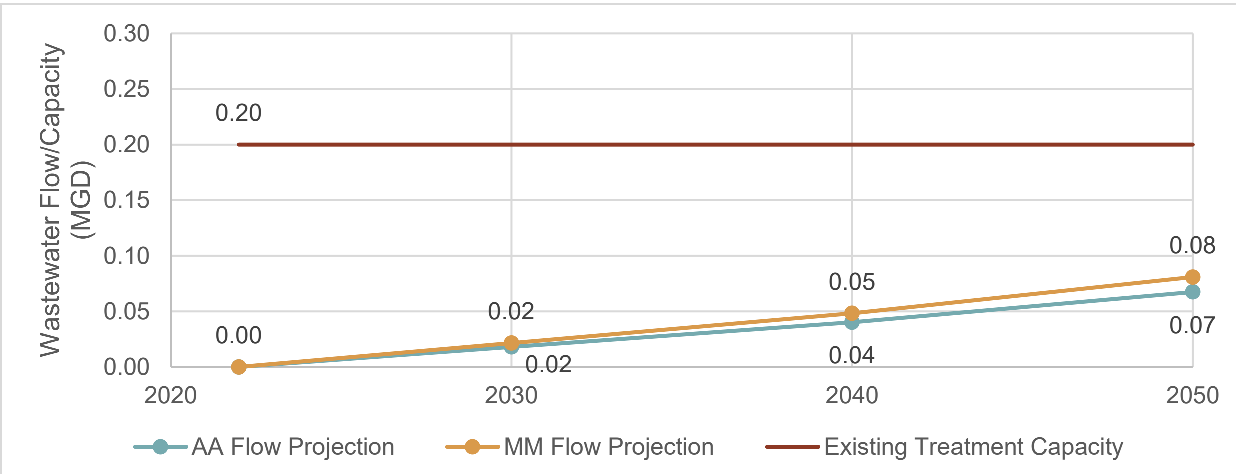


Figure 5-13: Sedalia Wastewater Flow Projections Versus Capacity Available

5.1.7.3 Town of Sedalia Worksheet

Worksheet can be found on the following page.

TOWN OF SEDALIA

Water Details

Source: Groundwater Well System
Safe Yield: N/A
WTP Capacity: N/A MGD
Purchase Contracts Available.......................... 0.2 MGD
- Greensboro .... 0.2 MGD (Future)

Sales Contract Obligations................................. 0 MGD
- N/A

Wastewater Details

NPDES Discharge Point: Individual or Community Systems
Treatment Capacity (MM): N/A MGD
Permit Conditions: N/A
Receives Contracts Commitments......................0 MGD
- N/A

Discharging Contracts Available......................0.2 MGD
- Greensboro ....0.2 MGD (Future)

Demand (2022)

2022 Average Day (MGD)		2022 Max Day (MGD)	
Produced	**0**	**Produced**	**0**
Purchased	**0**	**Purchased**	**0**
• N/A		• N/A	
Sold	**0**	**Sold**	**0**
• N/A		• N/A	

Capacity (2022)

2022 Average Day (MGD)		2022 Max Day (MGD)	
Treated	**0**	**Treated**	**0**
Discharged	**0**	**Discharged**	**0**
• N/A		• N/A	
Received	**0**	**Received**	**0**
• N/A		• N/A	

5.1.8 Town of Stokesdale

A summary of the Town of Stokesdale's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-8.

Table 5-8: Town of Stokesdale Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.15	0.21	0.32	0.50
Max Day Demand (MGD)	0.26	0.36	0.55	0.85
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.02	0.02	0.03
Maximum Monthly Flow (MGD)	-	0.02	0.03	0.04

5.1.8.1 Water Supply and Treatment

The Town of Stokesdale contracts with the WSFCU for its water service and has recently extended its contract to a maximum capacity of 0.5 MGD. The water needs for the Town of Stokesdale will not be included in the regional solutions.

Figure 5-14 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the Town of Stokesdale. Additional water capacity is required to meet the needs of Stokesdale through 2050.

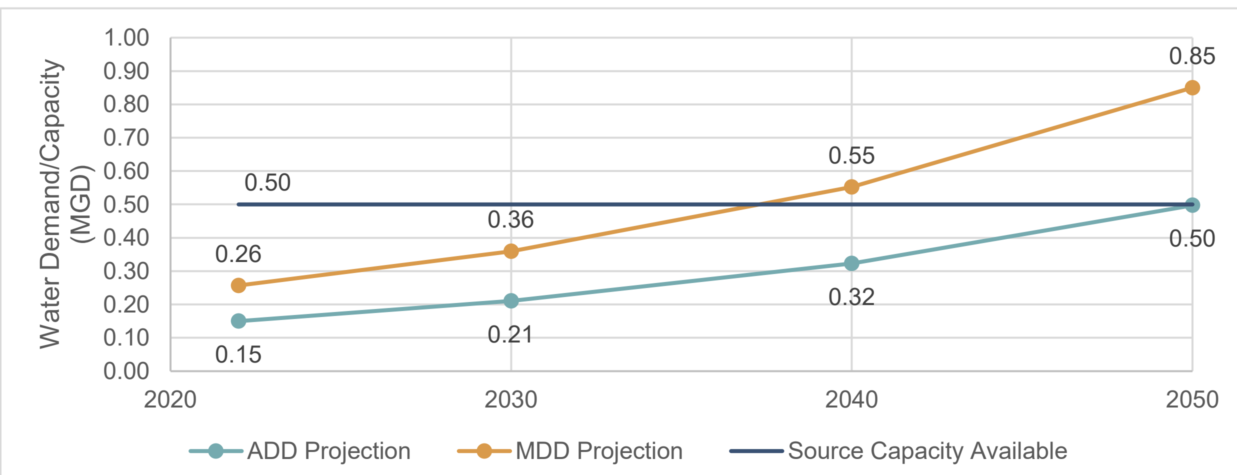


Figure 5-14: Stokesdale Water Demand Projections Versus Capacity Available

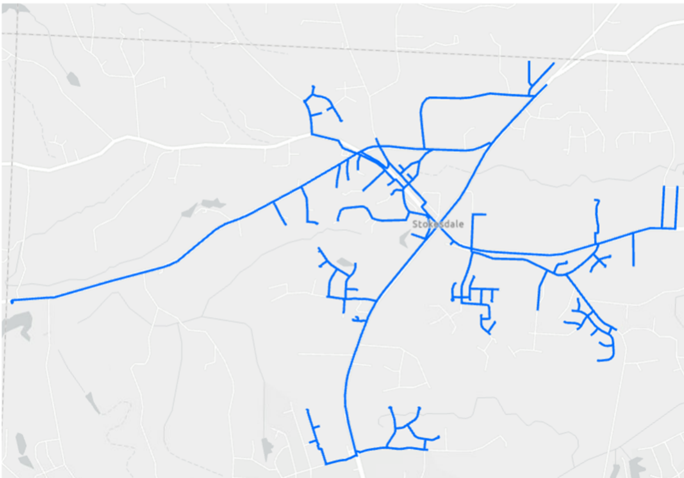
5.1.8.2 Wastewater Treatment

The Town of Stokesdale does not have a central wastewater treatment system. All wastewater is treated by private on-site sewer systems and septic tanks. The Town of Stokesdale does not plan to install a community wastewater system in the near future.

5.1.8.3 Town of Stokesdale Worksheet

Worksheet can be found on the following page.

TOWN OF STOKESDALE

Water Distribution System	Wastewater – (Name of WWTP)
	

Water Details

Source: N/A
Safe Yield: N/A
WTP Capacity: N/A MGD
Purchase Contracts Available.......................... 0.5 MGD

- WSFC Utilities Commission..................... 0.5 MGD

Sales Contract Obligations................................. 0 MGD

- N/A

Wastewater Details

NPDES Discharge Point: Individual or Community Systems
Treatment Capacity (MM): N/A MGD
Permit Conditions: N/A
Receives Contracts Commitments......................0 MGD

- N/A

Discharging Contracts Available.........................0 MGD

- N/A

Demand (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Produced 0	**Produced 0**
Purchased................. 0.15	**Purchased................. 0.26**
• WSPCUC 0.15	• WSPCUC 0.26
Sold 0	**Sold 0**
• N/A	• N/A

Capacity (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Treated 0	**Treated 0**
Discharged..................... 0	**Discharged..................... 0**
• N/A	• N/A
Received......................... 0	**Received 0**
• N/A	• N/A

5.1.9 Town of Summerfield

A summary of the Town of Summerfield's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow are presented in Table 5-9.

Table 5-9: Town of Summerfield Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	0.27	0.44	0.67
Max Day Demand (MGD)	-	0.41	0.66	1.00
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.23	0.36	0.53
Maximum Monthly Flow (MGD)	-	0.28	0.43	0.64

5.1.9.1 Water Supply and Treatment

The Town of Summerfield does not currently have a water system that would support dense development but has initiated the design of an elevated water tank to provide fire flow protection for the town. A small water system is currently planned to connect to existing groundwater wells. Should the town be interested in providing a potable water source, they will need to connect to adjacent water system, most likely the City of Greensboro.

Figure 5-15 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the Town of Summerfield. Additional water capacity is required to meet the needs of Summerfield through 2050.

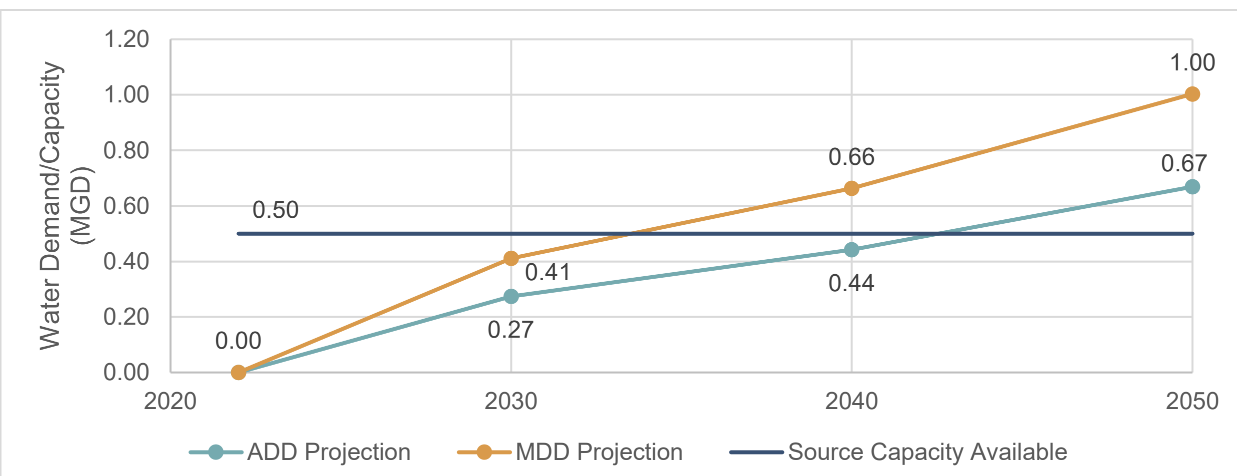


Figure 5-15: Summerfield Water Demand Projections Versus Capacity Available

5.1.9.2 Wastewater Treatment

The Town of Summerfield does not have a central wastewater treatment system. All wastewater is treated by private on-site sewer systems and septic tanks, and a community wastewater system is not currently planned.

5.1.9.3 Town of Summerfield Worksheet

Worksheet can be found on the following page.

TOWN OF SUMMERFIELD

Town of Summerfield™ North Carolina

"Respectful of the past, focused on the future."

Water Details

Source: N/A
Safe Yield: N/A
WTP Capacity: N/A MGD
Purchase Contracts Available .... 0 MGD

- N/A

Sales Contract Obligations .... 0 MGD

- N/A

Wastewater Details

NPDES Discharge Point: Individual or Community Systems
Treatment Capacity (MM): N/A MGD
Permit Conditions: N/A
Receives Contracts Commitments .... 0 MGD

- N/A

Discharging Contracts Available .... 0 MGD

- N/A

Demand (2022)

2022 Average Day (MGD)		2022 Max Day (MGD)	
Produced	**0**	**Produced**	**0**
Purchased	**0**	**Purchased**	**0**
• N/A		• N/A	
Sold	**0**	**Sold**	**0**
• N/A		• N/A	

Capacity (2022)

2022 Average Day (MGD)		2022 Max Day (MGD)	
Treated	**0**	**Treated**	**0**
Discharged	**0**	**Discharged**	**0**
• N/A		• N/A	
Received	**0**	**Received**	**0**
• N/A		• N/A	

5.1.10 Unincorporated Guilford County

A summary of Guilford County's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-10.

Table 5-10: Unincorporated Guilford County Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	0.30	0.60	1.09
Max Day Demand (MGD)	-	0.46	0.90	1.64
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.59	0.68	1.36
Maximum Monthly Flow (MGD)	-	0.71	0.82	1.63

5.1.10.1 Water Supply and Treatment

Guilford County has no water treatment facility (WTF) and relies totally on the municipal systems or private on-site groundwater well systems. The projected demands are anticipated to connect to existing water systems.

5.1.10.2 Wastewater Treatment

Guilford County has no wastewater treatment facility (WWTF) and relies totally on the municipal systems or private on-site wastewater treatment facilities. The projected demands are anticipated to connect to existing wastewater systems.

5.2 Randolph County Utilities

5.2.1 City of Archdale

A summary of the City of Archdale's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-11.

Table 5-11: City of Archdale Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.95	1.35	1.71	2.32
Max Day Demand (MGD)	1.87	2.65	3.38	4.63
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.96	1.40	1.77	2.41
Maximum Monthly Flow (MGD)	1.20	1.68	2.13	2.89

5.2.1.1 Water Supply and Treatment

Archdale has purchase agreements with PTRWA, High Point, and Davidson Water. The current PTRWA purchase capacity is 1.559 MGD but the capacity will increase to 2.45 MGD by 2028 with the PTRWA JFK-WTP expansion project that is currently under construction. Archdale's current High Point purchase capacity agreement is for 0.5 MGD and the current Davidson Water, Inc purchase capacity agreement is for 0.147 MGD.

Figure 5-16 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the City of Archdale. Additional water capacity is required to meet the needs of Archdale through 2050.

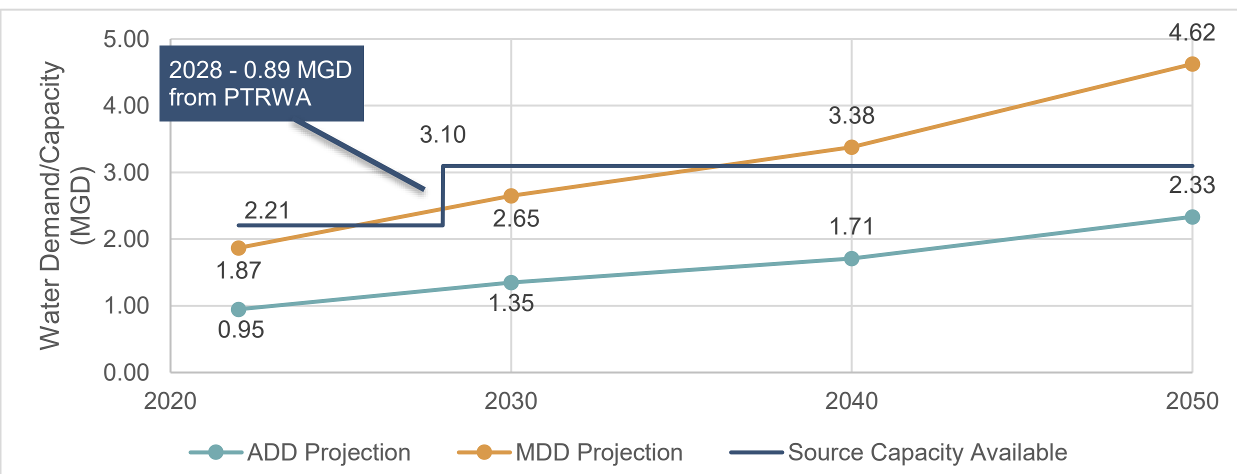


Figure 5-16: Archdale Water Demand Projections Versus Capacity Available

5.2.1.2 Wastewater Treatment

Archdale owns 2.5 MGD of capacity in the High Point Eastside WWTP and sends all of the City's wastewater to the facility. In addition, the cities of Archdale and Trinity have studied the alternative to build a WWTP discharging to the Yadkin River basin to meet their future needs. It is unclear at the time of this Study when, if ever, this alternative will be pursued. Therefore, we have not included it in the alternative scenarios.

Figure 5-17 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the source capacity available for the City of Archdale. The figure also shows 90% of the source capacity available to document when permits will need to be obtained for expansion. Additional wastewater capacity is required to meet the needs of Archdale through 2050.

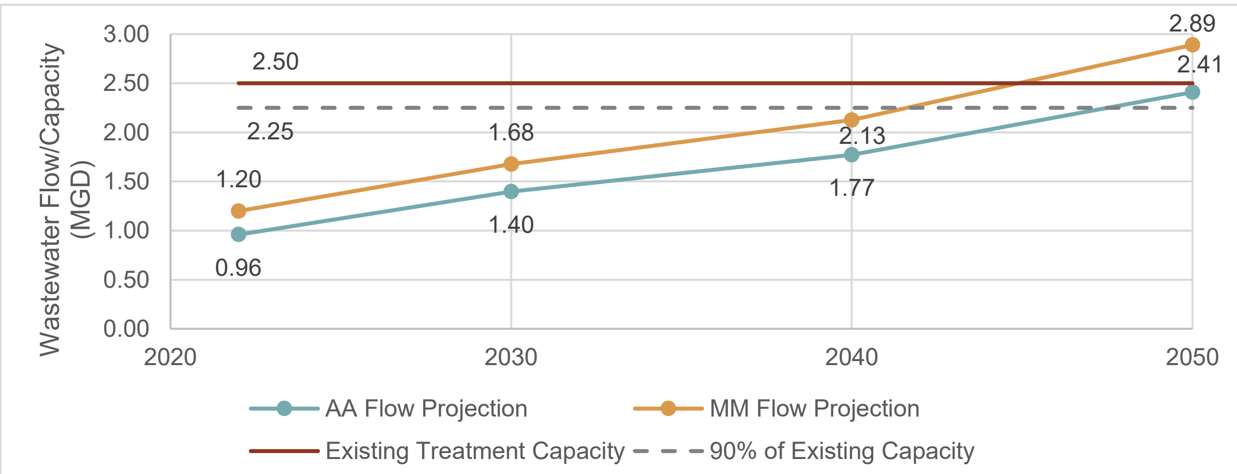


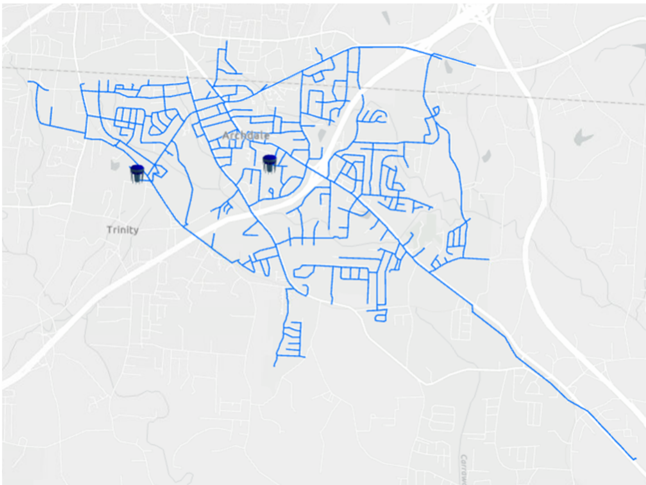
Figure 5-17: Archdale Wastewater Flow Projections Versus Capacity Available

5.2.1.3 City of Archdale Worksheet

Worksheet can be found on the following page.

CITY OF ARCHDALE

Water Distribution System	Wastewater Collection System



Archdale
— UNITY • LOYALTY • PROGRESS —

Water Details

Source: N/A
Safe Yield: N/A
WTP Capacity: 1.559 MGD (PTRWA JFK WTP Partner)
Purchase Contracts Available........................2.21 MGD

- Davidson Water, Inc. ....0.147 MGD
- High Point ....0.5 MGD
- PTRWA...1.559 MGD

Sales Contract Obligations...........................0.032 MGD

- Aqua America ....0.032 MGD
- Davidson Water, Inc. ....Not Typical

Wastewater Details

NPDES Discharge Point: N/A
Treatment Capacity (MM): 2.5 MGD (Eastside WWTP Partner)
Permit Conditions: N/A
Receives Contracts Commitments......................0 MGD

- N/A

Discharging Contracts Available.......................2.5 MGD

- High Point Eastside WWTP ....2.5 MGD

Demand (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Produced 0	**Produced 0**
Purchased.................0.95	**Purchased.................1.87**
• Davidson Water ...0.1	• Davidson Water....0.1
• High Point................0	• High Point.............0.5
• PTRWA 0.94	• PTRWA 1.37
Sold 0.06	**Sold 0.06**
• Aqua America.....0.05	• Aqua America 0.05
• Davidson Water 0.01	• Davidson Water 0.01

Capacity (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Treated 0	**Treated 0**
Discharged................0.96	**Discharged................1.20**
• High Point...........0.96	• High Point...........1.20
Received.........................0	**Received 0**
• N/A	• N/A

5.2.2 City of Asheboro

A summary of the City of Asheboro's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-12.

Table 5-12: City of Asheboro Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	5.27	7.29	8.82	9.95
Max Day Demand (MGD)	7.32	11.37	13.07	14.76
Wastewater Capacity Projections				
Average Daily Flow (MGD)	3.57	5.33	6.58	8.00
Maximum Monthly Flow (MGD)	4.64	6.81	8.39	10.20

5.2.2.1 Water Supply and Treatment

The City of Asheboro owns and operates Asheboro WTF with a treatment capacity of 12 MGD. The raw water supply for the facility includes two water supply lakes in the Uwharrie River sub-basin in the Yadkin-Pee Dee River basin with a safe yield of 26.5 MGD. However, the City's drinking water production is limited by a grandfathered IBT up to 9.36 MGD and would not be able to expand without applying for an IBT Certificate. Raw water is pumped from Lake Reese to Lake Lucas where it is pumped to the WTF. Currently a problem with the intake structure at Lake Lucas prevents water being pulled from that source.

Asheboro is starting a PFAS Evaluation and Assessment Study for the WTF to understand how best to address PFAS in the city's source water. The Study will involve pilot testing and is expected to be complete by the end of 2026. Asheboro is expected to begin the design of an advanced treatment system following the Study.

The City of Asheboro bulk sells water to Seagrove-Ulah Metro Water District with a maximum purchase of 0.5 MGD. Average sales in 2022 was 0.18 MGD. The city also bulk sells water to the City of Randleman with a maximum purchase of 0.125 MGD and an average purchase of 0.125 MGD.

The city is completing a water transmission main from the east side of the Asheboro to the Randolph County-Chatham County line. The water line is being constructed to support the Wolfspeed Industrial site with 3.3 MGD of flow. The line is also designed to support development in eastern part of Randolph County. In conjunction with this, a 24" water line is being extended from the existing PTRWA water line on Old Hwy 311 at Island Ford Rd to Pineview St, where it will connect to an existing 16" water line in the Asheboro system. This line will provide backup flow for the city in case of emergency or allow Randolph County to sell their PTRWA WTP allocation to Asheboro to support the development in the county.

Figure 5-18 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the City of Asheboro. An additional 5.5 MGD of water capacity is required to meet the needs of Asheboro through 2050.

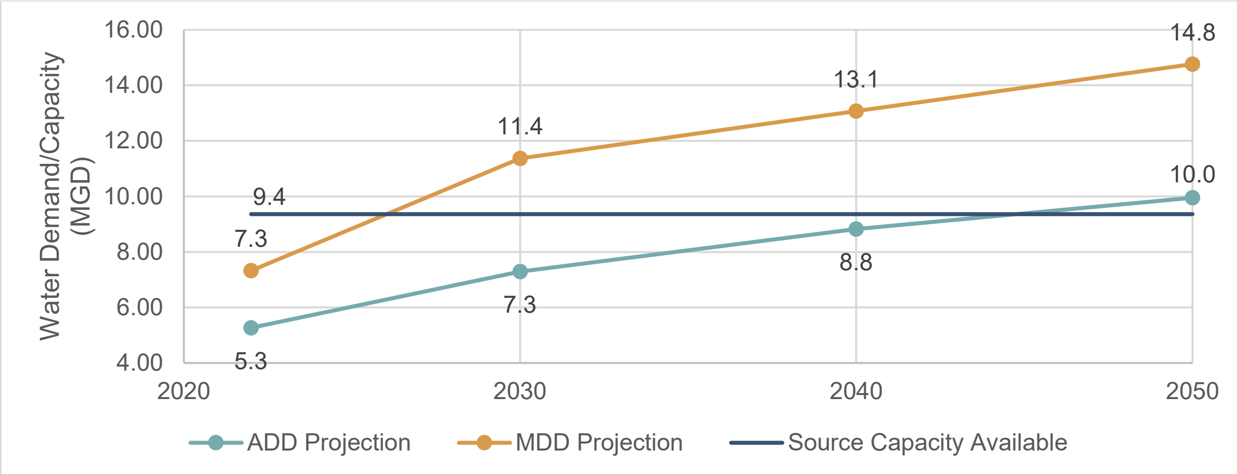


Figure 5-18: Asheboro Water Demand Projections Versus Capacity Available

5.2.2.2 Wastewater Treatment

The City of Asheboro owns and operates the Asheboro WWTP, a 9.0 MGD facility discharging to Hasketts Creek, a tributary of the Deep River. The Asheboro WWTP has a current average annual flow of 4 MGD. During peak days, flows of up to 15.5 MGD can occur due to collection system inflow and infiltration (I&I). These flows cause operational problems, such as bypassing flow around some treatment units. Portions of the WWTP equipment are reaching the end of its useful life and have deteriorated to the point of compromised performance. Although the liquid train of the WWTP has a capacity of 9 MGD, the solids treatment train is limited to 6 MGD.

In late 2022, NCDEQ issued a draft discharge permit with new effluent limits on metallic compounds and organic compounds, including 1,4-Dioxane. While the draft permit did not contain TN or TP effluent limits, they are expected to be imposed in the next permit cycle. The Asheboro WWTP was not designed to meet reduced nutrient effluent limits, and a facility upgrade will be needed to meet these needs. A master plan from 2023 evaluated treatment alternatives to meet new permitted compounds and expected TN and TP permit limits and evaluated a facility expansion to 13.5 MGD.

The city receives flow from several schools that are located outside of city limits and the developments that are near to those schools. The city also treats the leachate from the Randolph County Great Oak Landfill. There are discussions with the landfill regarding pretreatment which will be needed to assist the city in meeting projected limits.

Figure 5-19 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the source capacity available for the City of Asheboro. The figure also shows 90% of the source capacity available to document when permits will need to be obtained for expansion. Additional wastewater capacity is required to meet the needs of Asheboro through 2050.

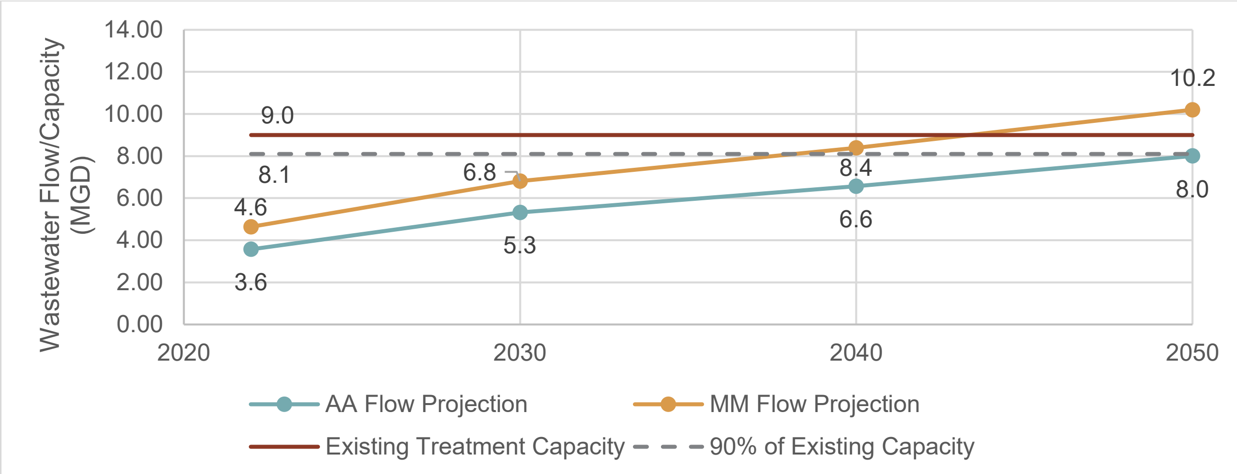


Figure 5-19: Asheboro Wastewater Flow Projections Versus Capacity Available

5.2.2.3 City of Asheboro Worksheet

Worksheet can be found on the following page.

CITY OF ASHEBORO

Water – Asheboro WTP

Wastewater – Asheboro WWTP

W.L. Brown WTP Details

Source: Lake Lucas & Lake Reese – Yadkin-Pee Dee River Basin
Safe Yield: 26.5 MGD
WTP Capacity: 12 MGD
Purchase Contracts Available .... 0 MGD

- N/A

Sales Contract Obligations .... 0.625 MGD

- Randleman .... 0.125 MGD
- Seagrove .... 0.5 MGD
- Tri-River/Wolfspeed (Future)

Asheboro WWTP Permit Details

NPDES Discharge Point: Haskett's Creek – Cape Fear River Basin
Treatment Capacity (MM): 9.0 MGD
Permit Conditions:

		Monthly	Weekly
BOD			
Summer	mg/L	5.0	7.5
Winter	mg/L	10.0	15.0
TSS	mg/L	30.0	45.0
NH_3-N			
Summer	mg/L	2.0	6.0
Winter	mg/L	4.0	12.0
TN	mg/L	M&R	
TP	mg/L	M&R	
1,4-Dioxane	µg/L	N/A	
PFAS	µg/L	N/A	

*Permit limits in the table are from permit issued June 27, 2012. The permit issued by NCDEQ August 21, 2023 has not been finalized and is not shown.

Receives Contracts Commitments ....0.125 MGD

- Randleman .... 0.125 MGD
- Seagrove (Future)

Discharging Contracts Available ....0 MGD

- N/A

Demand (2022)

2022 Average Day (MGD)

Produced 5.27
Purchased...................... 0

- N/A

Sold 0.3

- Randleman....... 0.125
- Seagrove........... 0.18

2022 Max Day (MGD)

Produced 7.32
Purchased...................... 0

- N/A

Sold 0.3

- Randleman....... 0.125
- Seagrove........... 0.18

Capacity (2022)

2022 Average Day (MGD)

Treated 3.57
Discharged..................... 0

- N/A

Received.................... 0.03

- Randleman 0.03

2022 Max Day (MGD)

Treated 4.64
Discharged..................... 0

- N/A

Received 0.03

- Randleman 0.03

5.2.3 Town of Franklinville

A summary of the Town of Franklinville's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-13.

Table 5-13: Town of Franklinville Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.11	0.11	0.12	0.13
Max Day Demand (MGD)	0.12	0.17	0.18	0.19
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.04	0.07	0.07	0.08
Maximum Monthly Flow (MGD)	0.05	0.08	0.09	0.09

5.2.3.1 Water Supply and Treatment

The Town of Franklinville has a water purchase agreement with the Town of Ramseur for 0.25 MGD of water. The Town provides water for Providence Grove High School located northwest of town. This includes a booster pump station and elevated tank to provide the flow to this area. Franklinville has approached the City of Asheboro to investigate the possibility of a secondary source.

Figure 5-20 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the Town of Franklinville. No additional water capacity is required to meet the needs of Franklinville through 2050.

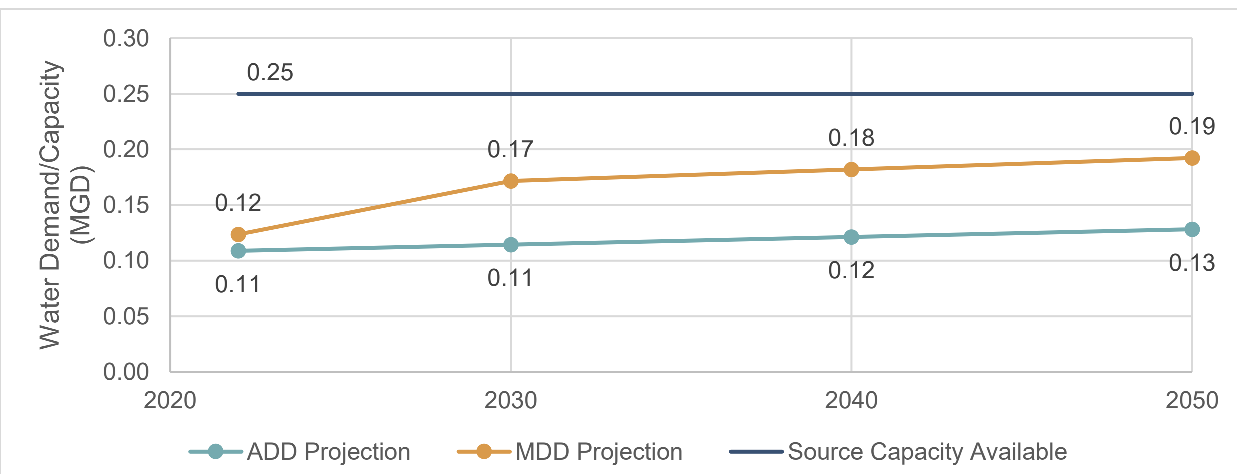


Figure 5-20: Franklinville Water Demand Projections Versus Capacity Available

5.2.3.2 Wastewater Treatment

The Town of Franklinville owns and operates the Franklinville WWTP that has a current design capacity of 0.1 MGD with an ability to expand to 0.2 MGD. The majority of the WWTP equipment is reaching the end of its useful life and has deteriorated. While the existing permit does not contain TN nor TP effluent limits, they are expected to be imposed in the next permit cycle. The Franklinville WWTP was not designed to meet TN or TP effluent limits, and a facility upgrade will be needed to meet projected future nutrient limits. A majority of the Town does not have public sewers and is treated by private on-site treatment systems.

Figure 5-21 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the source capacity available for the Town of Franklinville. The figure also shows 90% of the source capacity available to document when permits will need to be obtained for expansion. No additional wastewater capacity is required to meet the needs of Franklinville through 2050.

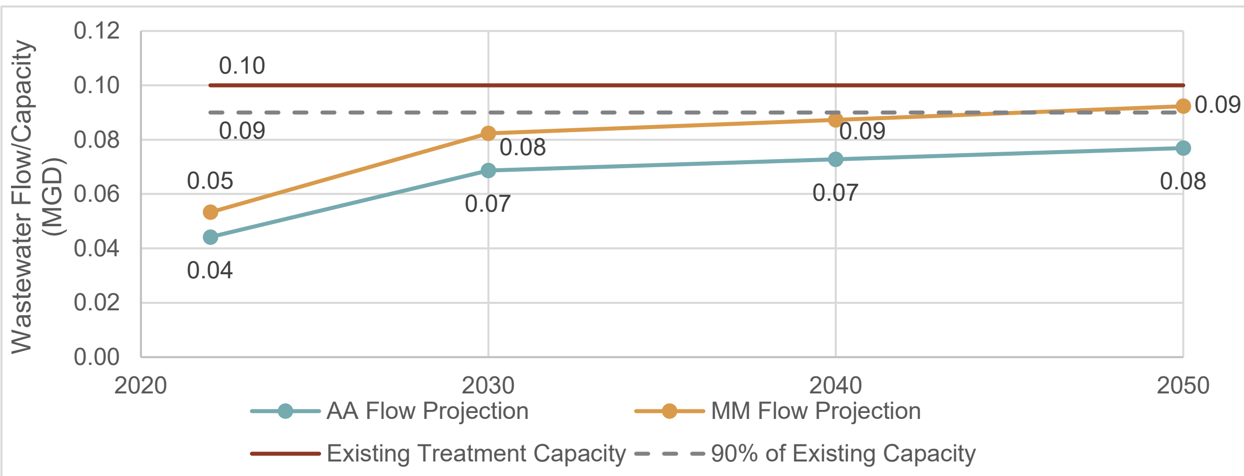


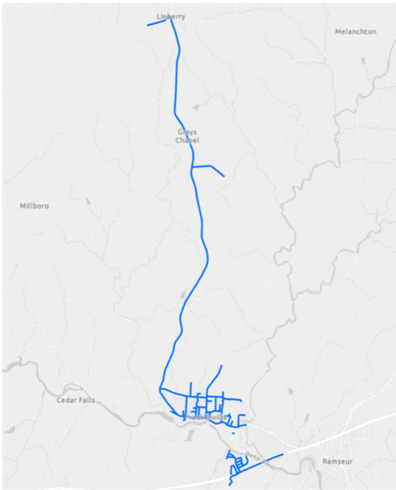
Figure 5-21: Franklinville Wastewater Flow Projections Versus Capacity Available

5.2.3.3 Town of Franklinville Worksheet

Worksheet can be found on the following page.

TOWN OF FRANKLINVILLE

Water Distribution System



Wastewater – Franklinville WWTP

Water Details

Source: N/A
Safe Yield: N/A
WTP Capacity: N/A MGD
Purchase Contracts Available.........................0.25 MGD

- Ramseur ....0.25 MGD

Sales Contract Obligations..................................0 MGD

- N/A

Franklinville WWTP Permit Details

NPDES Discharge Point: Deep River – Cape Fear River Basin
Treatment Capacity (MM): 0.1 MGD
Permit Conditions:

		Monthly	Daily
BOD	mg/L	30.0	45.0
TSS	mg/L	30.0	45.0
NH_3-N	mg/L	M&R	M&R
TN	mg/L	M&R	
TP	mg/L	M&R	
1,4-Dioxane	µg/L	N/A	
PFAS	µg/L	N/A	

Receives Contracts Commitments.......................0 MGD

- N/A

Discharging Contracts Available..........................0 MGD

- N/A

Demand (2022)

2022 Average Day (MGD)

Produced 0
Purchased..................0.11

- Ramseur 0.11

Sold 0

- N/A

2022 Max Day (MGD)

Produced 0
Purchased..................0.12

- Ramseur 0.12

Sold 0

- N/A

Capacity (2022)

2022 Average Day (MGD)

Treated 0.04
Discharged.....................0

- N/A

Received 0

- N/A

2022 Max Day (MGD)

Treated 0.05
Discharged.....................0

- N/A

Received 0

- N/A

5.2.4 Town of Liberty

A summary of the Town of Liberty's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-14.

Table 5-14: Town of Liberty Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.26	0.39	0.52	0.66
Max Day Demand (MGD)	0.31	0.58	0.79	0.99
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.32	0.42	0.61	0.90
Maximum Monthly Flow (MGD)	0.51	0.62	0.91	1.35

5.2.4.1 Water Supply and Treatment

The Town of Liberty water system includes 8 groundwater supply wells with a capacity of 0.56 MGD, and three above-ground storage tanks. There are ongoing discussions about connecting the town to the City of Greensboro water system from the Toyota Industrial site and to a secondary connection to Asheboro from a water line extended from the Asheboro Wolfspeed transmission main up Highway 49 to Liberty for resiliency. While the agreement has not been finalized, the City of Greensboro has discussed supplying 1.0 MGD of Randolph County's water capacity from the PTRWA WTP through the Greensboro system to the Town of Liberty.

Figure 5-22 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the Town of Liberty. Additional water capacity is required to meet the needs of Liberty through 2050.

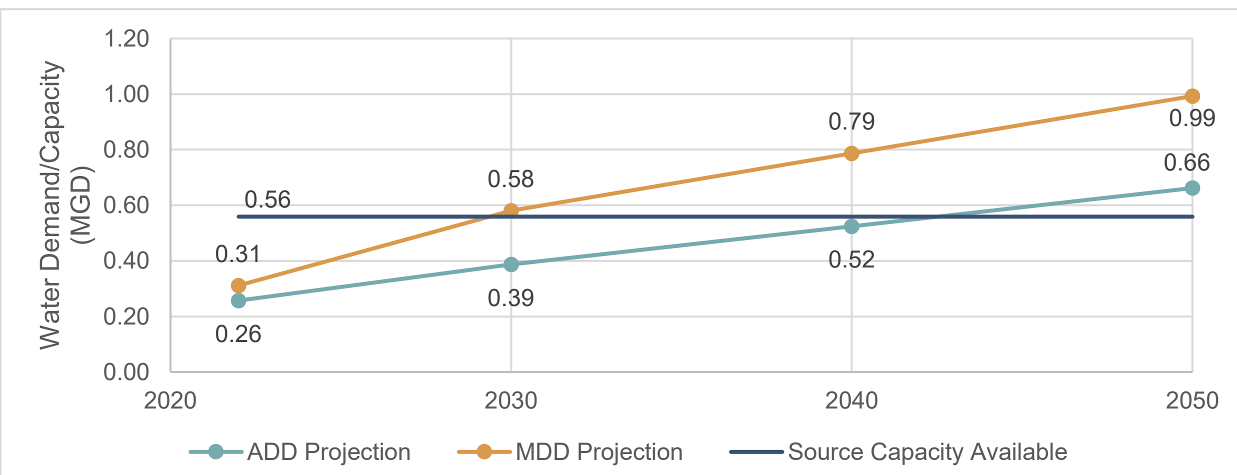


Figure 5-22: Liberty Water Demand Projections Versus Capacity Available

5.2.4.2 Wastewater Treatment

The Town of Liberty owns and operates a lagoon/spray irrigation WWTP that has a capacity of 0.55 MGD. The system has been in operation since 1987. The town experiences I&I that exceed the treatment facility capacity and is frequently in violation of its WWTP permit WQ003090. The town is under a SOC due to numerous Notices of Violations from the DWR. As part of the SOC, the Town is undergoing sewer collection rehabilitation projects to address system I&I.

A Wastewater Alternatives Analysis Report from December 2024, evaluated multiple alternatives for meeting the town's current and future wastewater flows. In the report, it was recommended that the town regionalize with the City of Greensboro and send wastewater to the existing Greensboro collection system at the Toyota Industrial site through the installation of a new sewer pump station and force main. The City of Greensboro and the Town of Liberty are discussing moving forward with this regional solution.

Figure 5-23 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the source capacity available for the Town of Liberty. The figure also shows 90% of the source capacity available to document when permits will need to be obtained for expansion. Additional wastewater capacity is required to meet the needs of Liberty by 2050.

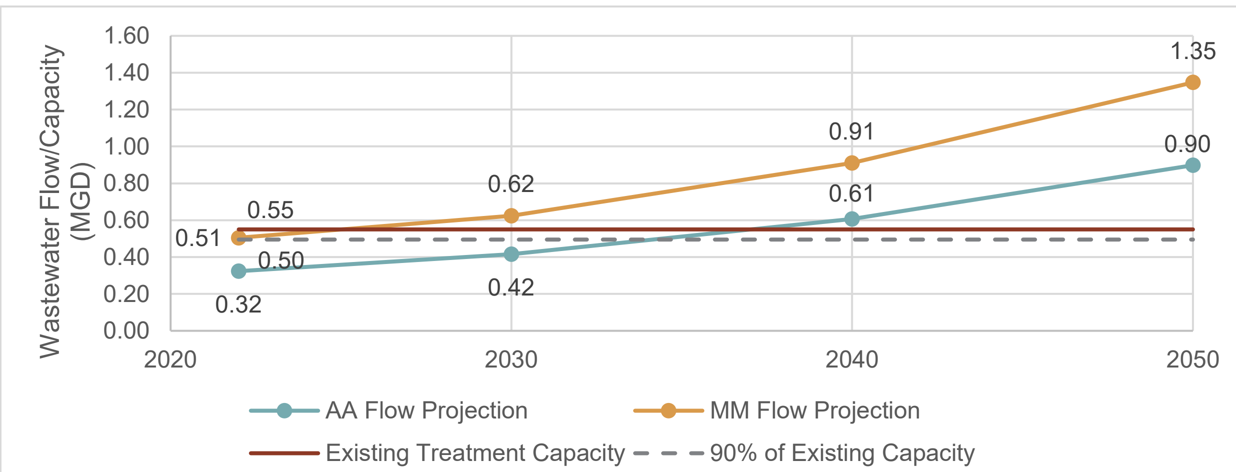
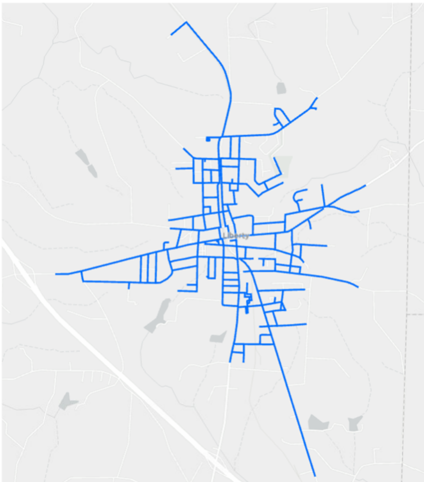


Figure 5-23: Liberty Wastewater Flow Projections Versus Capacity Available

5.2.4.3 Town of Liberty Worksheet

Worksheet can be found on the following page.

TOWN OF LIBERTY

Water Distribution System	Wastewater – Liberty WWTP
	

Water Details

Source: Groundwater Well System
Safe Yield: N/A
Well Capacity: 0.56 MGD
Purchase Contracts Available............................ 0 MGD

- Greensboro .... 1 MGD (Future)

Sales Contract Obligations................................. 0 MGD

- N/A

Wastewater Details

NPDES Discharge Point: Non-discharge– Spray Irrigation
Treatment Capacity (MM): 0.55 MGD
Permit Conditions: N/A

		Monthly	Weekly
BOD			
Summer	mg/L	-	-
Winter	mg/L	-	-
TSS	mg/L	-	-
NH_3-N			
Summer	mg/L	-	-
Winter	mg/L	-	-
TN	mg/L	-	
TP	mg/L	-	
1,4-Dioxane	µg/L	-	
PFAS	µg/L	-	

Receives Contracts Commitments......................0 MGD

- N/A

Discharging Contracts Available.........................0 MGD

- Greensboro (Future)

Demand (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Produced **0.26**	**Produced** **0.31**
Purchased...................... **0**	**Purchased**...................... **0**
• N/A	• N/A
Sold **0**	**Sold** **0**
• N/A	• N/A

Capacity (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Treated **0.32**	**Treated** **0.51**
Discharged.....................**0**	**Discharged**.....................**0**
• N/A	• N/A
Received.........................**0**	**Received** **0**
• N/A	• N/A

5.2.5 Town of Ramseur

A summary of the Town of Ramseur's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-15.

Table 5-15: Town of Ramseur Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.61	0.71	0.86	1.00
Max Day Demand (MGD)	1.63	1.83	2.21	2.59
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.18	0.30	0.64	0.67
Maximum Monthly Flow (MGD)	0.28	0.45	0.95	0.98

5.2.5.1 Water Supply and Treatment

The Town of Ramseur owns and operates the Ramseur WTP that has a capacity of 1.5 MGD. The raw water supply is a reservoir on Sandy Creek in the Deep River Tributary, which has a safe yield of 6.6 MG. The WTP was designed to be expanded to 3.0 MGD at the current site. The Ramseur WTP has aging infrastructure that requires rehabilitation. The facility will also be required to implement advanced treatment technology to meet the EPA PFAS MCLs that are scheduled to go into effect in 2031.

The Town sells water to the Town of Franklinville through a purchase agreement for a maximum of 0.25 MGD.

Figure 5-24 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the Town of Ramseur. Additional water capacity is required to meet the needs of Ramseur through 2050.

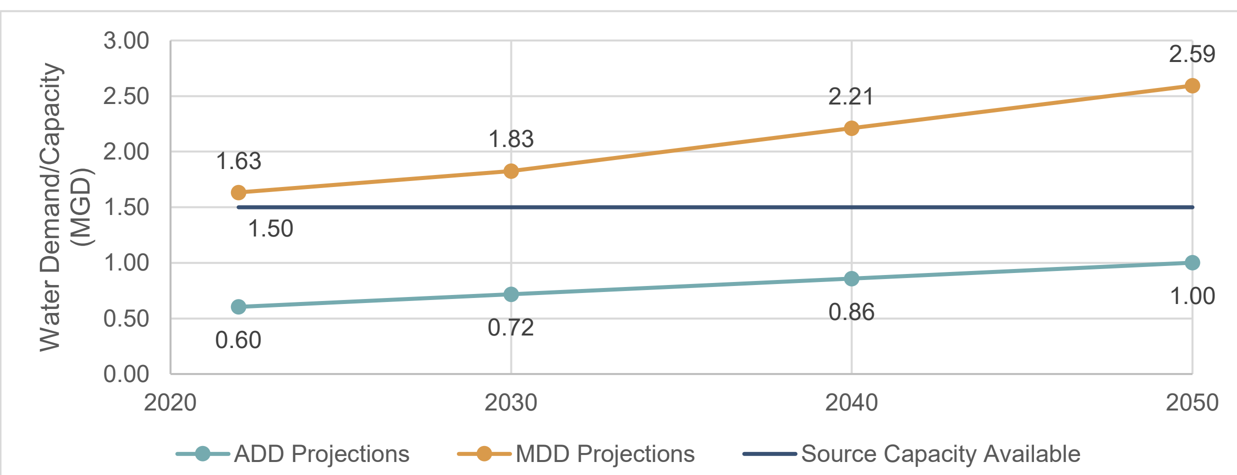


Figure 5-24: Ramseur Water Demand Projections Versus Capacity Available

5.2.5.2 Wastewater Treatment

The Town of Ramseur owns and operates the Ramseur WWTP, a 0.48 MGD facility discharging to the Deep River in the Cape Fear River Basin. The facility was designed for expansion to 1 MGD. The majority of the WWTP equipment is reaching the end of its useful life and has deteriorated. While the existing permit does not contain TN nor TP effluent limits, they are expected to be imposed on the next permit cycle. The Ramseur WWTP was not designed to meet nutrient removal limits, and a significant facility upgrade will be required.

Figure 5-25 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the source capacity available for the Town of Ramseur. The figure also shows 90% of the source capacity available to document when permits will need to be obtained for expansion. Additional wastewater capacity is required to meet the needs of Ramseur through 2050.

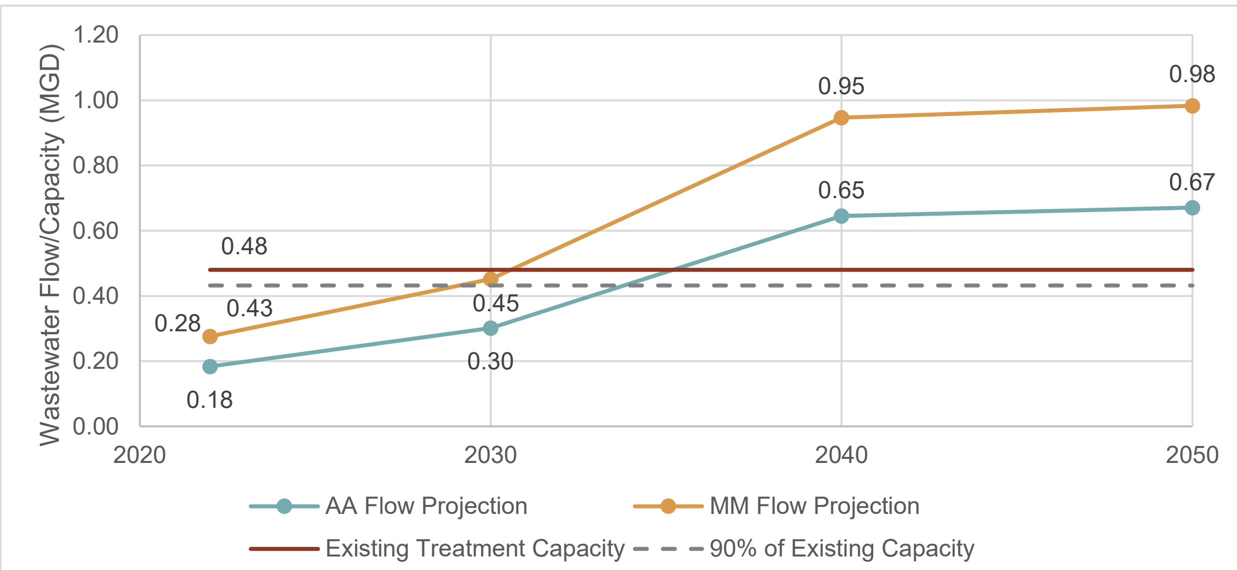


Figure 5-25: Ramseur Wastewater Flow Projections Versus Capacity Available

5.2.5.3 Town of Ramseur Worksheet

Worksheet can be found on the following page.

TOWN OF RAMSEUR

Water – Ramseur WTP

Wastewater – Ramseur WWTP

Ramseur WTP Details

Source: Sandy Creek – Deep River Tributary
Safe Yield: 6.6 MGD
WTP Capacity: 1.5 MGD
Purchase Contracts Available............................. 0 MGD

- N/A

Sales Contract Obligations............................. 0.25 MGD

- Franklinville... 0.25 MGD

Ramseur WWTP Permit Details

NPDES Discharge Point: Deep River – Cape Fear River Basin
Treatment Capacity (MM): 0.48 MGD
Permit Conditions:

		Monthly	Weekly
BOD	mg/L	30.0	45.0
TSS	mg/L	30.0	45.0
NH_3-N			
Summer	mg/L	18.0	35.0
Winter	mg/L	M&R	M&R
TN	mg/L	M&R	
TP	mg/L	M&R	
1,4-Dioxane	µg/L	M&R	
PFAS	µg/L	M&R	

Receives Contracts Commitments.......................0 MGD

- N/A

Discharging Contracts Available..........................0 MGD

- N/A

Demand (2022)

2022 Average Day (MGD)

Produced 0.60
Purchased...................... 0

- N/A

Sold 0.11

- Franklinville 0.11

2022 Max Day (MGD)

Produced 1.63
Purchased...................... 0

- N/A

Sold 0.12

- Franklinville 0.12

Capacity (2022)

2022 Average Day (MGD)

Treated 0.18
Discharged..................... 0

- N/A

Received......................... 0

- N/A

2022 Max Day (MGD)

Treated 0.28
Discharged..................... 0

- N/A

Received 0

- N/A

5.2.6 City of Randleman

A summary of the City of Randleman's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-16.

Table 5-16: City of Randleman Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.55	0.87	1.21	1.54
Max Day Demand (MGD)	1.04	1.74	2.41	3.08
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.51	0.77	1.09	1.41
Maximum Monthly Flow (MGD)	0.77	0.93	1.31	1.70

5.2.6.1 Water Supply and Treatment

The City of Randleman closed their WTF when they joined the Piedmont Triad Regional Water Authority system and now purchase water from the PTRWA JFK WTP at a capacity limit of 1.0 MGD. The city can also purchase 0.125 MGD of water from the City of Asheboro.

Figure 5-26 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the City of Randleman. Additional water capacity is required to meet the needs of Randleman through 2050.

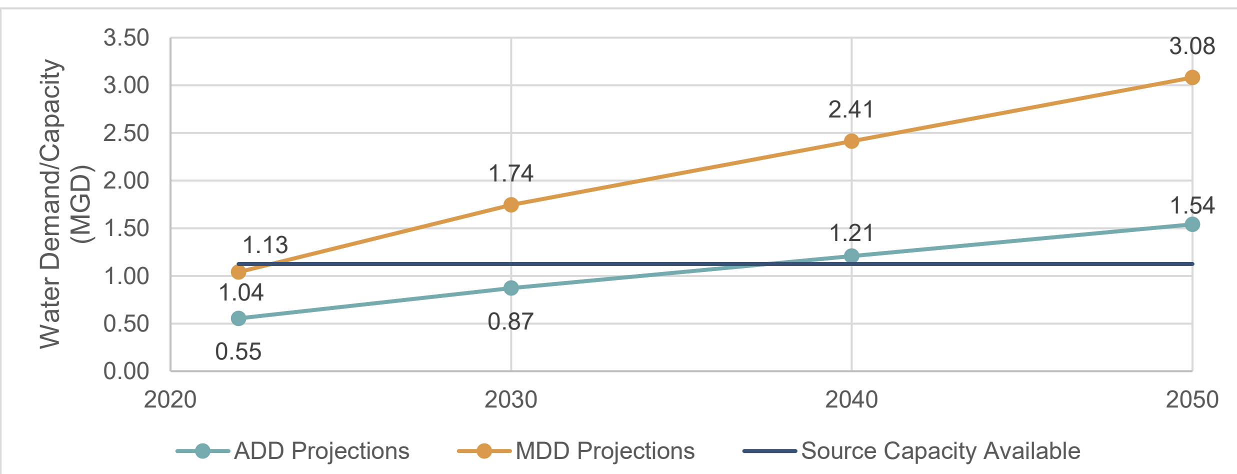


Figure 5-26: Randleman Water Demand Projections Versus Capacity Available

5.2.6.2 Wastewater Treatment

The City of Randleman owns and operates the Randleman WWTP, a 1.745 MGD facility discharging to the Deep River in the Cape Fear River Basin. The majority of the WWTP equipment is reaching the end of its useful life and requires a rehabilitation project. While the existing permit does not contain TN nor TP effluent limits, they are expected to be imposed on the next permit cycle. The Randleman WWTP was not designed to meet reduced nutrient limits, and a significant facility upgrade will be required.

The city is constructing a regional wastewater lift station that serves the Ross Home Goods site that is rated for 0.3 MGD. Initial flow from that facility is expected to be much less than that, but the station will provide sewer service to the area west of Randleman.

Figure 5-27 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the source capacity available for the City of Randleman. No additional wastewater capacity is required to meet the needs of Randleman through 2050.

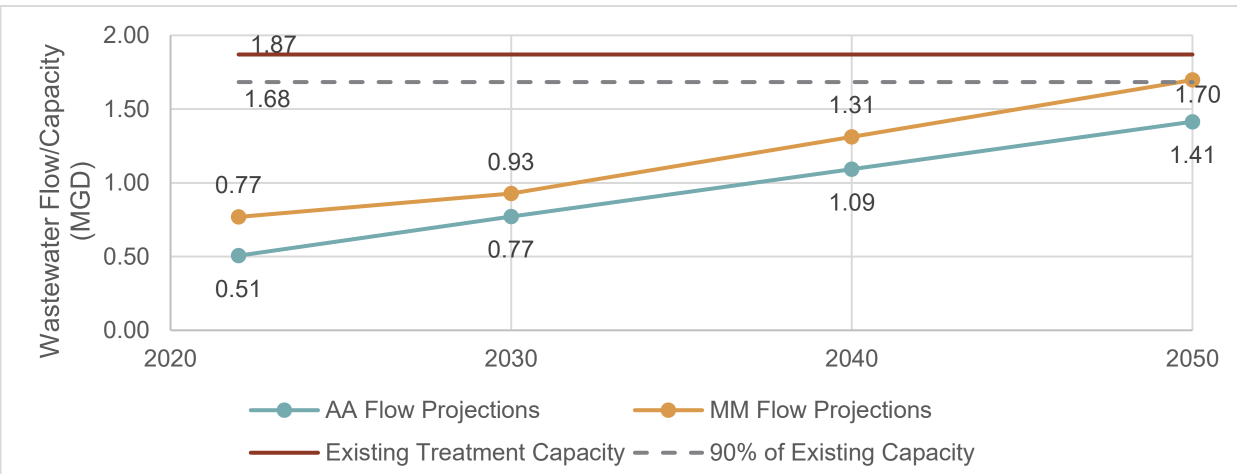
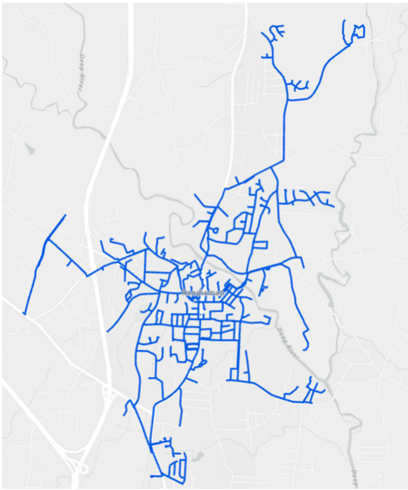


Figure 5-27: Randleman Wastewater Flow Projections Versus Capacity Available

5.2.6.3 City of Randleman Worksheet

Worksheet can be found on the following page.

CITY OF RANDLEMAN

Water Distribution System	Wastewater – Randleman WWTP
	

Water Details

Source: N/A
Safe Yield: N/A
WTP Capacity: 1.0 MGD (PTRWA JFK WTP Partner)
Purchase Contracts Available....................... 1.125 MGD

- Asheboro .... 0.125 MGD
- PTRWA .... 1.0 MGD

Sales Contract Obligations.................................. 0 MGD

- N/A

Randleman WWTP Permit Details

NPDES Discharge Point: Deep River – Cape Fear River Basin
Treatment Capacity (MM): 1.745 MGD
Permit Conditions:

		Monthly	Weekly
BOD			
Summer	mg/L	5.0	7.5
Winter	mg/L	10.0	15.0
TSS	mg/L	30.0	45.0
NH_3-N			
Summer	mg/L	2.0	6.0
Winter	mg/L	4.0	12.0
TN	mg/L	M&R	
TP	mg/L	M&R	
1,4-Dioxane	µg/L	M&R	
PFAS	µg/L	M&R	

Receives Contracts Commitments.......................0 MGD

- N/A

Discharging Contracts Available...................0.125 MGD

- Asheboro ....0.125 MGD

Demand (2022)

2022 Average Day (MGD)		2022 Max Day (MGD)	
Produced	**0**	**Produced**	**0**
Purchased	**0.795**	**Purchased**	**1.04**
• Asheboro	0.125	• Asheboro	0.125
• PTRWA	0.67	• PTRWA	0.915
Sold	**0**	**Sold**	**0**
• N/A		• N/A	

Capacity (2022)

2022 Average Day (MGD)		2022 Max Day (MGD)	
Treated	**0.47**	**Treated**	**0.74**
Discharged	**0.03**	**Discharged**	**0.03**
• Asheboro	0.03	• Asheboro	0.03
Received	**0**	**Received**	**0**
• N/A		• N/A	

5.2.7 Seagrove-Ulah Metropolitan Water District

A summary of the Town of Seagrove's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-17.

Table 5-17: Seagrove-Ulah MWD Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	0.18	0.18	0.20	0.22
Max Day Demand (MGD)	0.21	0.27	0.30	0.32
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.02	0.07	0.08	0.09
Maximum Monthly Flow (MGD)	0.03	0.11	0.12	0.13

5.2.7.1 Water Supply and Treatment

The Town of Seagrove water system is owned and operated by the Seagrove-Ulah Metro Water and Sewer District. This system has an agreement to purchase 0.5 MGD from the City of Asheboro.

Figure 5-28 shows the projected average day and maximum day water demand plus sales contracts through 2050 versus the source capacity available for the Town of Seagrove. The figure also shows 90% of the source capacity available to document when permits will need to be obtained for expansion. No additional water capacity is required to meet the needs of Seagrove through 2050.

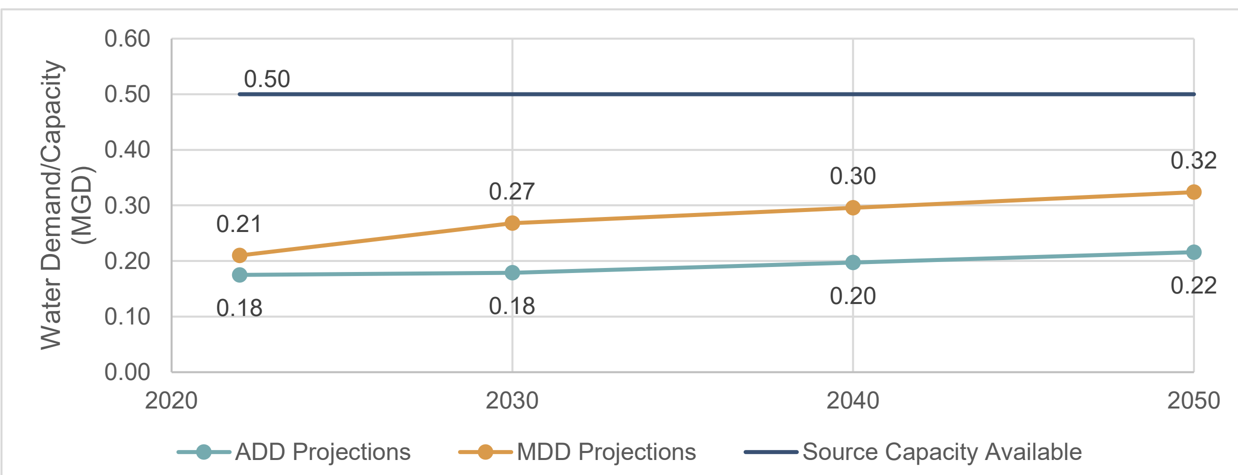


Figure 5-28: Seagrove Water Demand Projections Versus Capacity Available

5.2.7.2 Wastewater Treatment

The Seagrove-Ulah Metro Water and Sewer District recently purchased an old wastewater treatment facility from the Luck's Beans facility that had been shut down. This facility has a capacity of 0.08 MGD with an average flow of 0.03 MGD in 2023. The State rerated the facility to 0.03 MGD, which has caused the District to send flow north to the Town to Asheboro. The WWTF needs replacement and Randolph County has provided funding for a new 0.09 MGD package treatment facility that will be located at the same site as the existing facility.

Figure 5-29 shows the projected annual average and maximum month wastewater flows plus receiving contracts through 2050 versus the source capacity available for the Town of Seagrove. No additional wastewater capacity is required to meet the needs of Seagrove through 2050.

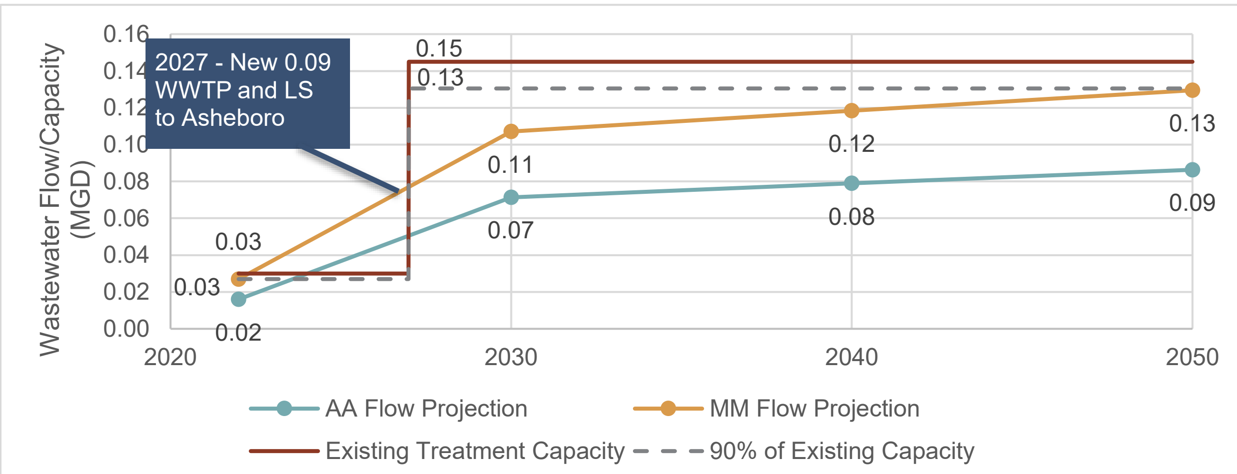


Figure 5-29: Seagrove Wastewater Flow Projections Versus Capacity Available

5.2.7.3 Seagrove-Ulah Metropolitan Water District Worksheet

Worksheet can be found on the following page.

TOWN OF SEAGROVE

Water – (Name of WTP)	Wastewater – Seagrove-Ulah Metropolitan Water District WWTF
	

Water Details

Source: N/A
Safe Yield: N/A
WTP Capacity: N/A MGD
Purchase Contracts Available........................... 0.5 MGD

- Asheboro .... 0.5 MGD

Sales Contract Obligations.................................. 0 MGD

- N/A

Seagrove-Ulah Metropolitan Water District WWTF Permit Details

NPDES Discharge Point: Seagrove-Ulah Metropolitan Water District
Treatment Capacity (MM): 0.03 MGD
Permit Conditions:

		Monthly	Weekly
BOD			
Summer	mg/L	-	-
Winter	mg/L	-	-
TSS	mg/L	-	-
NH_3-N			
Summer	mg/L	-	-
Winter	mg/L	-	-
TN	mg/L	-	
TP	mg/L	-	
1,4-Dioxane	µg/L	-	
PFAS	µg/L	-	

Receives Contracts Commitments.......................0 MGD

- N/A

Discharging Contracts Available..........................0 MGD

- N/A

Demand (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Produced 0	**Produced 0**
Purchased................. 0.18	**Purchased................. 0.18**
• Asheboro............ 0.18	• Asheboro............ 0.18
Sold 0	**Sold 0**
• N/A	• N/A

Capacity (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Treated 0.02	**Treated 0.03**
Discharged..................... 0	**Discharged..................... 0**
• N/A	• N/A
Received......................... 0	**Received 0**
• N/A	• N/A

5.2.8 City of Trinity

A summary of the City of Trinity's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-18.

Table 5-18: City of Trinity Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	1.57	1.69	1.82	1.95
Max Day Demand (MGD)	2.36	2.53	2.73	2.93
Wastewater Capacity Projections				
Average Daily Flow (MGD)	0.22	0.95	0.97	0.99
Maximum Monthly Flow (MGD)	0.27	1.14	1.17	1.19

5.2.8.1 Water Supply and Treatment

The City of Trinity does not operate a public water system, and it is within the Davidson Water, Inc. service area. No change is anticipated in this Study for the City of Trinity, therefore the water needs for the city will not be included in the regional solutions.

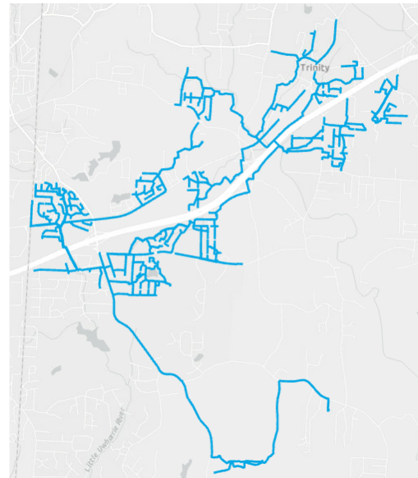
5.2.8.2 Wastewater Treatment

The City of Trinity currently discharges its wastewater to the City of Thomasville through a receiving contract of up to 1 MGD. However, the City has signed an ILA with the City of High Point to purchase 1 MGD of capacity at High Point's Westside WWTP. Trinity has a capital improvement project in progress to install a force main from their existing Steeplegate Lift Station to the existing City of High Point 18" outfall on Old Thomasville Road. Once the project is complete, Trinity will send their wastewater to Westside WWTP. With this project underway, the wastewater needs for the city will not be included in the regional solutions.

5.2.8.3 City of Trinity Worksheet

Worksheet can be found on the following page.

CITY OF TRINITY

Water	Wastewater Collection System
	

Water Details

Source: N/A
Safe Yield: N/A
WTP Capacity:N/A MGD
Purchase Contracts Available.......................... 3.0 MGD

- Davidson Water, Inc.

Sales Contract Obligations................................. 0 MGD

- N/A

Wastewater Details

NPDES Discharge Point: N/A
Treatment Capacity (MM): N/A
Permit Conditions: N/A
Receives Contracts Commitments......................0 MGD

- N/A

Discharging Contracts Available......................1.0 MGD

- Thomasville ....1.0 MGD
- High Point – Westside WWTP (Future)

Demand (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Produced 0	**Produced 0**
Purchased................. 1.57	**Purchased................. 2.36**
• Davidson Water 1.57	• Davidson Water 2.36
Sold 0	**Sold 0**
• N/A	• N/A

Capacity (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Treated 0	**Treated 0**
Discharged................ 0.22	**Discharged.................. 0.3**
• Thomasville 0.22	• Thomasville 0.3
Received......................... 0	**Received 0**
• N/A	• N/A

5.2.9 Unincorporated Randolph County

A summary of Randolph County's water supply, water treatment and wastewater treatment capacity, water sales contracts, wastewater receiving contracts, 2022 water demand, and 2022 wastewater flow is presented in Table 5-19.

Table 5-19: Unincorporated Randolph County Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	-	1.57	1.97	2.85
Max Day Demand (MGD)	-	3.11	5.95	9.13
Wastewater Capacity Projections				
Average Daily Flow (MGD)	-	0.11	0.42	0.94
Maximum Monthly Flow (MGD)	-	0.13	0.51	1.13

5.2.9.1 Water Supply and Treatment

Randolph County has no water treatment facility but owns an allocation of 1.25 MGD from the PTRWA facility. The County currently has no users of this water, so the County purchases the water without any sales. The County is actively trying to get their water to Liberty, Asheboro or out into the County.

5.2.9.2 Wastewater Treatment

Randolph County has no wastewater treatment facility and relies totally on the adjacent municipal systems or private on-site wastewater treatment facilities.

5.3 Piedmont Triad Regional Water Authority

5.3.1 Piedmont Triad Regional Water Authority

Table 5-20: PTRWA Projections Summary

	2022	2030	2040	2050
Water Demand Projections				
Average Day Demand (MGD)	11.75	17.11	18.48	20.04
Max Day Demand (MGD)	12.58	22.56	33.03	45.83

5.3.1.1 Water Supply and Treatment

The PTRWA Authority currently operates the John F. Kime WTP, a 14.7 MGD conventional treatment facility located on Randleman Lake. The Randleman Lake reservoir has a safe yield of 54 MGD. Due to the arrangements of PTRWA's contracts with the six member utilities, the facility is relatively consistent with production throughout the year, allowing the water utility providers with treatment facilities to respond directly to fluctuations in demand.

PTRWA JFK WTP is currently under construction to expand the facility to a 26.7 MGD permitted facility, with upgrades to reduce PFAS and 1,4-dioxane concentrations with the installation of a Reverse Osmosis facility and should be online in the next five years.

Figure 5-30 shows the combined projected average day and maximum day water purchase needs of the region from JFK WTP through 2050 versus the source capacity available at the WTP. Additional future expansions of JFK WTP up to the Randleman Lake safe yield is required to meet the needs of the region through 2050.

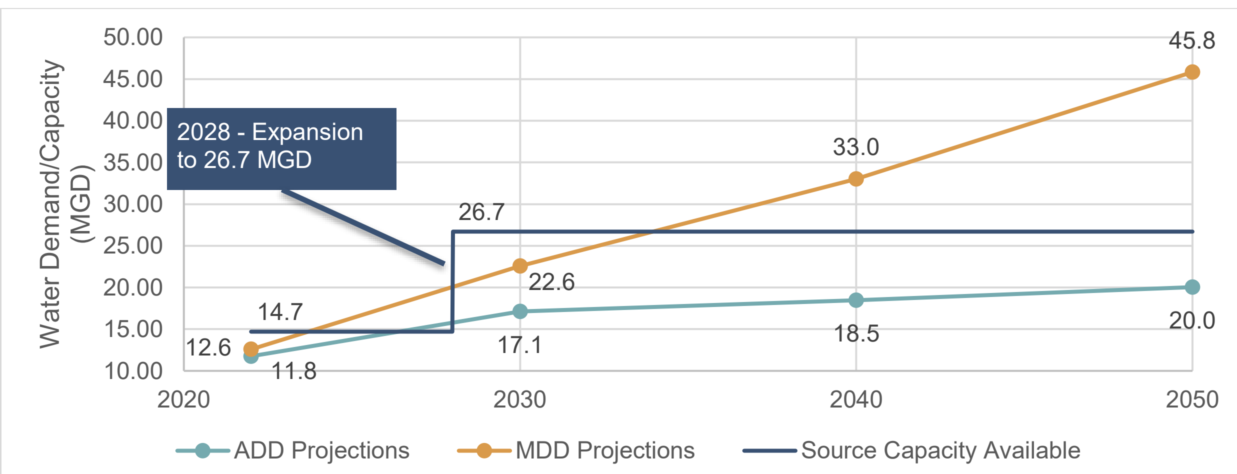


Figure 5-30: Projected PTRWA Member Utilities' Water Purchase Needs Versus Capacity Available

5.3.1.2 PTRWA Worksheet

Worksheet can be found on the following page.

Water – John F. Kime WTP

John F. Kime WTP Details

Source: Randleman Lake – Cape Fear River Basin
Safe Yield: 54 MGD
WTP Capacity: 14.7 MGD
Purchase Contracts Available .... 0 MGD

- N/A

Sales Contract Obligations .... 14.7 MGD

- Greensboro .... 7.836 MGD
- High Point .... 2.28 MGD
- Randleman .... 1 MGD
- Randolph County .... 1.25 MGD
- Jamestown .... 0.775 MGD
- Archdale .... 1.559 MGD

Demand (2022)

2022 Average Day (MGD)	2022 Max Day (MGD)
Produced 11.75	**Produced 12.58**
Purchased 0	**Purchased 0**
• N/A	• N/A
Sold 11.09	**Sold 11.84**
• Greensboro 6.74	• Greensboro 6.74
• High Point 2.28	• High Point 2.28
• Randleman 0.67	• Randleman 0.92
• Randolph County 0	• Randolph County 0
• Jamestown 0.46	• Jamestown 0.54
• Archdale 0.94	• Archdale 1.37

6. Future Planning Alternatives

6.1 Water Supply and Treatment Evaluation

6.1.1 Regional Evaluation for Water Supply and Distribution

The study area total ADD and MDD projections for 2030, 2040, and 2050 are shown in Figure 6-1. The total water demand projections include the demand projections of all municipalities within the study area. The team took great care not to double-count demand, i.e. we only included the unique demand for each municipality to serve their customers. For example, where the City of Greensboro might convey flow to Jamestown for PTRWA, we were careful to only assign those flows to the Town of Jamestown and not include those demands for Greensboro when calculating the need for the study area. Figure 6-1 includes:

- utilities that are served water by providers outside of the study area (e.g. Gibsonville served by Burlington)
- utilities responsible for sales to those outside of the study area
- the total existing maximum day water supply capacity, including both WTP capacity within the study area and water purchase contracts available with providers outside of the study area

However, when looking at the scenarios to meet these demands in the future, we had to assign the needs for municipalities without treatment plants to those utilities capable of serving them. Thus, in this chapter, the reader will see that the water providers and wastewater treatment providers have been consolidated to those capable of serving the need.

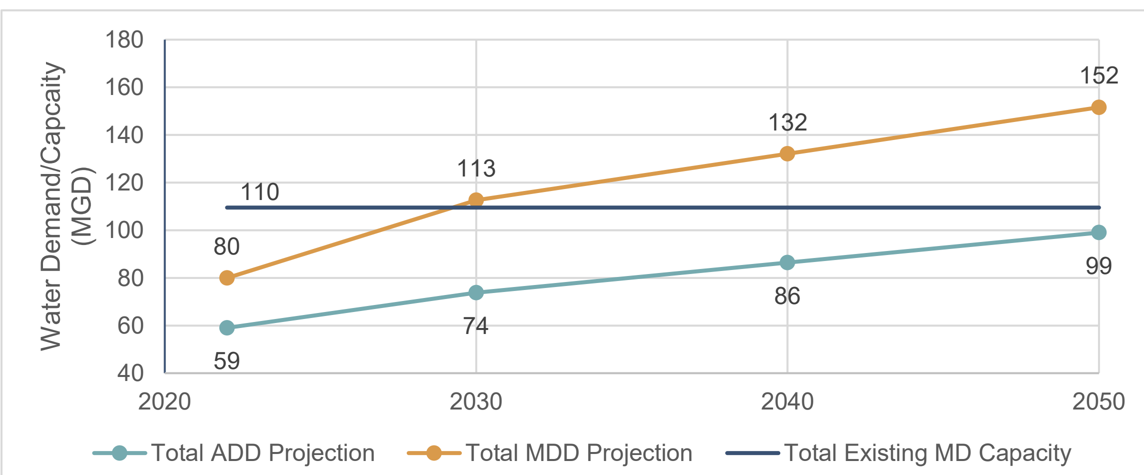


Figure 6-1: Study Area Water Demand Projections and Existing Capacity

There is a need for additional water capacity to be able to meet the future water demand projections for the study area. Fortunately, a regional solution already exists for the water supply and treatment for the region. PTRWA and the Town of Ramseur have available reservoir supply to provide additional flow to the stakeholders in the region. The sections below present the regional partnerships and capital infrastructure projects that will give the region the ability to engage in coordinated, long-term resource planning to address projected growth and improvements required to meet new regulatory standards in water sources.

The City of Asheboro also has available safe yield in their reservoirs to assist the region in meeting the water demand into the future, however, the IBT rules currently limit the transfer to 9.36 MGD from the Yadkin-Pee Dee to the Cape Fear River Basin. A recommendation in this report is to include a collective approach of the regional partnership to apply for an interbasin transfer certificate to allow this capacity to be accessible to the Randolph County area past 2050. This process can take time, starting it early will be important.

6.1.2 Regional Partnerships and Future Needs

As previously discussed, the member utilities who are currently allocated water from PTRWA's JFK-WTP are the City of Archdale, the City of Greensboro, the City of High Point, the City of Randleman, the Town of Jamestown and Randolph County. Table 6-1 presents the ultimate safe yield finished water ownership of the PTRWA Randleman Reservoir.

Table 6-1: Ultimate Safe Yield Finished Water Ownership of the Randleman Reservoir

Member Government	Total Reservoir Safe Yield Ownership Percentage	Total Reservoir Safe Yield Finished Water Allocation (MGD)	Present Day Water Allocation (MGD)
Greensboro	53.1%	25.5	7.84
High Point	19.0%	9.10	2.28
Randolph County	18.2%	8.75	1.25
Archdale	5.1%	2.45	1.56
Jamestown	2.5%	1.2	0.78
Randleman	2.1%	1.0	1.0
Total	100%	48.0	14.7

Randolph County does not currently operate a water distribution network and has indicated they have no immediate plans to do so, despite their current allocation of 1.25 MGD at the JFK WTP and access to an ultimate finished water allocation of 8.75 MGD. However, Randolph County's decision to be an important part of the Authority will prove to be vital to the county's continued growth and water securities in the future. Without this foresight to be a part of the Regional Water Authority, the County wouldn't have been considered for the economic development opportunities they are experiencing today, ultimately leading to the loss of employment opportunities, lower residential growth, and a decrease in tax revenue. The availability of this water allocation will allow the County to wholesale their available water supply to the municipal utilities within the County as needed. This will provide the water security needed for each one of these growing utilities at a controlled cost shared by the regional partnership, instead of requiring improvements at smaller, individual, aging water treatment facilities. The County's commitment to securing the water availability to the citizens within the County well before it was needed was well planned and a proven success of the regional approach.

As can be seen in the regional alternatives outlined below, there are a number of stakeholders within the study area that will benefit from the access to the Randolph County allocation to Randleman Reservoir to meet their projected 2050 water demands. These stakeholders include the City of Archdale, the City of Randleman, the City of Asheboro, and the Town of Liberty. Based on input from the stakeholders in the region, this Study recommends that the City of Archdale, the City of Randleman, the Town of Liberty and the City of Asheboro utilize a portion of the Randolph County allocation. In the case of Archdale and Randleman, capacity can be purchased and contractually transferred into the Authority's structure. However, at its current structure, the Town of Liberty and City of Asheboro would secure an Interlocal Agreement to purchase water from PTRWA, utilizing the Randolph County allocation. The Town of Liberty's supply would likely be provided through the City of Greensboro initially through an agreement with Randolph County, purchase the equivalent flow from PTRWA as Randolph County allocation. The City of Asheboro and PTRWA are currently partners on a project to install a water line along Hwy 73/74 to provide water when needed to offset the commitment to serving Wolfspeed and demands at the Chatham Advanced Manufacturing Megasite in Chatham County.

6.1.3 Regionalization Recommendations

The summary of water supply and treatment recommendations are shown in Figure 6-2. Detailed project descriptions, projected project costs and estimated timelines for the design and construction of each proposed project follow Figure 6-2. The projects do not capture the water solutions and contractual agreements already in place that are not proposed to change in the future. The projects also do not capture water improvement projects that the individual municipalities have in their capital improvement plans that only impact their existing water systems. Examples of the projects that are not included are water line and pump station rehabilitation, tank maintenance, meter improvements, etc. that are required to maintain the individual distribution systems.

The projected timeline for the required WTP expansions at both PTWRA and Ramseur, and for the additional purchase contracts needed with providers outside the study area is detailed in Figure 6-2.

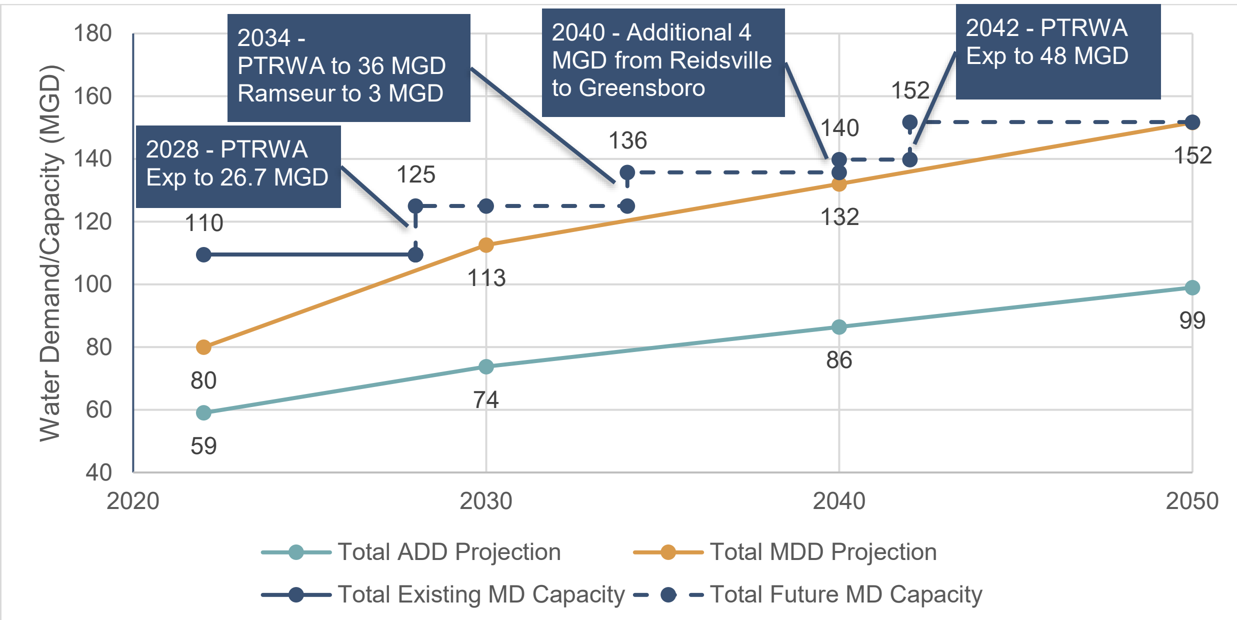
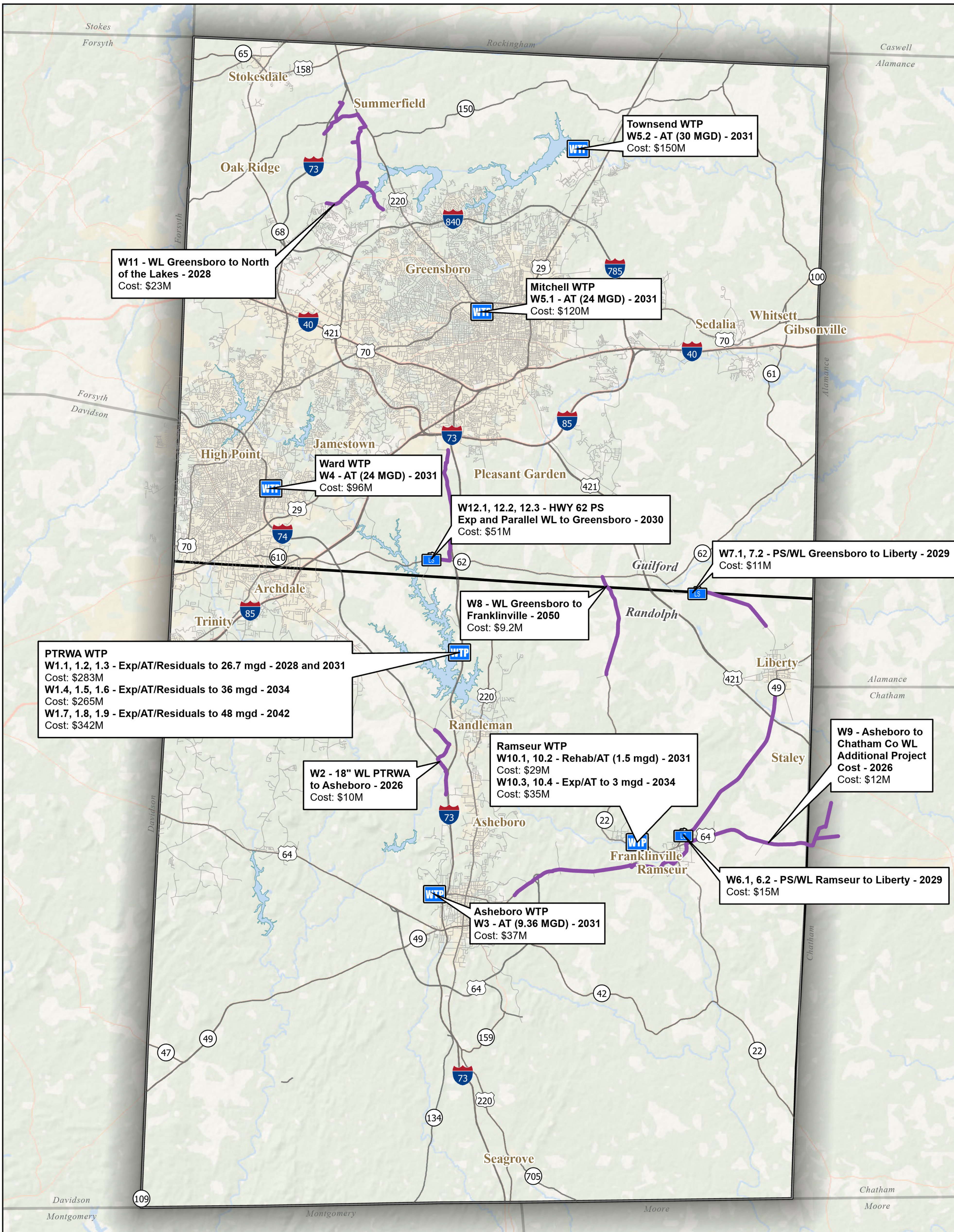


Figure 6-2: Study Area Water Demand Projections and Required Future Capacity

Table 6-2: Capital Projects by year required for the Water Regionalization Scenario

Utility Resp. for Upgrade	CY Project Completed By	Project ID	Water Capital Project Description	Est. Total Project Cost
Asheboro	2026	W2	Water service from PTRWA to Asheboro	$10,400,000
Asheboro	2026	W9	Asheboro to Chatham County Water Line Additional Project Funding	$12,000,000
Greensboro	2028	W11	Water service from Greensboro to North of the Lakes	$22,800,000
Liberty	2029	W6.1	Water service from Ramseur to Liberty	$14,200,000
Liberty	2029	W6.2	Ramseur to Liberty Booster Pump Station	$1,000,000
Liberty	2029	W7.1	Liberty Water Line from Greensboro - Toyota facility	$9,500,000
Liberty	2029	W7.2	Greensboro to Liberty Booster Pump Station	$1,500,000
Greensboro	2030	W12.1	Greensboro HWY 62 Pump Station Expansion	$1,500,000
Greensboro	2030	W12.2	Parallel Waterline from HWY 62 to Sutton Rd -Hwy 73 GSO	$35,200,000
Greensboro	2030	W12.3	Parallel Waterline from Sutton Rd to S Holden Rd GSO	$14,300,000
PTRWA	2031	W1.1	PTRWA Expansion to 26.7 MGD	$94,100,000
PTRWA	2031	W1.2	PTRWA Advanced Treatment Upgrade 26.7 MGD	$146,900,000
PTRWA	2031	W1.3	PTRWA Residuals Facility Expansion to 26.7 MGD	$42,200,000
Asheboro	2031	W3	Asheboro WTP Advanced Treatment Upgrade	$37,400,000
High Point	2031	W4	High Point Ward WTP Advanced Treatment Upgrade	$95,900,000
Greensboro	2031	W5.1	Mitchell Advanced Treatment Upgrades	$120,000,000
Greensboro	2031	W5.2	Townsend Advanced Treatment Upgrades	$150,000,000
Ramseur	2031	W10.1	Ramseur WTP Rehabilitation of existing facility	$23,400,000
Ramseur	2031	W10.2	Ramseur WTP Advanced Treatment Upgrade at 1.5MGD	$6,000,000
PTRWA	2034	W1.4	PTRWA Expansion to 36 MGD	$181,400,000
PTRWA	2034	W1.5	PTRWA Advanced Treatment Upgrade to 36 MGD	$51,200,000
PTRWA	2034	W1.6	PTRWA Residuals Facility Expansion to 36 MGD	$32,700,000
Ramseur	2034	W10.3	Ramseur WTP Expansion to 3MGD	$29,300,000
Ramseur	2034	W10.4	Ramseur WTP Advanced Treatment Upgrade to 3 MGD	$6,000,000
PTRWA	2042	W1.7	PTRWA Expansion to 48 MGD	$234,000,000
PTRWA	2042	W1.8	PTRWA Advanced Treatment Upgrade to 48 MGD	$66,000,000
PTRWA	2042	W1.9	PTRWA Residuals Facility Expansion to 48 MGD	$42,200,000
Franklinville	2050	W8	Water service from Greensboro to Franklinville	$9,200,000
			Total: Water Regionalization Capital Project Costs	**$1,490,300,000**



Legend

- Guilford and Randolph County
- Water Treatment Plant
- Proposed Pump Stations
- Proposed Water Lines
- Major Waterbodies

N

0 5 10 Miles

Water Supply and Distribution Recommendations

Figure 6-3

December 2025

Piedmont Triad Regional Water Authority

PATH: O:\GIS\Projects\31645\31645-002\ArcGISPro\PTRWA_SB\PTRWA_SB.aprx; Layout: PTRWA Basemap Portrait; User: SBailey

W1 - PTRWA Expansion and Advanced Treatment Upgrade to 26.7 mgd

Project Location

Site Description: Existing John F. Kime WTP on Adams Farm Rd in Randleman, operated by Piedmont Triad Regional Water Authority.

Project Summary

PTRWA is currently working to expand the JFK WTP's capacity from 14.7 mgd to 26.7 mgd to assist the region in meeting the near-term expected water demands. The expanded facility is expected to be complete in August 2028. PTRWA is also in design of an enhanced treatment process to meet new and emerging regulations for drinking water. Reverse Osmosis (RO) membrane treatment has been selected as the process to treat PFAS and 1,4-Dioxane, and construction is expected to finish in 2031. The current EPA deadline to comply with the PFAS MCLs is April 2031.

Current Capacity (mgd)	**14.7**
Expanded Capacity (mgd)	**26.7**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (89%), Archdale (7.4%), Jamestown (3.5%)**
W1.1 - PTRWA Expansion to 26.7 mgd	**$62,700,000**
W1.2 - Advanced Treatment Upgrade	**$97,900,000**
W1.3 - Residual Expansion to 26.7 mgd	**$28,100,000**
Total Construction Cost	**$188,700,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$28,300,000**
Permitting/Admin. (10% of Const. Cost)	**$18,800,000**
Project Contingency (20% of All Costs)	**$47,400,000**
Total Cost	**$283,200,000**

Timeline

Beginning of Design	**2023**
Beginning of Construction	**2025**
End of Construction	**2031**

W1 - PTRWA Expansion and Advanced Treatment Upgrade to 36, 48 mgd

Project Location

Site Description: Existing John F. Kime WTP on Adams Farm Rd, Randleman operated by Piedmont Triad Regional Water Authority.

Project Summary

PTRWA will further expand the JFK WTP in order to assist the region in meeting the projected 2050 maximum day demand (MDD). The first expansion will increase the WTP capacity from 26.7 mgd to 36 mgd. The second expansion will increase the WTP capacity from 36 mgd to 48 mgd. The expansions will cover conventional treatment, advanced treatment and residuals treatment.

Starting Capacity (mgd)	**26.7**
Expanded Capacity (mgd)	**36 and 48**

Project Funding and Timeline

Funding for 36 mgd Expansion		Funding for 48 mgd Expansion	
Asset Owner(s)	**High Point (57%), Archdale (17%), Randleman (26%)**	Asset Owner(s)	**Greensboro (57.5%), High Point (13%), Asheboro (29.5%)**
W1.4 - PTRWA Expansion to 36 mgd	**$120,900,000**	W1.7 - PTRWA Expansion to 48 mgd	**$156,000,000**
W1.5 - Advanced Treatment Upgrade	**$34,100,000**	W1.8 - Advanced Treatment Upgrade	**$44,000,000**
W1.6 - Residual Expansion to 36 mgd	**$21,800,000**	W1.9 - Residual Expansion to 48 mgd	**$28,100,000**
Total Construction Cost	**$176,800,000**	**Total Construction Cost**	**$228,100,000**
Easements (7.5% of Const. Cost)	**-**	Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$26,500,000**	Engineering (15% of Const. Cost)	**$34,200,000**
Permitting/Admin. (10% of Const. Cost)	**$17,600,000**	Permitting/Admin. (10% of Const. Cost)	**$22,800,000**
Project Contingency (20% of All Costs)	**$44,400,000**	Project Contingency (20% of All Costs)	**$57,100,000**
Total Cost	**$265,300,000**	**Total Cost**	**$342,200,000**

Timeline for 36 mgd Expansion		Timeline for 48 mgd Expansion	
Beginning of Design	**2028**	Beginning of Design	**2035**
Beginning of Construction	**2030**	Beginning of Construction	**2037**
End of Construction	**2034**	End of Construction	**2042**

W2 - Water Service from PTRWA to Asheboro

Project Location

Site Description: Water line tie-ins at Island Ford Rd in Randleman and Pineview Rd in Asheboro.

Project Summary

This project will extend an 18" water line to connect the PTRWA distribution system to the Asheboro water system. Design of the water line is complete and construction is expected to start in 2026.

Pipe Diameter (in)	**18**
Pump Size (mgd)	**N/A**
Pipe Length (ft)	**18,200**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**Asheboro**
Known Funding Sources	**American Rescue Plan Act Funds**

Water Line

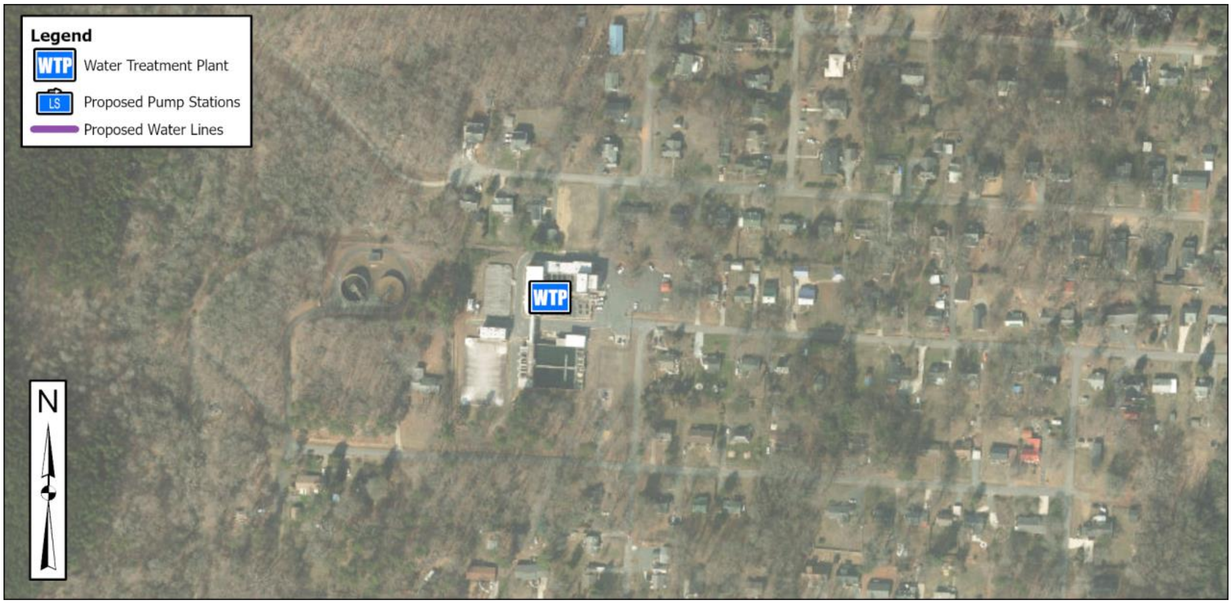
Construction Cost	**$6,900,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$1,000,000**
Permitting/Admin. (10% of Const. Cost)	**$600,000**
Project Contingency (20% of All Costs)	**$1,900,000**
Total Cost	**$10,400,000**

Timeline

Beginning of Design	**2024**
Beginning of Construction	**2026**
End of Construction	**2026**

W3 - Asheboro WTP Advanced Treatment Upgrade

Project Location



Site Description: Existing W.L. Brown WTP on Winslow Ave in Asheboro, operated by the City of Asheboro.

Project Summary

The existing W.L. Brown WTP has a capacity of 12 mgd, however due to a grandfathered inter-basin transfer (IBT), the WTP capacity is limited to 9.36 MGD and is not expected to expand. Asheboro will need to upgrade its WTP with an enhanced treatment process to meet new and emerging regulations for drinking water. The current EPA deadline to comply with the PFAS MCLs is April 2031.

Current Capacity (mgd)	**12**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Asheboro**
Potential Funding Sources	**N/A**

WTP

Construction Cost	**$24,900,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$3,700,000**
Permitting/Admin. (10% of Const. Cost)	**$2,400,000**
Project Contingency (20% of All Costs)	**$6,400,000**
Total Cost	**$37,400,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2028**
End of Construction	**2031**

W4 - High Point Ward WTP Advanced Treatment Upgrade

Project Location

Site Description: Existing Frank L. Ward WTP on Pendleton St in High Point, operated by the City of High Point

Project Summary

The existing Frank L. Ward WTP has a capacity of 24 mgd and is not expected to expand due to limits in reservoir safe yield. High Point will need to upgrade its WTP with an enhanced treatment process to meet new and emerging regulations for drinking water. The current EPA deadline to comply with the PFAS MCLs is April 2031.

Current Capacity (mgd)	**24**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of High Point**
Potential Funding Sources	**N/A**

WTP

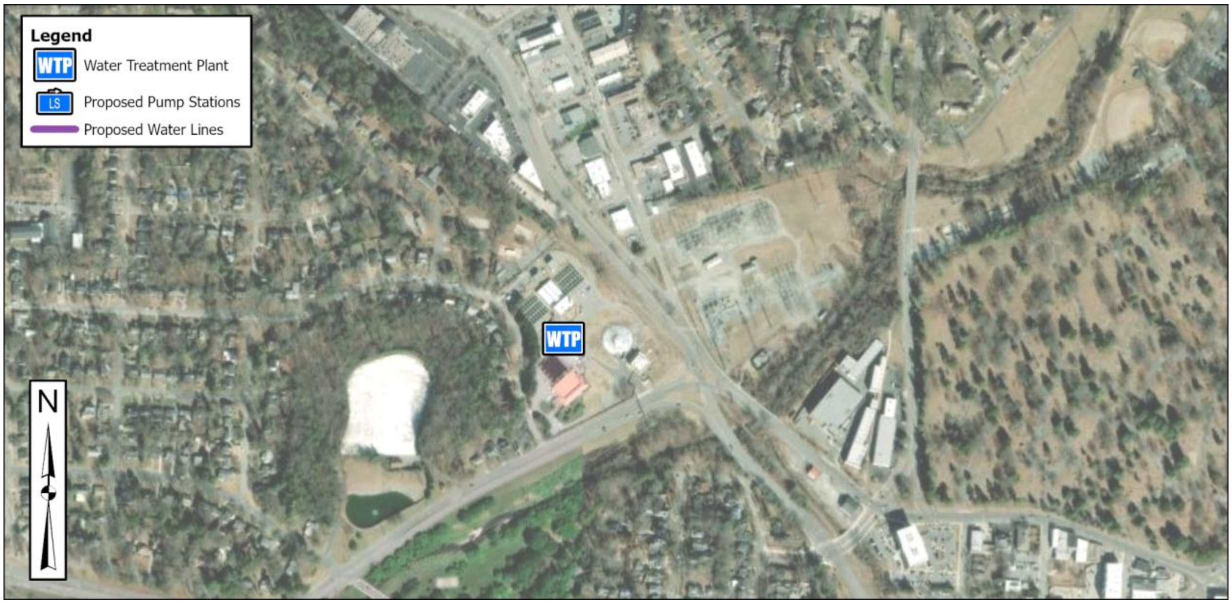
Construction Cost	**$63,900,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$9,600,000**
Permitting/Admin. (10% of Const. Cost)	**$6,400,000**
Project Contingency (20% of All Costs)	**$16,000,000**
Total Cost	**$95,900,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2028**
End of Construction	**2031**

W5.1 - Greensboro Mitchell WTP Advanced Treatment Upgrade

Project Location



Site Description: Existing 24 mgd Mitchell WTP on Battleground Ave in Greensboro, operated by the City of Greensboro.

Project Summary

Greensboro is upgrading the Mitchell WTP with a Granular Activated Carbon facility to ensure compliance with anticipated PFAS regulations. The current EPA deadline to comply with the PFAS MCLs is April 2031.

Current Capacity (mgd)	**24**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	**N/A**

WTP

Construction Cost	**$80,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$12,000,000**
Permitting/Admin. (10% of Const. Cost)	**$8,000,000**
Project Contingency (20% of All Costs)	**$20,000,000**
Total Cost	**$120,000,000**

Timeline

Beginning of Design	**2023**
Beginning of Construction	**2025**
End of Construction	**2031**

W5.2 - Greensboro Townsend WTP Advanced Treatment Upgrade

Project Location

Site Description: Existing 30 mgd Lake Townsend WTP on Townsend Rd in Brown Summit, operated by the City of Greensboro.

Project Summary

Greensboro will upgrade the Townsend WTP with an enhanced treatment process to ensure compliance with anticipated PFAS regulations.The current EPA deadline to comply with the PFAS MCLs is April 2031.

Current Capacity (mgd)	**30**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	**N/A**

WTP

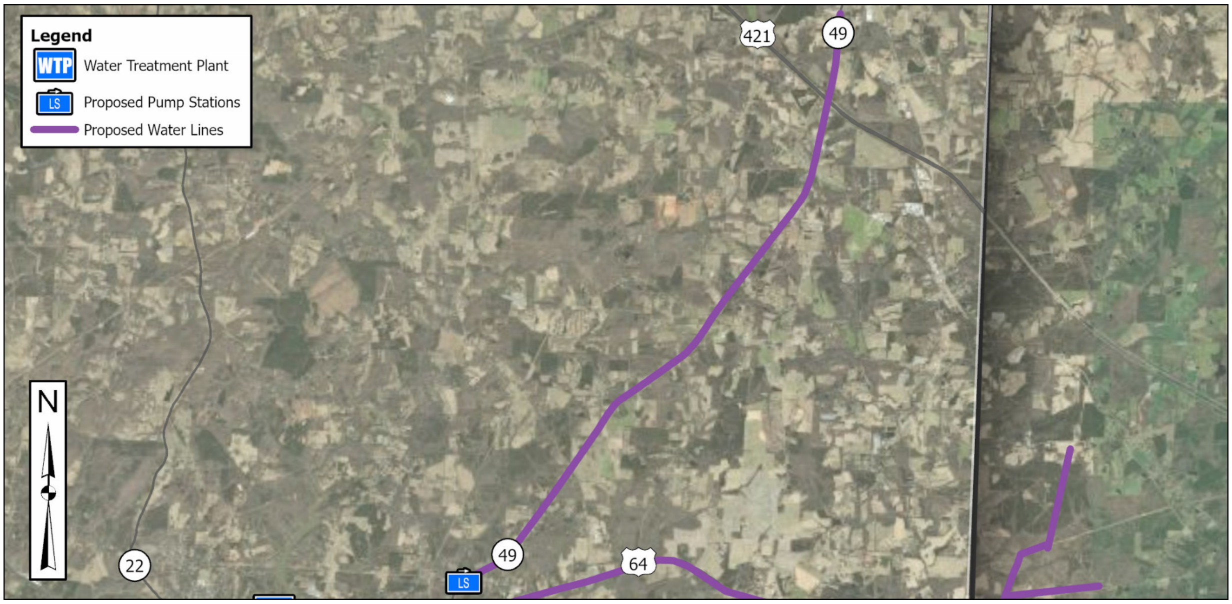
Construction Cost	**$100,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$15,000,000**
Permitting/Admin. (10% of Const. Cost)	**$10,000,000**
Project Contingency (20% of All Costs)	**$25,000,000**
Total Cost	**$150,000,000**

Timeline

Beginning of Design	**2025**
Beginning of Construction	**2027**
End of Construction	**2031**

W6 - Pump Station and Water Service from Ramseur to Liberty

Project Location



Site Description: Proposed pump station to be located on NC Hwy 49 in Ramseur, connecting to proposed waterline along NC Hwy 49 to Crutchfield Country Rd in Liberty.

Project Summary

A new pump station and water line to provide water service to the Town of Liberty from the Town of Ramseur. Due to concerns regarding water quality and resiliency of the single source supplies, the Town of Liberty's water system is also proposed to be tied into the City of Greensboro at the Toyota facility to create a distribution loop. The timeline for this project is adjustable, as there are other ways to deal with water quality from a single source, such as flushing.

Pipe Diameter (in)	**12**
Pump Size (mgd)	**0.7**
Pipe Length (ft)	**37,100**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Liberty**
Potential Funding Sources	**Randolph County State Budget Allocation**

W6.1 - Water Line

Construction Cost	**$8,900,000**
Easements (7.5% of Const. Cost)	**$700,000**
Engineering (15% of Const. Cost)	**$1,300,000**
Permitting/Admin. (10% of Const. Cost)	**$800,000**
Project Contingency (20% of All Costs)	**$2,500,000**
Total Cost	**$14,200,000**

W6.2 - Pump Station

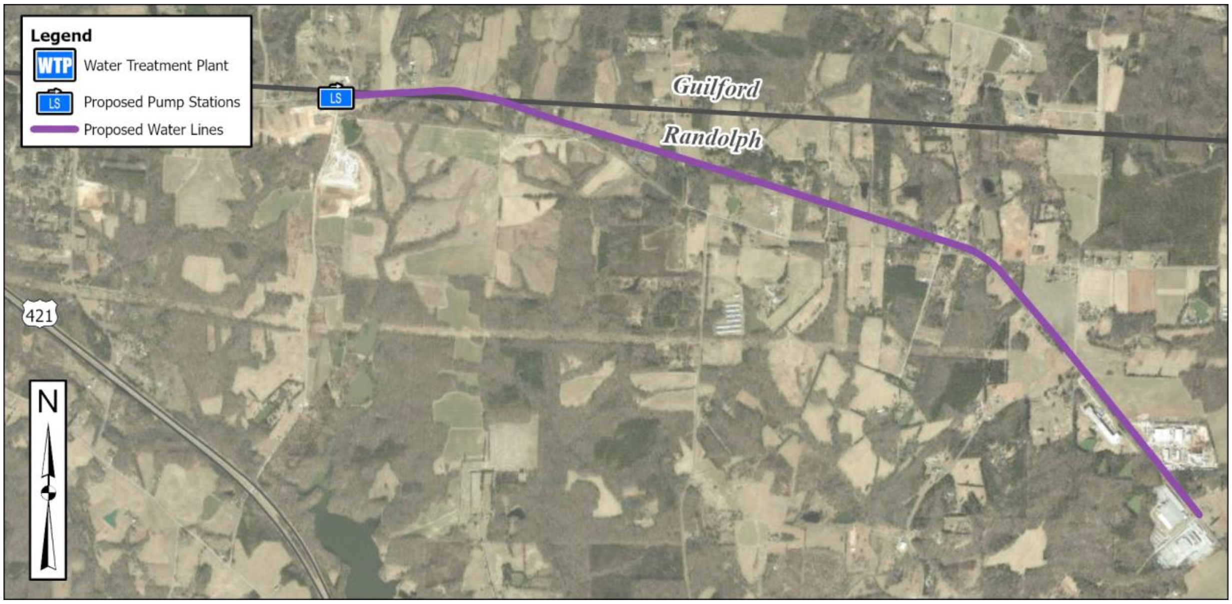
Construction Cost	**$700,000**
Easements (7.5% of Const. Cost)	-
Engineering (15% of Const. Cost)	**$100,000**
Permitting/Admin. (10% of Const. Cost)	-
Project Contingency (20% of All Costs)	**$200,000**
Total Cost	**$1,000,000**

Timeline

Beginning of Design	**2025**
Beginning of Construction	**2027**
End of Construction	**2029**

W7 - Pump Station and Water Service from Greensboro to Liberty

Project Location



Site Description: Proposed pump station to be located on Old 421 Rd near Browns Meadow Rd, connecting to proposed waterline along Old 421 Rd to Curtis Industrial Dr in Liberty.

Project Summary

A new pump station and water line to provide water service to the Town of Liberty from the City of Greensboro. The new line will connect to Greensboro's existing water infrastructure at the Toyota facility and will tie into the northern portion of Liberty's existing water system. Liberty's existing groundwater supplied system would be able to be supplemented or fully replaced by the new water supply source. Due to concerns regarding water quality and resiliency of the single source supplies, the Town of Liberty's water system is also proposed to be tied into the City of Ramseur distribution system to create a distribution loop.

Pipe Diameter (in)	**12**
Pump Size (mgd)	**1**
Pipe Length (ft)	**25,000**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Liberty**
Potential Funding Sources	**Randolph County State Budget Allocation**

W7.1 - Water Line

Construction Cost	**$6,000,000**
Easements (7.5% of Const. Cost)	**$500,000**
Engineering (15% of Const. Cost)	**$900,000**
Permitting/Admin. (10% of Const. Cost)	**$600,000**
Project Contingency (20% of All Costs)	**$1,500,000**
Total Cost	**$9,500,000**

W7.2 - Pump Station

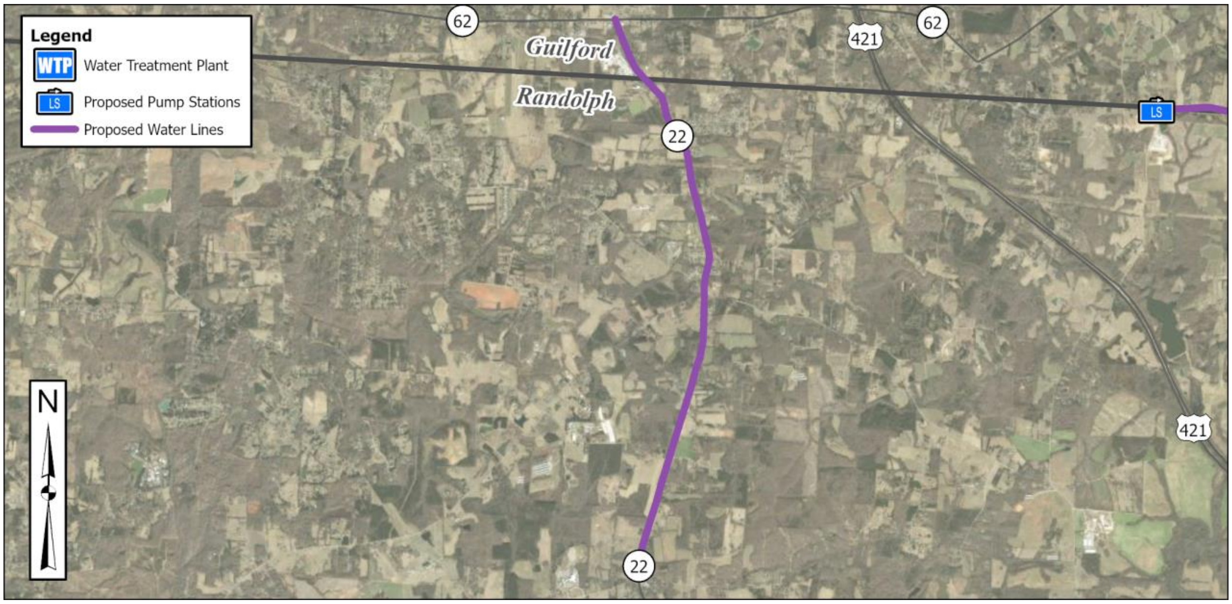
Construction Cost	**$1,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$200,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$100,000**
Total Cost	**$1,500,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2028**
End of Construction	**2029**

W8 - Water Service from Greensboro to Franklinville

Project Location



Site Description: Proposed waterline along NC Hwy 22S from Monnett Rd to Mack Lineberry Rd in Franklinville.

Project Summary

Due to concerns regarding water quality and resiliency of the Town of Franklinville's single source supply from the Town of Ramseur, this project is recommended to tie in Franklinville's existing water distribution system into the Greensboro water system from the north. This will create a distribution loop.

Pipe Diameter (in)	**12**
Pump Size (mgd)	**N/A**
Pipe Length (ft)	**24,200**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Franklinville**
Potential Funding Sources	**Randolph County State Budget Allocation**

Water Line

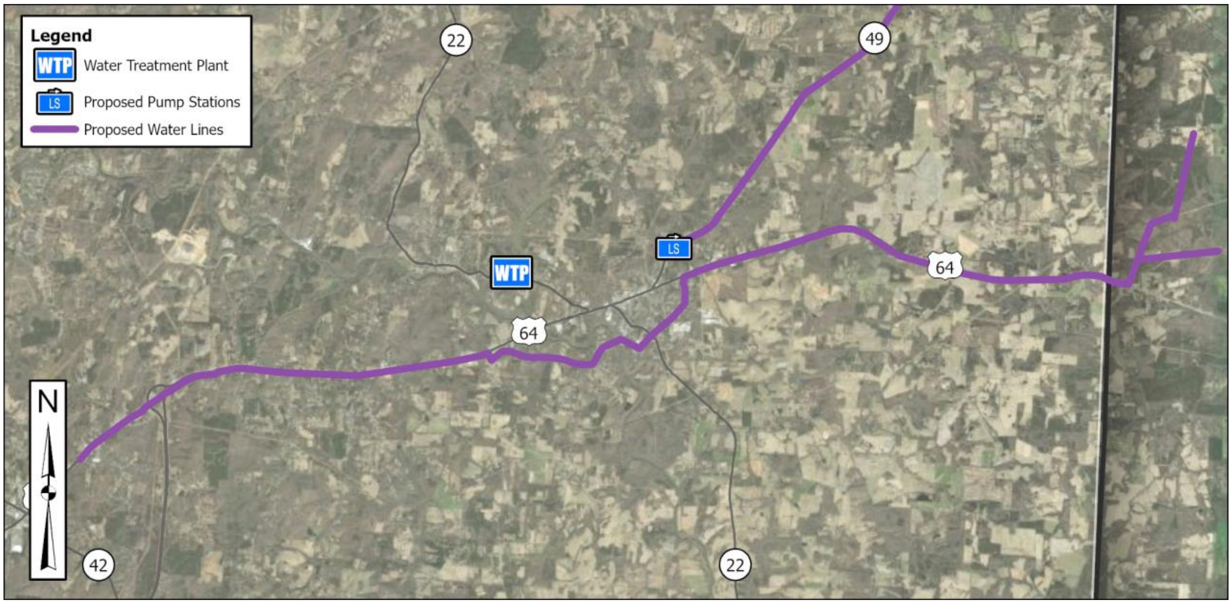
Construction Cost	**$5,800,000**
Easements (7.5% of Const. Cost)	**$400,000**
Engineering (15% of Const. Cost)	**$900,000**
Permitting/Admin. (10% of Const. Cost)	**$600,000**
Project Contingency (20% of All Costs)	**$1,500,000**
Total Cost	**$9,200,000**

Timeline

Beginning of Design	**2047**
Beginning of Construction	**2049**
End of Construction	**2050**

W9 - Water Service from Asheboro to Chatham County Additional Project Cost

Project Location



Site Description: Proposed waterline along US Hwy 64 E from Vista Pkwy to Carolina Core Pkwy where the waterline forks.

Project Summary

The water line to convey up to 4.55 mgd from the City of Asheboro's water distribution system to the Chatham Advanced Manufacturing site (3.3 mgd) and Eastern Randolph County (1.25 mgd) through Franklinville and Ramseur has already been designed and is currently in construction. The State provided $55M in funding for this project, however the construction budget has run over the grant amount and an estimated additional $12M is needed for the completion of all sections of the water line.

Pipe Diameter (in)	**16**
Pump Size (mgd)	**N/A**
Pipe Length (ft)	**23,650**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Asheboro**
Potential Funding Sources	**Randolph County State Budget Allocation**

Water Line

Construction Cost	**$12,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**-**
Permitting/Admin. (10% of Const. Cost)	**-**
Project Contingency (20% of All Costs)	**-**
Total Cost	**$12,000,000**

Timeline

Beginning of Design	**2023**
Beginning of Construction	**2025**
End of Construction	**2026**

W10 - Ramseur WTP Expansion and Advanced Treatment Upgrade to 3 mgd

Project Location

Site Description: Existing Ramseur WTP on NC Hwy 22 N in Ramseur, operated by the Town of Ramseur.

Project Summary

The existing Ramseur WTP has a capacity of 1.5 mgd, and the safe yield of Ramseur's water source is 6.6 mgd. The existing WTP has aging infrastructure and is in need of a rehabilitation project. In addition to rehabilating existing structures and equipment, Ramseur will need an enhanced treatment process to meet new and emerging regulations for drinking water. The current EPA deadline to comply with the PFAS MCLs is April 2031. This Study also recommends the expansion of the WTP capacity to 3 mgd to assist the region in meeting the projected 2050 maximum day demand (MDD).

Current Capacity (mgd)	**1.5**
Expanded Capacity (mgd)	**3**

Project Funding and Timeline

Funding for 1.5 mgd Upgrades	
Asset Owner(s)	**Town of Ramseur**
Potential Funding Sources	
W10.1 - Rehabilitation and Upgrades	**$15,600,000**
W10.2 - Advanced Treatment Upgrade	**$4,000,000**
Total Construction Cost	**$19,600,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$2,900,000**
Permitting/Admin. (10% of Const. Cost)	**$2,000,000**
Project Contingency (20% of All Costs)	**$4,900,000**
Total Cost	**$29,400,000**

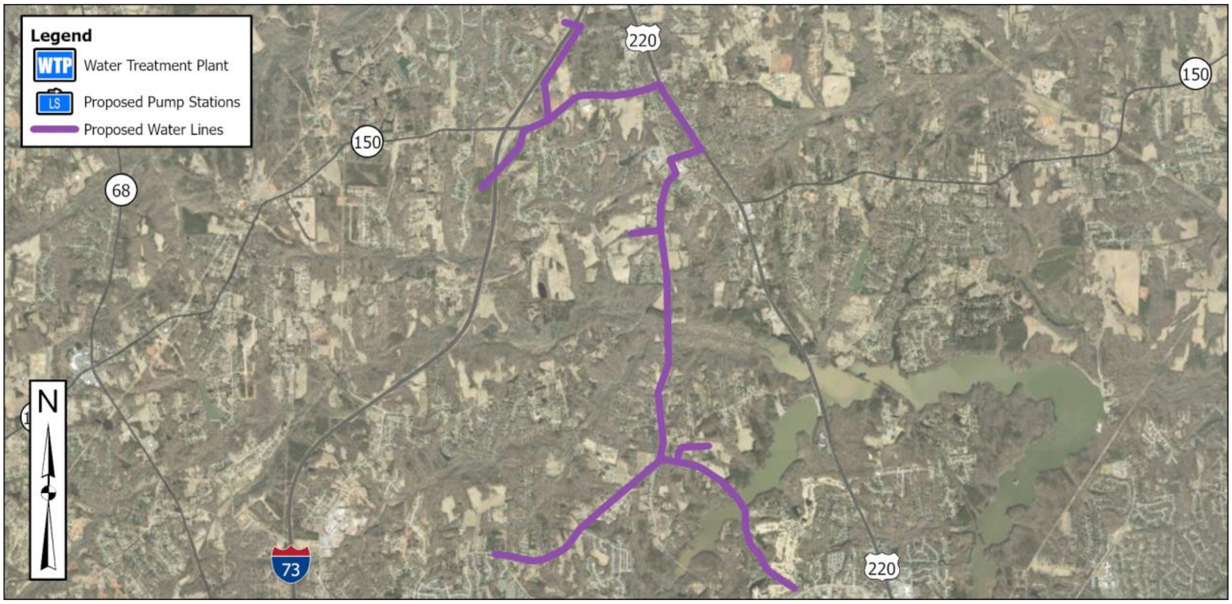
Funding for 3 mgd Expansion	
Asset Owner(s)	**Town of Ramseur**
Potential Funding Sources	
W10.3 - Expansion to 3 mgd	**$19,500,000**
W10.4 - Advanced Treatment Upgrade	**$4,000,000**
Total Construction Cost	**$23,500,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$3,500,000**
Permitting/Admin. (10% of Const. Cost)	**$2,400,000**
Project Contingency (20% of All Costs)	**$5,900,000**
Total Cost	**$35,300,000**

Timeline for 1.5 mgd Upgrades	
Beginning of Design	**2026**
Beginning of Construction	**2028**
End of Construction	**2031**

Timeline for 3 mgd Expansion	
Beginning of Design	**2029**
Beginning of Construction	**2031**
End of Construction	**2034**

W11 - Water Service from Greensboro to North of the Lakes

Project Location



Site Description: Proposed waterline to connect the Greensboro water system at Fleming Rd and Horse Pen Creek Rd to serve communities north of Lake Higgins and Lake Brandt.

Project Summary

A new water line to provide water service to portions of Northwest Guilford County from the City of Greensboro. The new line will connect to Greensboro's existing water infrastructure at Fleming Rd and Horse Pen Creek Rd and will serve six development areas plus future needs for the Town of Summerfield. Plans for development north of Lake Higgins and Lake Brandt are still being developed, so the water line alignment and connection points will be refined as planning continues. The area's existing groundwater supplied system would be fully replaced by the new water supply source.

Pipe Diameter (in)	**16**
Pump Size (mgd)	**N/A**
Pipe Length (ft)	**44,800**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

Water Line

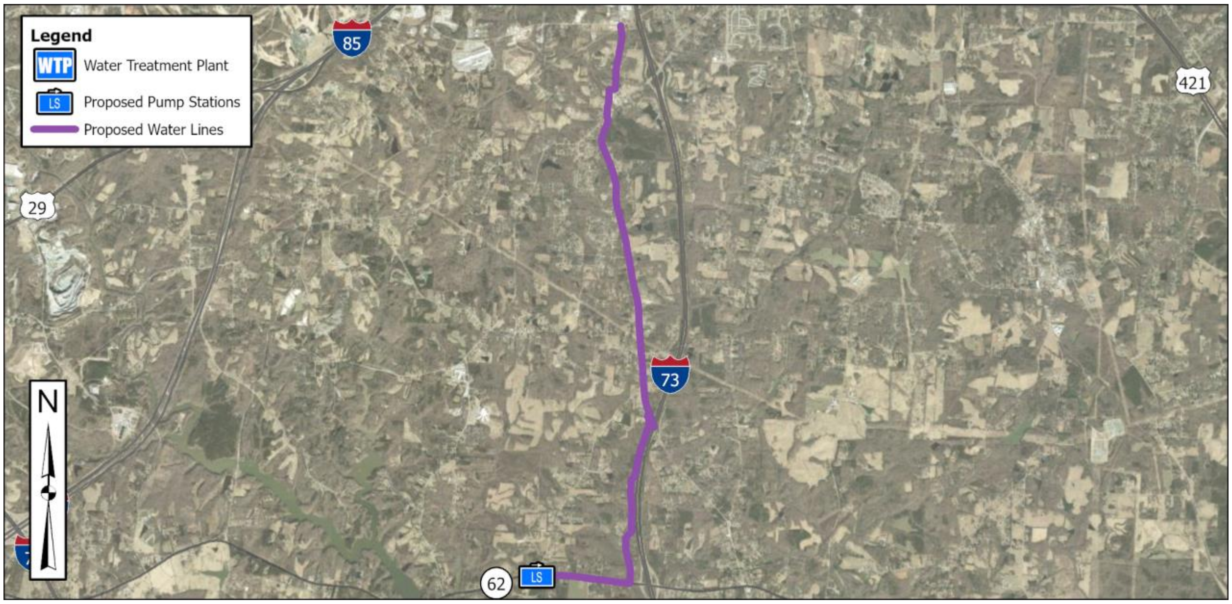
Construction Cost	**$14,300,000**
Easements (7.5% of Const. Cost)	**$1,100,000**
Engineering (15% of Const. Cost)	**$2,100,000**
Permitting/Admin. (10% of Const. Cost)	**$1,400,000**
Project Contingency (20% of All Costs)	**$3,900,000**
Total Cost	**$22,800,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2027**
End of Construction	**2028**

W12 - PTRWA Transfer Pump Station Expansion and Second Waterline to Serve Greensboro

Project Location



Site Description: Existing PTRWA transfer pump station on Coltrane Mill Rd near NC Hwy 62. Parallel water line along NC Hwy 62, Thurber Rd, Old Randleman Rd, and S Holden Rd to Bishop Rd.

Project Summary

The PTRWA Transfer PS that sends flow to Greensboro will need to be expanded to allow additional Greensboro allocation from PTRWA to be pumped to the north. The existing PS has two pumps that send water to Greensboro with an open spot for a third pump. This project includes installing a 3rd, like-kind pump to add capacity. Greensboro will need to add a parallel 36" water line from the transfer PS along NC Hwy 62, up Old Randleman Rd to Sutton Rd, and then a parallel 30" water line on Old Randleman Rd from Sutton Rd to Bishop Rd. This parallel line is sized to handle ultimate Greensboro supply from PTRWA, along with ultimate Jamestown flow and Liberty flow from PTRWA through Greensboro's system.

Pipe Diameter (in)	**30 and 36**
Pump Size (mgd)	**12**
Pipe Length (ft)	**35,470**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s) **City of Greensboro**

12.1 - Pump Station

Construction Cost	**$1,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$200,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$100,000**
Total Cost	**$1,500,000**

12.2, 12.3 - Water Lines

Construction Cost	**$31,100,000**
Easements (7.5% of Const. Cost)	**$2,400,000**
Engineering (15% of Const. Cost)	**$4,700,000**
Permitting/Admin. (10% of Const. Cost)	**$3,200,000**
Project Contingency (20% of All Costs)	**$8,100,000**
Total Cost	**$49,500,000**

Timeline

Beginning of Design	**2027**
Beginning of Construction	**2029**
End of Construction	**2030**

6.2 Wastewater Treatment Capacity Evaluation

6.2.1 Regional Evaluation for Wastewater Treatment and Collection

The study area total average day wastewater flow and maximum month wastewater flow projections for 2030, 2040, and 2050 are shown in Figure 6-4. The total wastewater flow projections include the flow projections of all municipalities within the study area, even those that have discharging contracts with providers outside of the study area. The total wastewater flow projections also include the anticipated receiving contracts from municipalities outside of the study area with the regional providers. The total existing maximum month wastewater capacity, including both WWTP capacity within the study area and wastewater discharge contracts available with providers outside of the study area, is shown in Figure 6-4.

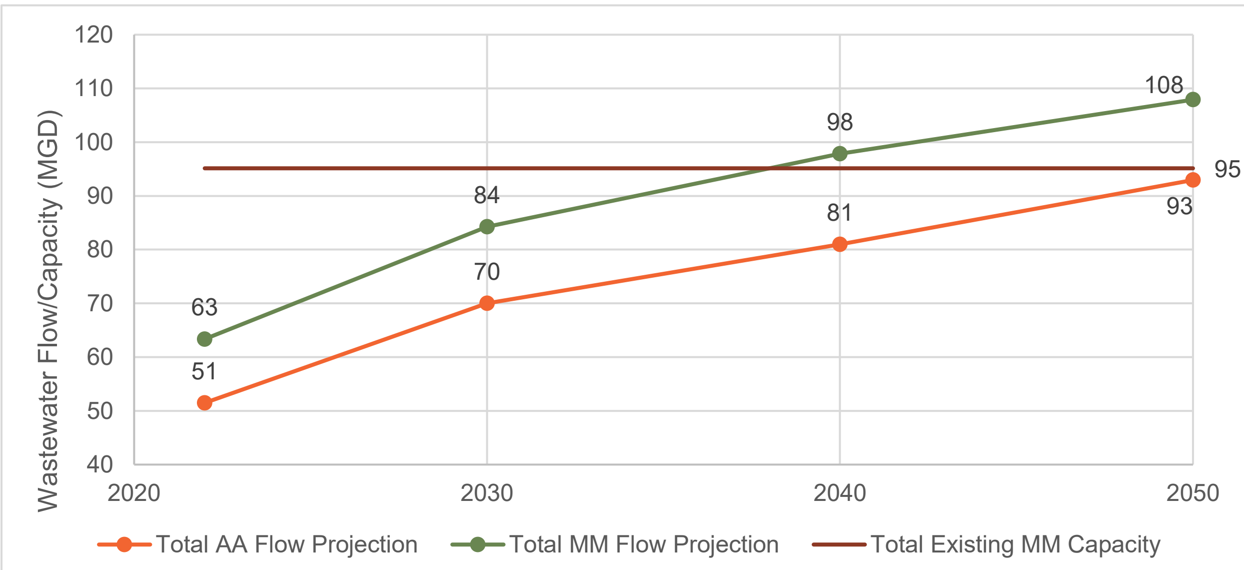


Figure 6-4: Study Area Wastewater Flow Projections and Existing Capacity

There is a need for additional wastewater capacity to be able to meet the future wastewater flow projections for the region. Unlike on the water side, there is a not a clear regional solution that already exists for wastewater collection and treatment.

In addition to the wastewater capacity needs of the region, the majority of the existing WWTPs in the study area have aging infrastructure and need extensive rehabilitation. On top of the rehabilitation needs, the anticipated wastewater discharge requirements for nutrient removal criteria in the Deep River Sub-Basin will require large treatment improvements at all the existing WWTPs located in Randolph County. Additionally, contaminants of emerging concern, like PFAS and 1,4-Dioxane, have documented impacts in the Cape Fear River Basin and are anticipated to be regulated in wastewater discharge in the future.

The sections below present both a “Go-it-Alone” wastewater approach and four regionalization wastewater alternatives to address projected growth, aging infrastructure, nutrient management, and PFAS, 1,4-Dioxane and other emerging contaminants in wastewater discharges. In all the alternatives described below, the proposed projects do not capture the wastewater solutions and contractual agreements already in place that are not proposed to change in the future. The projects also do not capture wastewater improvement projects that the individual municipalities have in their capital improvement plans that only impact their existing wastewater systems. Examples of the projects that are not included are sewer line and lift station rehabilitation, manhole replacements, outfall improvements, etc.

6.2.2 "Go-it-Alone" Scenario

This section presents the capital infrastructure projects that the individual municipalities will need to complete on their own to address localized growth demands, facility rehabilitation, and regulatory requirements if they choose to continue to operate as independent service providers.

The summary of wastewater collection and treatment projects included in the "Go-it-Alone" scenario is shown in Figure 6-5. Detailed project descriptions, projected project costs and estimated timelines for the design and construction of each proposed project follow Figure 6-5.

In the "Go-it-Alone" scenario, five utilities have been identified as requiring treatment plant expansions within the 25-year planning period to address capacity shortfalls: Greensboro, High Point, Randleman, Asheboro, and Ramseur. A defining feature and major limitation under the "Go-it-Alone" scenario is the inability of the region's largest providers, Greensboro and High Point, to secure sufficient capacity to meet the projected demands in 2050. It is projected that both Greensboro and High Point will exceed their wastewater capacity limit by 2042 in this scenario that includes an expansion of Greensboro's T.Z. Osborne WRF from 56 MGD to 60 MGD and an expansion of High Point's Eastside WWTP from 26 MGD to 32 MGD. The expansion capabilities of their systems are constrained by existing NPDES permits and capacity limitations in the Haw River sub-basin (Greensboro's discharge receiving stream) and Randleman Lake (High Point Eastside WWTP receiving water body).

In the "Go-it-Alone" scenario, Randleman, Asheboro, Ramseur, and Franklinville will each need to address ageing infrastructure and undergo large improvement projects at their wastewater treatment facilities to meet anticipated TN, TP, PFAS and 1,4-Dioxane discharge limits. Randleman, Asheboro, and Ramseur are all projected to require WWTP expansions by 2036 to meet localized growth demands.

Due to the limitations in improvements to the facilities in Greensboro and High Point and the undesirable outcome of the increased WWTP discharges to a drinking water source at Randleman Lake, the Study concludes the "Go-it-Alone" scenario to not be a viable alternative for the region.

Table 6-4 illustrates the capacity required in future planning years and the anticipated projects to meet those needs. Table 6-4 includes further detail on the projects required in the "Go-it-Alone" scenario to reach the maximum month capacity from the existing infrastructure and proposed upgrade projects sorted by year the project is required to be completed.

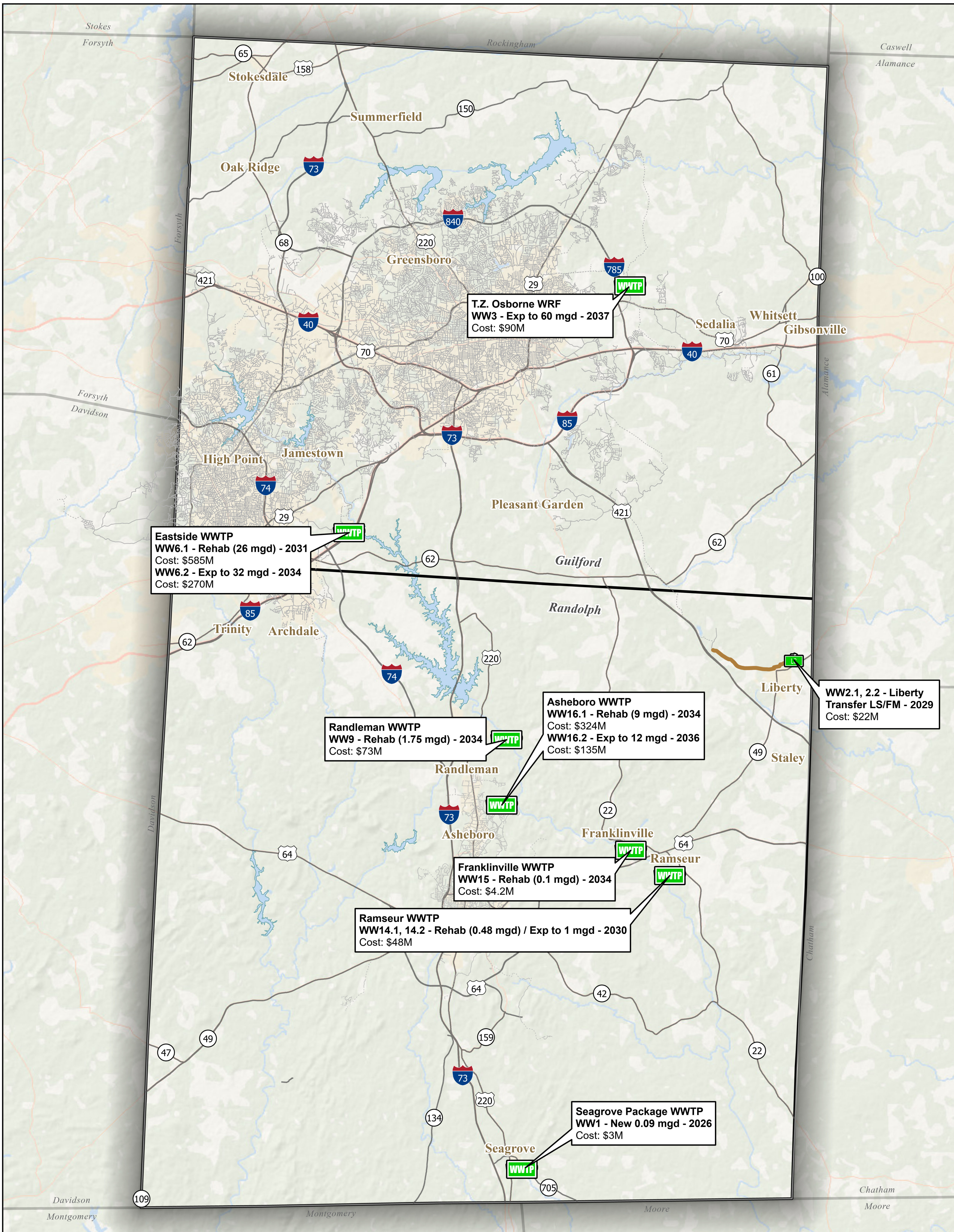
Table 6-3: Meeting Utility Wastewater Needs in the "Go-it-Alone" Scenario

Municipality	Current Capacity (MGD)	2022 MM (MGD)	2030 MM (MGD)	2040 MM (MGD)	2050 MM (MGD)	Projects or Plans to Meet Need
Archdale	2.50	1.20	1.68	2.13	2.89	• Invest in Project WW6.1 and WW6.2 to upgrade and expand Eastside WWTP and extend contract with the City of High Point
Asheboro	9.00	4.64	6.81	8.39	10.20	• Complete projects WW16.1 by 2034 and WW16.2 by 2036 to upgrade and expand Asheboro WWTP to 12 MGD
Franklinville	0.1	0.05	0.08	0.09	0.09	• Complete project WW15 by 2034 to upgrade the existing facility
Gibsonville	1.55	0.91	1.74	2.71	3.09	• Extend Agreement with the City of Burlington
Greensboro	56.78	37.51	45.58	52.12	59.70	• Complete Project WW3 by 2037 to expand T.Z. Osborne WRF to 60 MGD. • Capacity limited to 90% of MM flow - 54 MGD, limiting Greensboro's growth to Planning Year 2042
Guilford County	-	-	0.71	0.82	1.63	• Guilford County will contract with the closest utility to meet future needs.
High Point	26	19.81	23.92	27.65	32.32	• Complete Project WW6.1 by 2031 and WW6.2 by 2034 to upgrade and expand Eastside WWTP to 32 MGD. • Capacity limited to 90% of MM flow – 28.8 MGD, limiting High Point's growth to Planning Year 2042
Jamestown	2	1.82	2.10	2.52	2.95	• Invest in Project WW6.1 and WW6.2 to upgrade and expand Eastside WWTP and extend contract with the City of High Point
Liberty	0.55	0.51	0.62	0.91	1.35	• Complete project WW2.1 and WW2.2 by 2029 to discharge to the City of Greensboro.
Oak Ridge	-	-	0.05	0.09	0.11	• Oak Ridge will need to contract with WSFCU or the City of Greensboro
Pleasant Garden	-	-	0.03	0.06	0.14	• Pleasant Garden will contract with the City of Greensboro
Ramseur	0.48	0.28	0.45	0.95	0.98	• Complete projects WW14.1 and WW14.2 by 2030 to upgrade and expand Ramseur WWTP to 1 MGD
Randleman	1.87	0.77	0.93	1.31	1.70	• Complete upgrade project WW9 by 2034
Randolph County	-	-	0.13	0.51	1.13	• Randolph County will contract with the nearest utility to meet future needs
Seagrove-Ulah MWD	0.03	0.03	0.11	0.12	0.13	• Complete project WW1 by 2026
Sedalia	-	-	0.02	0.05	0.08	• Sedalia will contract with the City of Greensboro for 0.2 MGD
Stokesdale	-	-	0.02	0.03	0.04	• Stokesdale will contract with WSFCU, Rockingham County or the City of Greensboro
Summerfield	-	-	0.28	0.43	0.64	• Summerfield will contract with the City of Greensboro
Trinity	1	0.27	1.14	1.17	1.19	• Trinity will contract with High Point's Westside WWTP

Table 6-4: Capital Projects Required for the "Go-it-Alone" Scenario

Utility Resp. for Upgrade	CY Project Comp. By	Project ID	Wastewater Capital Project Description	Est. Total Project Cost
Seagrove-Ulah MWD	2026	WW1	Seagrove 0.09 MGD Package WWTP	$3,000,000
Liberty	2029	WW2.1	Liberty Transfer Lift Station to Greensboro	$12,600,000
Liberty	2029	WW2.2	Liberty Sewer Force Main to Greensboro	$9,500,000
Ramseur	2030	WW14.1	Ramseur WWTP Upgrade of Existing 0.46 MGD	$20,200,000
Ramseur	2030	WW14.2	Ramseur WWTP Expansion to 1 MGD	$27,300,000
High Point	2031	WW6.1	High Point Eastside WWTP Upgrade of Existing 26 MGD	$585,000,000
High Point	2034	WW6.2	High Point Eastside WWTP Expansion to 32 MGD	$270,000,000
Randleman	2034	WW9	Randleman WWTP Upgrade of existing 1.745 MGD	$73,300,000
Franklinville	2034	WW15	Franklinville WWTP Upgrade of Existing 0.1 MGD	$4,200,000
Asheboro	2034	WW16.1	Asheboro WWTP Upgrade of Existing 9 MGD	$324,000,000
Asheboro	2036	WW16.2	Asheboro WWTP Expansion to 12 MGD	$135,000,000
Greensboro	2037	WW3	Greensboro TZO WRF Expansion to 60 MGD	$90,000,000
			Total: Wastewater “Go-it-Alone” Capital Project Costs	**$1,554,100,000**

The project sheets, Figure 6-5, consists of the detailed descriptions of the projects listed above for the “Go-it-Alone” scenario including project maps, the utilities involved with each upgrade and their percentage of financial responsibility.



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Legend

- Guilford and Randolph County
- WWTP
- Proposed Lift Stations
- Proposed Sewer Force Main
- Major Waterbodies

Go-It-Alone Wastewater Treatment and Collection Alternative

0 5 10 Miles

Figure 6-5

December 2025

Piedmont Triad Regional Water Authority

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WW1 - Seagrove Package WWTP

Project Location

Site Description: Proposed 0.09 mgd Package WWTP on existing property on NC-705 in Seagrove, operated by the Seagrove Ulah Metropolitan Water District.

Project Summary

Seagrove Ulah Metropolitan Water District operates an existing 0.03 mgd package WWTP. The facility has repeatedly reached its treatment capacity over the past few years, necessitating the need for an expansion. A new 0.09 mgd package WWTP is proposed to replace the existing facility and be able to meet the localized projected growth in Seagrove. A portion of Seagrove wastewater flow is directed to the Asheboro sewer system through the new Uwharrie Charter Lift Station, which provides additional wastewater capacity in the area.

Current Capacity (mgd)	**0.03**
New Capacity (mgd)	**0.09**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Seagrove**
Potential Funding Sources	**Randolph County State Budget Allocation**

WWTP

Construction Cost	**$2,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$300,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$500,000**
Total Cost	**$3,000,000**

Timeline

Beginning of Design	**2023**
Beginning of Construction	**2025**
End of Construction	**2026**

WW2 - Liberty Transfer Lift Station and Force Main

Project Location

Site Description: Proposed sewer lift station at existing Liberty WWTP on Highfill St in Liberty, connecting to proposed force main along Starmount Rd to southern end of the Toyota Facility.

Project Summary

The Town of Liberty has an existing 0.55 mgd non-discharge wastewater treatment and spray irrigation facility. The Town has struggled with high flows due to inflow and infiltration (I&I) to the collection system, and has reported multiple bypasses of nontreated wastewater from treatment units since 2018. To address these concerns and accomodate projected growth in the region, Liberty will decommission their WWTP/sprayfields and pump wastewater through a new transfer lift station to the Greensboro sewer system, through the existing transfer lift station at the Toyota site.

Pipe Diameter (in)	**12**
Pump Size (mgd)	**2.8**
Pipe Length (ft)	**25,000**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Liberty**
Potential Funding Sources	**Randolph County State Budget Allocation**

WW2.1 - Lift Station		**WW2.2 - Force Main**	
Construction Cost	**$8,400,000**	Construction Cost	**$6,000,000**
Easements (7.5% of Const. Cost)	**-**	Easements (7.5% of Const. Cost)	**$500,000**
Engineering (15% of Const. Cost)	**$1,300,000**	Engineering (15% of Const. Cost)	**$900,000**
Permitting/Admin. (10% of Const. Cost)	**$800,000**	Permitting/Admin. (10% of Const. Cost)	**$600,000**
Project Contingency (20% of All Costs)	**$2,100,000**	Project Contingency (20% of All Costs)	**$1,500,000**
Total Cost	**$12,600,000**	**Total Cost**	**$9,500,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2027**
End of Construction	**2029**

WW3 - Greensboro TZ Osborne WRF Expansion

Project Location

Site Description: Existing TZ Osborne WRF on Huffine Mill Rd in McLeansville, operated by the City of Greensboro.

Project Summary

The existing Greensboro TZO WRF completed a major facility upgrade and expansion to a maximum month capacity of 56 mgd in 2021. A re-rate study completed in 2023, showed the facility could be expanded to 60 mgd with limited additional new infrastructure. TZO WRF discharges to South Buffalo Creek in the Haw River sub-basin and is subject to mass-based nutrient limits of 891,272 lb/year and 112,044 lb/year for TN and TP, respectively, as set forth by the Jordan Lake Water Supply Nutrient Management Strategy. Based on the City's previous discussions with NCDEQ, 60 mgd is expected to be the capacity expansion limit for TZO WRF. This project expands the capacity of TZO WRF to 60 mgd with a minor upgrade project.

Current Capacity (mgd)	**56**
Expanded Capacity (mgd)	**60**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

WRF Expansion

Construction Cost	**$60,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$9,000,000**
Permitting/Admin. (10% of Const. Cost)	**$6,000,000**
Project Contingency (20% of All Costs)	**$15,000,000**
Total Cost	**$90,000,000**

Timeline

Beginning of Design	**2032**
Beginning of Construction	**2034**
End of Construction	**2037**

WW6 - High Point Eastside WWTP Rehabilitation and Expansion (Alt 0)

Project Location

Site Description: Existing Eastside WWTP on Riverdale Dr in Jamestown, operated by the City of High Point.

Project Summary

The existing High Point Eastside WWTP has a maximum month capacity of 26 mgd and needs to address ageing infrastructure through a rehabilitation project. High Point received speculative limits from NCDEQ in 2022 for an expansion of Eastside WWTP to 32 mgd. Since Randleman Lake, Eastside's discharge water body, is a water supply lake, 32 mgd is expected to be the capacity expansion limit. Under this Alternative, Eastside WWTP will expand to 32 mgd to help treat the projected future wastewater flows. The facility will need to undergo an improvement project to meet anticipated lower total nitrogen (TN) and total phosphorus (TP) discharge limits.

Current Capacity (mgd)	**26**
Expanded Capacity (mgd)	**32**

Project Funding and Timeline

Funding

Asset Owner(s)	**High Point (82.7%), Archdale (9.6%), Jamestown (7.7%)**	Asset Owner(s)	**City of High Point**

WW6.1 - 26 mgd Rehabilitation		**WW6.2 - 32 mgd Expansion**	
Construction Cost	**$390,000,000**	Construction Cost	**$180,000,000**
Easements (7.5% of Const. Cost)	**-**	Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$58,500,000**	Engineering (15% of Const. Cost)	**$27,000,000**
Permitting/Admin. (10% of Const. Cost)	**$39,000,000**	Permitting/Admin. (10% of Const. Cost)	**$18,000,000**
Project Contingency (20% of All Costs)	**$97,500,000**	Project Contingency (20% of All Costs)	**$45,000,000**
Total Cost	**$585,000,000**	**Total Cost**	**$270,000,000**

Timeline

Beginning of Design	**2026**	Beginning of Design	**2028**
Beginning of Construction	**2028**	Beginning of Construction	**2030**
End of Construction	**2031**	End of Construction	**2034**

WW9 - Randleman WWTP Rehabilitation and Upgrade (Alt 0)

Project Location

Site Description: Existing Randleman WWTP on Applewood Rd in Randleman, operated by the City of Randleman.

Project Summary

The existing Randleman WWTP has a maximum month capacity of 1.745 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits.

Current Capacity (mgd)	**1.745**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Randleman**
Potential Funding Sources	

<u>WWTP Rehabilitation and Upgrades</u>

Construction Cost	**$48,900,000**
Easements (7.5% of Const. Cost)	**-**
Engineering Design (15% of Const. Cost)	**$7,300,000**
Permitting and Admin. (10% of Const. Cost)	**$4,800,000**
Project Contingency (20% of All Costs)	**$12,300,000**
Total Cost	**$73,300,000**

Timeline

Beginning of Design	**2030**
Beginning of Construction	**2032**
End of Construction	**2034**

WW14 - Ramseur WWTP Rehabilitation and Expansion to 1.0 mgd (Alt 0,1,2)

Project Location

Site Description: Existing Ramseur WWTP on Roundleaf Rd in Ramseur, operated by the Town of Ramseur.

Project Summary

The existing Ramseur WWTP has a maximum month capacity of 0.48 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits. The Ramseur WWTP will need to be expanded to 1.0 mgd by 2030 to treat the projected 2050 wastewater flows for Ramseur.

Current Capacity (mgd)	**0.48**
Expanded Capacity (mgd)	**1**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Ramseur**
Potential Funding Sources	

WW14.1 - Rehabilitation and Upgrades	
Construction Cost	**$13,500,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$2,000,000**
Permitting/Admin. (10% of Const. Cost)	**$1,400,000**
Project Contingency (20% of All Costs)	**$3,300,000**
Total Cost	**$20,200,000**

WW14.2 - Expansion of Facility	
Construction Cost	**$18,200,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$2,700,000**
Permitting/Admin. (10% of Const. Cost)	**$1,800,000**
Project Contingency (20% of All Costs)	**$4,600,000**
Total Cost	**$27,300,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2028**
End of Construction	**2030**

WW15 - Franklinville WWTP Rehabilitation and Upgrade (Alt 0,1,2)

Project Location

Site Description: Existing Franklinville WWTP on Rising Sun Way in Franklinville, operated by the Town of Franklinville.

Project Summary

The existing Franklinville WWTP has a maximum month capacity of 0.1 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits.

Current Capacity (mgd)	**0.1**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Franklinville**
Potential Funding Sources	**Randolph County State Budget Allocation**

WWTP Upgrades

Construction Cost	**$2,800,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$400,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$800,000**
Total Cost	**$4,200,000**

Timeline

Beginning of Design	**2030**
Beginning of Construction	**2032**
End of Construction	**2034**

WW16 - Asheboro WWTP Rehabilitation and Expansion to 12.0 mgd (Alt 0,1,2)

Project Location

Site Description: Existing Asheboro WWTP on Bonkemeyer Dr in Asheboro, operated by the City of Asheboro.

Project Summary

The existing Asheboro WWTP has a maximum month capacity of 9.0 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits. The Asheboro WWTP will need to be expanded to 12.0 mgd by 2036 to treat the projected 2050 wastewater flows for Asheboro.

Current Capacity (mgd)	**9**
Expanded Capacity (mgd)	**12**

Project Funding and Timeline

Funding for 9 mgd Upgrades

Asset Owner(s)	**City of Asheboro**
Potential Funding Sources	

WW16.1 - Rehabilitation and Upgrades

Construction Cost	**$216,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$32,400,000**
Permitting/Admin. (10% of Const. Cost)	**$21,600,000**
Project Contingency (20% of All Costs)	**$54,000,000**
Total Cost	**$324,000,000**

Funding for 12 mgd Expansion

Asset Owner(s)	**City of Asheboro**
Potential Funding Sources	

WW16.2 - Expansion of Facility

Construction Cost	**$90,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$13,500,000**
Permitting/Admin. (10% of Const. Cost)	**$9,000,000**
Project Contingency (20% of All Costs)	**$22,500,000**
Total Cost	**$135,000,000**

Timeline for 9 mgd Upgrades

Beginning of Design	**2029**
Beginning of Construction	**2031**
End of Construction	**2034**

Timeline for 12 mgd Expansion

Beginning of Design	**2031**
Beginning of Construction	**2033**
End of Construction	**2036**

6.2.3 Regionalization Alternatives

The four wastewater regionalization alternatives presented below provide varying degrees of regional collaboration to meet the challenges facing the region. Each alternative represents a distinct strategic approach to wastewater infrastructure consolidation, expansion, and service delivery, designed to move the region beyond the fragmented structure of the "Go-it-Alone" scenario.

6.2.3.1 Alternative 1

Alternative 1 provides a significant step toward regional collaboration and includes the construction of a new Regional WRF located near Randleman, with Greensboro, High Point and Randleman participating. Randleman's existing WWTP would be decommissioned and replaced by their expanded allocated share in the new state-of-the-art regional facility prepared to treat to the limits of technology for nutrients and contaminants of emerging concern. This removes a small, ageing facility from the region and consolidates its service. Greensboro and High Point would be allocated capacity at the new regional plant, providing a crucial and sustainable avenue for growth that is unavailable under the "Go-it-Alone" Scenario due to their current NPDES permit restrictions. Liberty, Jamestown, and Archdale's future demands are incorporated in either Greensboro or High Point's allocated capacity based on existing agreements. While utilizing the new Regional WRF for some of their projected capacity needs, Greensboro would also be required to expand its existing TZO WRF from 56 MGD to 60 MGD, the anticipated capacity limit in the Haw River sub-basin. In Alternative 1, Asheboro, Ramseur, and Franklinville would not participate in the Regional WRF and would continue to operate and expand their localized systems as detailed in the "Go-it-Alone" scenario.

The new Regional WRF in Alternative 1 is projected to be needed by 2034, with an initial maximum month capacity of 9.5 MGD. This will provide the additional capacity needed by High Point, Randleman, Jamestown, and Archdale to get through the first 17 years of the 25-year planning period. The Regional WRF is projected to expand to a 25 MGD facility by 2042 to meet the additional capacity needs of Greensboro, High Point, Jamestown, and Archdale through 2050.

<u>New Regional WRF Initial Capacity of 9.5 MGD (2034)</u>

- Greensboro (Liberty): 0 MGD
- High Point (Jamestown, Archdale): 7.3 MGD
- Randleman: 2.2 MGD

<u>New Regional WRF Expanded Capacity of 25 MGD (2042)</u>

- Greensboro (Liberty): 9.2 MGD
- High Point (Jamestown, Archdale): 13.6 MGD
- Randleman: 2.2 MGD

Per NCDEQ Rules, when the current system flow reaches 80% of system treatment capacity, planning efforts should be taken to expand capacity or limit growth. At 90%, permitting should be complete for expansion as needed (see 15A NCAC 02T .0118). Its purpose is to ensure that treatment facilities do not exceed their hydraulic treatment capabilities, and it details what actions must be taken when treatment plants reach maximum month flows of 80% and/or 90% of their permitted capacity. The capacity of the new Regional WRF in Alternative 1 was calculated by setting the summarized maximum month capacity needs of the participating members in 2050 as 90% of the WRF rated maximum month capacity.

The summary of wastewater collection and treatment projects included in Alternative 1 are shown in Figure 6-6. Detailed project descriptions, projected project costs and estimated timelines for the design and construction of each proposed project follow Figure 6-6.

Table 6-5 illustrates the capacity required in future planning years and the anticipated projects to meet those needs. Table 6-6 includes further detail on the projects required in Regionalization Alternative 1 to reach the maximum month capacity from the existing infrastructure and proposed upgrade projects sorted by year the project is required to be completed.

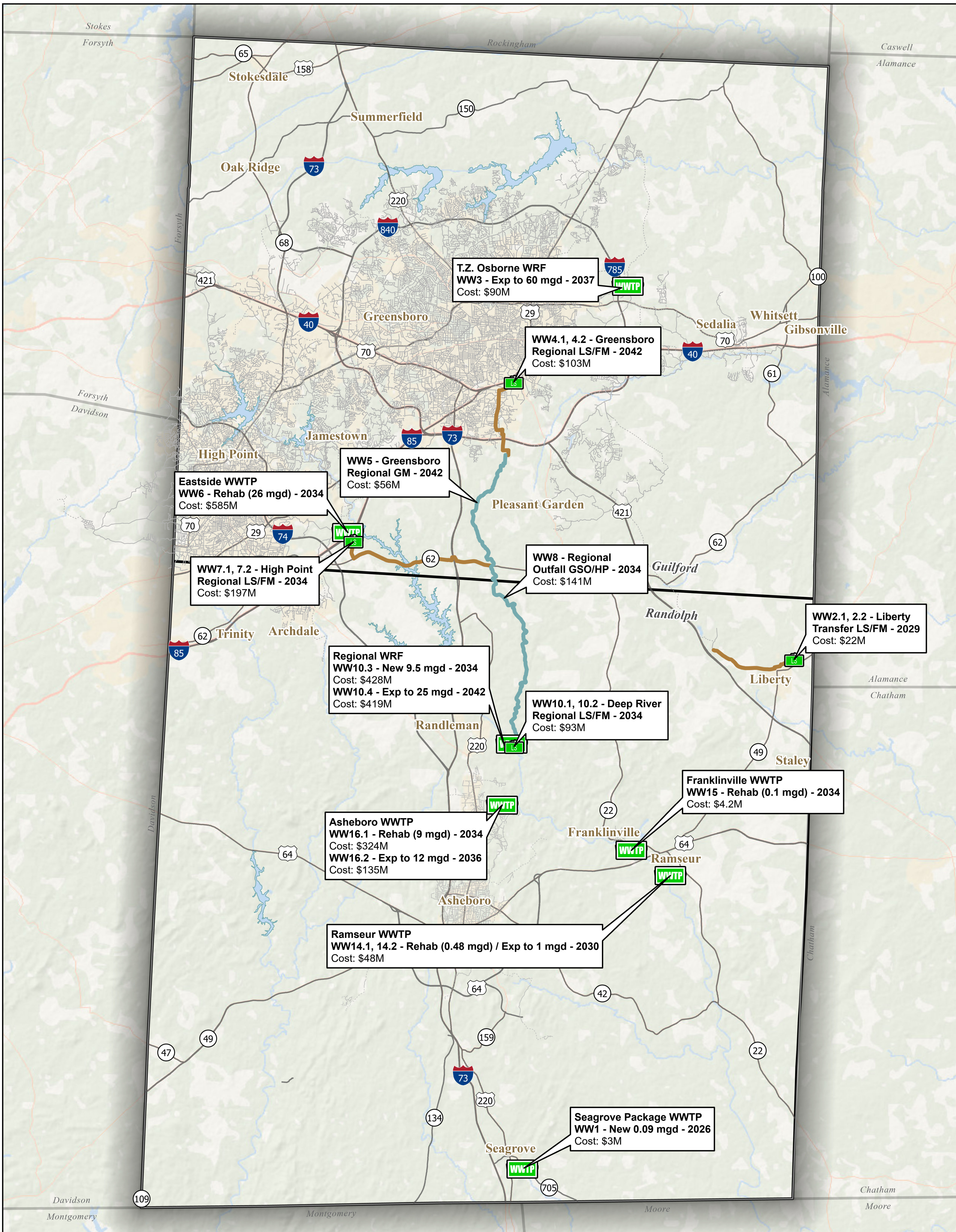
Table 6-5: Meeting Utility Wastewater Needs with Regionalization Alternative 1

Municipality	Current Capacity (MGD)	2022 MM (MGD)	2030 MM (MGD)	2040 MM (MGD)	2050 MM (MGD)	Projects or Plans to Meet Need
Archdale	2.50	1.20	1.68	2.13	2.89	• Invest in Project WW6 to upgrade Eastside WWTP and extend contract with the City of High Point
Asheboro	9.00	4.64	6.81	8.39	10.20	• Complete projects WW16.1 by 2034 and WW16.2 by 2036 to upgrade and expand Asheboro WWTP to 12 MGD
Franklinville	0.1	0.05	0.08	0.09	0.09	• Complete project WW15 by 2034 to upgrade the existing facility
Gibsonville	1.55	0.91	1.74	2.71	3.09	• Extend Agreement with the City of Burlington
Greensboro	56.78	37.51	45.58	52.12	59.70	• Complete Project WW3 by 2037 to expand T.Z. Osborne WRF to 60 MGD. • Complete projects WW8, WW10.1, WW10.2, and WW10.3 by 2034 for the Regional WRF with High Point and Randleman • Complete project WW4.1, WW4.2, and WW5 by 2042 to convey flow to the Regional WRF. • Complete project WW10.4 by 2042 to expand the Regional WRF for an additional 9 MGD of capacity.
Guilford County	-	-	0.71	0.82	1.63	• Guilford County will contract with the closest utility to meet future needs.
High Point	26	19.81	23.92	27.65	32.32	• Complete Project WW6 by 2034 to upgrade 26 MGD Eastside WWTP. • Complete project WW7.1, WW7.2, and WW8 by 2034 to convey flow to the Regional WRF. • Complete projects WW10.1, WW10.2, and WW10.3 by 2034 for the Regional WRF with Greensboro and Randleman for an additional 7 MGD of capacity. • Complete project WW10.4 by 2042 to expand the Regional WRF for an additional 6.5 MGD of capacity.
Jamestown	2	1.82	2.10	2.52	2.95	• Invest in Project WW6 to upgrade Eastside WWTP and extend contract with the City of High Point.
Liberty	0.55	0.51	0.62	0.91	1.35	• Complete project WW2.1 and WW2.2 by 2029 to discharge to the City of Greensboro.
Oak Ridge	-	-	0.05	0.09	0.11	• Oak Ridge will need to contract with WSFCU or the City of Greensboro
Pleasant Garden	-	-	0.03	0.06	0.14	• Pleasant Garden will contract with the City of Greensboro
Ramseur	0.48	0.28	0.45	0.95	0.98	• Complete projects WW14.1 and WW14.2 by 2030 to upgrade and expand Ramseur WWTP to 1 MGD
Randleman	1.87	0.77	0.93	1.31	1.70	• Complete project WW10.3 by 2034 for the Regional WRF with Greensboro and High Point for 2.2 MGD of capacity. The existing Randleman WWTP will be decommissioned in 2034.
Randolph County	-	-	0.13	0.51	1.13	• Randolph County will contract with the nearest utility to meet future needs
Seagrove-Ulah MWD	0.03	0.03	0.11	0.12	0.13	• Complete project WW1 by 2026
Sedalia	-	-	0.02	0.05	0.08	• Sedalia will contract with the City of Greensboro for 0.2 MGD
Stokesdale	-	-	0.02	0.03	0.04	• Stokesdale will contract with WSFCU, Rockingham County or the City of Greensboro
Summerfield	-	-	0.28	0.43	0.64	• Summerfield will contract with the City of Greensboro
Trinity	1	0.27	1.14	1.17	1.19	• Trinity will contract with High Point's Westside WWTP

Table 6-6: Capital Projects Required for Regionalization Alternative 1

Utility Resp. for Upgrade	CY Project Comp. By	Project ID	Wastewater Capital Project Description	Est. Total Project Cost
Seagrove-Ulah MWD	2026	WW1	Seagrove 0.09 MGD Package WWTP	$3,000,000
Liberty	2029	WW2.1	Liberty Transfer Lift Station to Greensboro	$12,600,000
Liberty	2029	WW2.2	Liberty Sewer Force Main to Greensboro	$9,500,000
Ramseur	2030	WW14.1	Ramseur WWTP Upgrade of Existing 0.46 MGD	$20,200,000
Ramseur	2030	WW14.2	Ramseur WWTP Expansion to 1 MGD	$27,300,000
High Point	2034	WW6	High Point Eastside WWTP Upgrade of Existing 26 MGD	$585,000,000
High Point	2034	WW7.1	High Point Regional Lift Station	$57,300,000
High Point	2034	WW7.2	High Point Regional Force Main	$140,000,000
Greensboro/High Point	2034	WW8	Regional Gravity Outfall GSO/HP	$140,800,000
Regional Authority	2034	WW10.1	Deep River Regional Lift Station (GSO, HP)	$81,400,000
Regional Authority	2034	WW10.2	Deep River Regional Force Main (GSO, HP)	$11,800,000
Regional Authority	2034	WW10.3	New Deep River WRF 9.5 MGD	$427,500,000
Franklinville	2034	WW15	Franklinville WWTP Upgrade of Existing 0.1 MGD	$4,200,000
Asheboro	2034	WW16.1	Asheboro WWTP Upgrade of Existing 9 MGD	$324,000,000
Asheboro	2036	WW16.2	Asheboro WWTP Expansion to 12 MGD	$135,000,000
Greensboro	2037	WW3	Greensboro TZO WRF Expansion to 60 MGD	$90,000,000
Greensboro	2042	WW4.1	Greensboro Regional Lift Station	$40,800,000
Greensboro	2042	WW4.2	Greensboro Regional Force Main	$62,100,000
Greensboro	2042	WW5	Greensboro Regional Gravity Main	$55,700,000
Regional Authority	2042	WW10.4	Deep River WRF Expansion to 25 MGD	$418,500,000
			Total: Wastewater Alternative 1 Capital Project Costs	**$2,646,700,000**

The project sheets, Figure 6-6, consists of the detailed descriptions of the projects listed above for Regionalization Alternative 1 including project maps, the utilities involved with each upgrade and their percentage of financial responsibility.



Legend

- Guilford and Randolph County
- WWTP
- Proposed Lift Stations
- Proposed Sewer Force Main
- Proposed Sewer Gravity Main
- Major Waterbodies

N

Wastewater Treatment and Collection Alternative 1

0 5 10 Miles

Figure 6-6

December 2025

Piedmont Triad Regional Water Authority

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WW1 - Seagrove Package WWTP

Project Location

Site Description: Proposed 0.09 mgd Package WWTP on existing property on NC-705 in Seagrove, operated by the Seagrove Ulah Metropolitan Water District.

Project Summary

Seagrove Ulah Metropolitan Water District operates an existing 0.03 mgd package WWTP. The facility has repeatedly reached its treatment capacity over the past few years, necessitating the need for an expansion. A new 0.09 mgd package WWTP is proposed to replace the existing facility and be able to meet the localized projected growth in Seagrove. A portion of Seagrove wastewater flow is directed to the Asheboro sewer system through the new Uwharrie Charter Lift Station, which provides additional wastewater capacity in the area.

Current Capacity (mgd)	**0.03**
New Capacity (mgd)	**0.09**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Seagrove**
Potential Funding Sources	**Randolph County State Budget Allocation**

WWTP

Construction Cost	**$2,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$300,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$500,000**
Total Cost	**$3,000,000**

Timeline

Beginning of Design	**2023**
Beginning of Construction	**2025**
End of Construction	**2026**

WW2 - Liberty Transfer Lift Station and Force Main

Project Location

Site Description: Proposed sewer lift station at existing Liberty WWTP on Highfill St in Liberty, connecting to proposed force main along Starmount Rd to southern end of the Toyota Facility.

Project Summary

The Town of Liberty has an existing 0.55 mgd non-discharge wastewater treatment and spray irrigation facility. The Town has struggled with high flows due to inflow and infiltration (I&I) to the collection system, and has reported multiple bypasses of nontreated wastewater from treatment units since 2018. To address these concerns and accomodate projected growth in the region, Liberty will decommission their WWTP/sprayfields and pump wastewater through a new transfer lift station to the Greensboro sewer system, through the existing transfer lift station at the Toyota site.

Pipe Diameter (in)	**12**
Pump Size (mgd)	**2.8**
Pipe Length (ft)	**25,000**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Liberty**
Potential Funding Sources	**Randolph County State Budget Allocation**

WW2.1 - Lift Station

Construction Cost	**$8,400,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$1,300,000**
Permitting/Admin. (10% of Const. Cost)	**$800,000**
Project Contingency (20% of All Costs)	**$2,100,000**
Total Cost	**$12,600,000**

WW2.2 - Force Main

Construction Cost	**$6,000,000**
Easements (7.5% of Const. Cost)	**$500,000**
Engineering (15% of Const. Cost)	**$900,000**
Permitting/Admin. (10% of Const. Cost)	**$600,000**
Project Contingency (20% of All Costs)	**$1,500,000**
Total Cost	**$9,500,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2027**
End of Construction	**2029**

WW3 - Greensboro TZ Osborne WRF Expansion

Project Location

Site Description: Existing TZ Osborne WRF on Huffine Mill Rd in McLeansville, operated by the City of Greensboro.

Project Summary

The existing Greensboro TZO WRF completed a major facility upgrade and expansion to a maximum month capacity of 56 mgd in 2021. A re-rate study completed in 2023, showed the facility could be expanded to 60 mgd with limited additional new infrastructure. TZO WRF discharges to South Buffalo Creek in the Haw River sub-basin and is subject to mass-based nutrient limits of 891,272 lb/year and 112,044 lb/year for TN and TP, respectively, as set forth by the Jordan Lake Water Supply Nutrient Management Strategy. Based on the City's previous discussions with NCDEQ, 60 mgd is expected to be the capacity expansion limit for TZO WRF. This project expands the capacity of TZO WRF to 60 mgd with a minor upgrade project.

Current Capacity (mgd)	**56**
Expanded Capacity (mgd)	**60**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

WRF Expansion

Construction Cost	**$60,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$9,000,000**
Permitting/Admin. (10% of Const. Cost)	**$6,000,000**
Project Contingency (20% of All Costs)	**$15,000,000**
Total Cost	**$90,000,000**

Timeline

Beginning of Design	**2032**
Beginning of Construction	**2034**
End of Construction	**2037**

WW4 - Greensboro Regional Lift Station and Force Main (Alt 1,2)

Project Location

Site Description: Proposed sewer lift station near Broome Rd in Greensboro, connecting the proposed sewer force main along S Elm Eugene St to proposed gravity main on Ritters Lake Rd.

Project Summary

The City of Greensboro will need new infrastructure to convey wastewater from Greensboro's existing sewer system south to a new Regional WRF. This will provide Greensboro with additional capacity to supplement the expanded TZO WRF capacity (60 mgd MM). This project includes constructing a new sewer lift station and force main to convey wastewater from Greensboro's existing sewer system to the high elevation point in the proposed alignment at Ritters Lake Rd. The lift station and force main are sized to convey Greensboro's projected 2050 peak hour flow (24 mgd) that is proposed to be treated at the new Regional WRF in Randleman.

Pipe Diameter (in)	**42**
Pump Size (mgd)	**24**
Pipe Length (ft)	**23,500**
Trenchless Crossings (ft)	**600**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

WW4.1 - Lift Station

Construction Cost	**$25,500,000**
Easements (7.5% of Const. Cost)	**$2,000,000**
Engineering (15% of Const. Cost)	**$3,900,000**
Permitting/Admin. (10% of Const. Cost)	**$2,600,000**
Project Contingency (20% of All Costs)	**$6,800,000**
Total Cost	**$40,800,000**

WW4.2 - Force Main

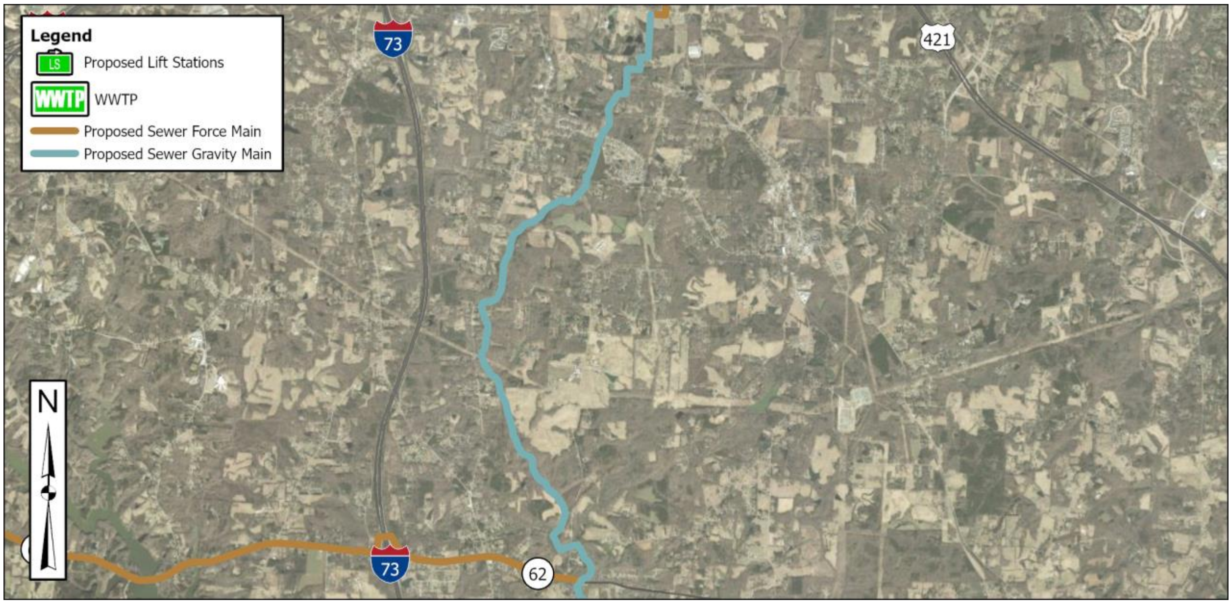
Construction Cost	**$38,800,000**
Easements (7.5% of Const. Cost)	**$3,000,000**
Engineering (15% of Const. Cost)	**$5,900,000**
Permitting/Admin. (10% of Const. Cost)	**$4,000,000**
Project Contingency (20% of All Costs)	**$10,400,000**
Total Cost	**$62,100,000**

Timeline

Beginning of Design	**2036**
Beginning of Construction	**2038**
End of Construction	**2042**

WW5 - Greensboro Regional Gravity Main (Alt 1,2)

Project Location



Site Description: Proposed sewer gravity main along Polecat Creek from proposed Greensboro force main tie-in at Ritters Lake Rd to proposed tie-in to the High Point force main at NC Hwy 62.

Project Summary

The City of Greensboro will need new infrastructure to convey wastewater from Greensboro's existing sewer system south to a new Regional WRF. This will provide Greensboro with additional capacity to supplement the expanded TZO WRF capacity (60 mgd MM). This project includes constructing a new gravity sewer main that will connect to Greensboro's proposed sewer force main at Ritters Lake Rd and continue to convey wastewater to the tie-in point with High Point's new proposed sewer force main at NC Hwy 62. The gravity sewer main is sized to convey Greensboro's projected 2050 peak hour flow (24 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**60**
Capacity (mgd)	**24**
Pipe Length (ft)	**33,490**
Trenchless Crossings (ft)	**500**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

Gravity Line

Construction Cost	**$34,800,000**
Easements (7.5% of Const. Cost)	**$2,700,000**
Engineering (15% of Const. Cost)	**$5,300,000**
Permitting/Admin. (10% of Const. Cost)	**$3,600,000**
Project Contingency (20% of All Costs)	**$9,300,000**
Total Cost	**$55,700,000**

Timeline

Beginning of Design	**2036**
Beginning of Construction	**2038**
End of Construction	**2042**

WW6 - High Point Eastside WWTP Rehabilitation (Alt 1,3,4)

Project Location

Site Description: Existing Eastside WWTP on Riverdale Dr in Jamestown, operated by the City of High Point.

Project Summary

The existing High Point Eastside WWTP has a maximum month capacity of 26 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo an improvement project to meet anticipated lower total nitrogen (TN) and total phosphorus (TP) discharge limits. Eastside WWTP will need to reduce TN from 6 mg/L and TP from 0.4 mg/L to lower concentrations to share available nutrient allocation in the Deep River Basin with the new Regional WRF.

Current Capacity (mgd)	**26**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**High Point (82.7%), Archdale (9.6%), Jamestown (7.7%)**

WWTP Upgrade

Construction Cost	**$390,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$58,500,000**
Permitting/Admin. (10% of Const. Cost)	**$39,000,000**
Project Contingency (20% of All Costs)	**$97,500,000**
Total Cost	**$585,000,000**

Timeline

Beginning of Design	**2030**
Beginning of Construction	**2032**
End of Construction	**2034**

WW7 - High Point Regional Lift Station and Force Main (Alt 1,3,4)

Project Location

Site Description: Proposed sewer lift station at Eastside WWTP on Riverdale Dr in Jamestown, connecting the proposed sewer force main along NC Hwy 62 to proposed gravity main tie-on with the Greensboro gravity main along Polecat Creek.

Project Summary

The City of High Point will need new infrastructure to convey wastewater from High Point's existing sewer system south to a new Regional WRF. This will provide High Point with additional capacity to supplement the existing Eastside WWTP capacity (26 mgd MM). This project includes constructing a new sewer lift station and force main to convey wastewater from High Point's existing sewer system to the tie-in location with Greensboro's new proposed gravity main along Polecat Creek. The lift station and force main are sized to convey High Point's projected 2050 peak hour flow (36 mgd) that is proposed to be treated at the new Regional WRF under this alternative.

Pipe Diameter (in)	**42**
Pump Size (mgd)	**36**
Pipe Length (ft)	**42,400**
Trenchless Crossings (ft)	**4,450**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of High Point**
Potential Funding Sources	

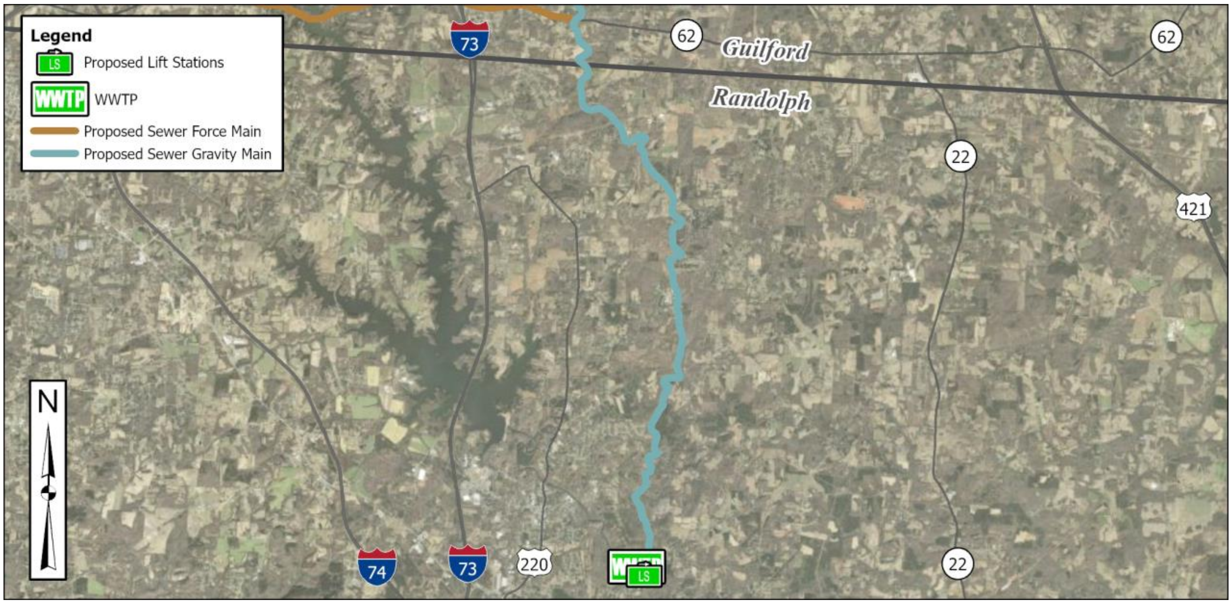
WW7.1 - Lift Station		**WW7.2 - Force Main**	
Construction Cost	**$36,000,000**	Construction Cost	**$88,000,000**
Easements (7.5% of Const. Cost)	**$2,700,000**	Easements (7.5% of Const. Cost)	**$6,600,000**
Engineering (15% of Const. Cost)	**$5,400,000**	Engineering (15% of Const. Cost)	**$13,200,000**
Permitting/Admin. (10% of Const. Cost)	**$3,600,000**	Permitting/Admin. (10% of Const. Cost)	**$8,800,000**
Project Contingency (20% of All Costs)	**$9,600,000**	Project Contingency (20% of All Costs)	**$23,400,000**
Total Cost	**$57,300,000**	**Total Cost**	**$140,000,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW8 - Regional Outfall for Greensboro and High Point (Alt 1)

Project Location



Site Description: Proposed sewer gravity main along Polecat Creek from proposed High Point force main tie-in at NC Hwy 62 to proposed Regional WRF influent lift station in Randleman.

Project Summary

Greensboro and High Point will need new infrastructure to convey wastewater from their existing sewer systems south to a new Regional WRF. This project includes constructing a new gravity sewer main that will connect at the proposed tie-in point of Greensboro's gravity main and High Point's force main at the intersection of NC Hwy 62 and Polecat Creek, and continue to convey wastewater to the proposed Regional WRF influent lift station. The gravity sewer main is sized to convey the sum of Greensboro's projected 2050 peak hour flow (24 mgd) and High Point's projected 2050 peak hour flow (36 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**72**
Capacity (mgd)	**60**
Pipe Length (ft)	**55,050**
Trenchless Crossings (ft)	**1,125**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (40%) and High Point (60%)**
Potential Funding Sources	

Gravity Line

Construction Cost	**$88,300,000**
Easements (7.5% of Const. Cost)	**$6,700,000**
Engineering (15% of Const. Cost)	**$13,300,000**
Permitting/Admin. (10% of Const. Cost)	**$9,000,000**
Project Contingency (20% of All Costs)	**$23,500,000**
Total Cost	**$140,800,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW10 - Regional WRF Influent Pump Station in Randleman (Alt 1)

Project Location

Site Description: Proposed sewer lift station located on the east side of Polecat Creek in Randleman, connecting to proposed force main pumping across Polecat Creek to new Regional WRF in Randleman.

Project Summary

Greensboro and High Point will need new infrastructure to convey wastewater from their existing sewer systems south to a new Regional WRF located in Randleman. This project includes constructing a new sewer lift station and force main to convey wastewater from the new regional outfall installed along the east side of Polecat Creek to the new Regional WRF located at the existing Randleman WWTP property. The lift station and force main is sized to convey the sum of Greensboro's and High Point's projected 2050 peak hour flows (24 mgd, 36 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**48**
Pump Size (mgd)	**60**
Pipe Length (ft)	**3,577**
Trenchless Crossings (ft)	**0**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (40%), High Point (60%)**

WW10.1 - Lift Station

Construction Cost	**$51,000,000**
Easements (7.5% of Const. Cost)	**$3,900,000**
Engineering (15% of Const. Cost)	**$7,700,000**
Permitting/Admin. (10% of Const. Cost)	**$5,200,000**
Project Contingency (20% of All Costs)	**$13,600,000**
Total Cost	**$81,400,000**

WW10.2 - Force Main

Construction Cost	**$7,300,000**
Easements (7.5% of Const. Cost)	**$600,000**
Engineering (15% of Const. Cost)	**$1,100,000**
Permitting/Admin. (10% of Const. Cost)	**$800,000**
Project Contingency (20% of All Costs)	**$2,000,000**
Total Cost	**$11,800,000**

Timeline

Beginning of Design	**2029**
Beginning of Construction	**2031**
End of Construction	**2034**

WW10 - New Regional WRF in Randleman and Expansion (Alt 1)

Project Location

Site Description: New Regional WRF located on the property of the existing Randleman WWTP on Applewood Rd in Randleman.

Project Summary

A new state-of-the-art Regional WRF will be constructed to treat wastewater from Greensboro, High Point, and Randleman. The initial maximum month capacity of the WRF will be 18.5 mgd and is projected to come online in 2034. A future expansion of the Regional WRF to 25 mgd is projected to take place in 2042 to meet the capacity needs of the participating members through 2050. The capacity of the new Regional WRF was calculated by setting the summarized maximum month capacity needs of the participating members in 2050 as 90% of the WRF rated maximum month capacity. In this Alternative, the existing Randleman WWTP would be decommissioned.

Initial Capacity (mgd)	**9.5**
Expanded Capacity (mgd)	**25**

Project Funding and Timeline

Funding for New 9.5 mgd Facility

Asset Owner(s)	**Greensboro (37%), High Point (55%), & Randleman (9%)**

WW10.3 - New Regional WRF

Construction Cost	**$285,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$42,800,000**
Permitting/Admin. (10% of Const. Cost)	**$28,600,000**
Project Contingency (20% of All Costs)	**$71,100,000**
Total Cost	**$427,500,000**

Timeline for New 9.5 mgd Facility

Beginning of Design	**2029**
Beginning of Construction	**2031**
End of Construction	**2034**

Funding for 25 mgd Expansion

Asset Owner(s)	**Greensboro (37%), High Point (55%), & Randleman (9%)**

WW10.4 - Expansion of Regional WRF

Construction Cost	**$279,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$41,900,000**
Permitting/Admin. (10% of Const. Cost)	**$28,000,000**
Project Contingency (20% of All Costs)	**$69,600,000**
Total Cost	**$418,500,000**

Timeline for 25 mgd Expansion

Beginning of Design	**2037**
Beginning of Construction	**2039**
End of Construction	**2042**

WW14 - Ramseur WWTP Rehabilitation and Expansion to 1.0 mgd (Alt 0,1,2)

Project Location

Site Description: Existing Ramseur WWTP on Roundleaf Rd in Ramseur, operated by the Town of Ramseur.

Project Summary

The existing Ramseur WWTP has a maximum month capacity of 0.48 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits. The Ramseur WWTP will need to be expanded to 1.0 mgd by 2030 to treat the projected 2050 wastewater flows for Ramseur.

Current Capacity (mgd)	**0.48**
Expanded Capacity (mgd)	**1**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Ramseur**
Potential Funding Sources	

WW14.1 - Rehabilitation and Upgrades		**WW14.2 - Expansion of Facility**	
Construction Cost	**$13,500,000**	Construction Cost	**$18,200,000**
Easements (7.5% of Const. Cost)	**-**	Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$2,000,000**	Engineering (15% of Const. Cost)	**$2,700,000**
Permitting/Admin. (10% of Const. Cost)	**$1,400,000**	Permitting/Admin. (10% of Const. Cost)	**$1,800,000**
Project Contingency (20% of All Costs)	**$3,300,000**	Project Contingency (20% of All Costs)	**$4,600,000**
Total Cost	**$20,200,000**	**Total Cost**	**$27,300,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2028**
End of Construction	**2030**

WW15 - Franklinville WWTP Rehabilitation and Upgrade (Alt 0,1,2)

Project Location

Site Description: Existing Franklinville WWTP on Rising Sun Way in Franklinville, operated by the Town of Franklinville.

Project Summary

The existing Franklinville WWTP has a maximum month capacity of 0.1 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits.

Current Capacity (mgd)	**0.1**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Franklinville**
Potential Funding Sources	**Randolph County State Budget Allocation**

<u>WWTP Upgrades</u>

Construction Cost	**$2,800,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$400,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$800,000**
Total Cost	**$4,200,000**

Timeline

Beginning of Design	**2030**
Beginning of Construction	**2032**
End of Construction	**2034**

WW16 - Asheboro WWTP Rehabilitation and Expansion to 12.0 mgd (Alt 0,1,2)

Project Location

Site Description: Existing Asheboro WWTP on Bonkemeyer Dr in Asheboro, operated by the City of Asheboro.

Project Summary

The existing Asheboro WWTP has a maximum month capacity of 9.0 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits. The Asheboro WWTP will need to be expanded to 12.0 mgd by 2036 to treat the projected 2050 wastewater flows for Asheboro.

Current Capacity (mgd)	**9**
Expanded Capacity (mgd)	**12**

Project Funding and Timeline

Funding for 9 mgd Upgrades

Asset Owner(s)	**City of Asheboro**
Potential Funding Sources	

WW16.1 - Rehabilitation and Upgrades	
Construction Cost	**$216,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$32,400,000**
Permitting/Admin. (10% of Const. Cost)	**$21,600,000**
Project Contingency (20% of All Costs)	**$54,000,000**
Total Cost	**$324,000,000**

Funding for 12 mgd Expansion

Asset Owner(s)	**City of Asheboro**
Potential Funding Sources	

WW16.2 - Expansion of Facility	
Construction Cost	**$90,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$13,500,000**
Permitting/Admin. (10% of Const. Cost)	**$9,000,000**
Project Contingency (20% of All Costs)	**$22,500,000**
Total Cost	**$135,000,000**

Timeline for 9 mgd Upgrades

Beginning of Design	**2029**
Beginning of Construction	**2031**
End of Construction	**2034**

Timeline for 12 mgd Expansion

Beginning of Design	**2031**
Beginning of Construction	**2033**
End of Construction	**2036**

6.2.3.2 Alternative 2

Alternative 2 also includes the construction of a new Regional WRF located near Randleman with Greensboro, High Point and Randleman participating, like Alternative 1. However, Alternative 2 also includes the expansion of the High Point Eastside WWTP from 26 MGD to 32 MGD. The Eastside facility expansion would be online before 2034 and the TZ Osborne WRF expansion would be required by 2037. The expansions at TZO WRF and Eastside WWTP delay the near-term need for additional capacity at a new Regional WRF.

The new Regional WRF in Alternative 2 is projected to be in service by 2042 and has a maximum month capacity of 18.5 MGD. This will provide the additional capacity needed by Greensboro, High Point, Randleman, Liberty, Jamestown, and Archdale through 2050. The capacity of the new Regional WRF in Alternative 2 was calculated by setting the summarized maximum month capacity needs of the participating members in 2050 as 90% of the WRF rated maximum month capacity.

<u>New Regional WRF Capacity of 18.5 MGD (2042)</u>

- Greensboro (Liberty): 9.3 MGD
- High Point (Jamestown, Archdale): 7.0 MGD
- Randleman: 2.2 MGD

With the new Regional WRF not coming online until 2042, Randleman will need to perform a minimal rehabilitation project at its existing WWTP by 2034 to address ageing infrastructure that is not expected to last another 17 years. Once the new Regional WRF is commissioned, the existing Randleman WWTP will be decommissioned. In Alternative 2, Asheboro, Ramseur, and Franklinville would not participate in the Regional WRF and would continue to operate and expand their localized systems as detailed in the "Go-it-Alone" scenario.

The summary of wastewater collection and treatment projects included in Alternative 2 are shown in Figure 6-7. Detailed project descriptions, projected project costs and estimated timelines for the design and construction of each proposed project follow Figure 6-7.

Table 6-7 illustrates the capacity required in future planning years and the anticipated projects to meet those needs. Table 6-8 includes further detail on the projects required in Regionalization Alternative 2 to reach the maximum month capacity from the existing infrastructure and proposed upgrade projects sorted by year the project is required to be completed.

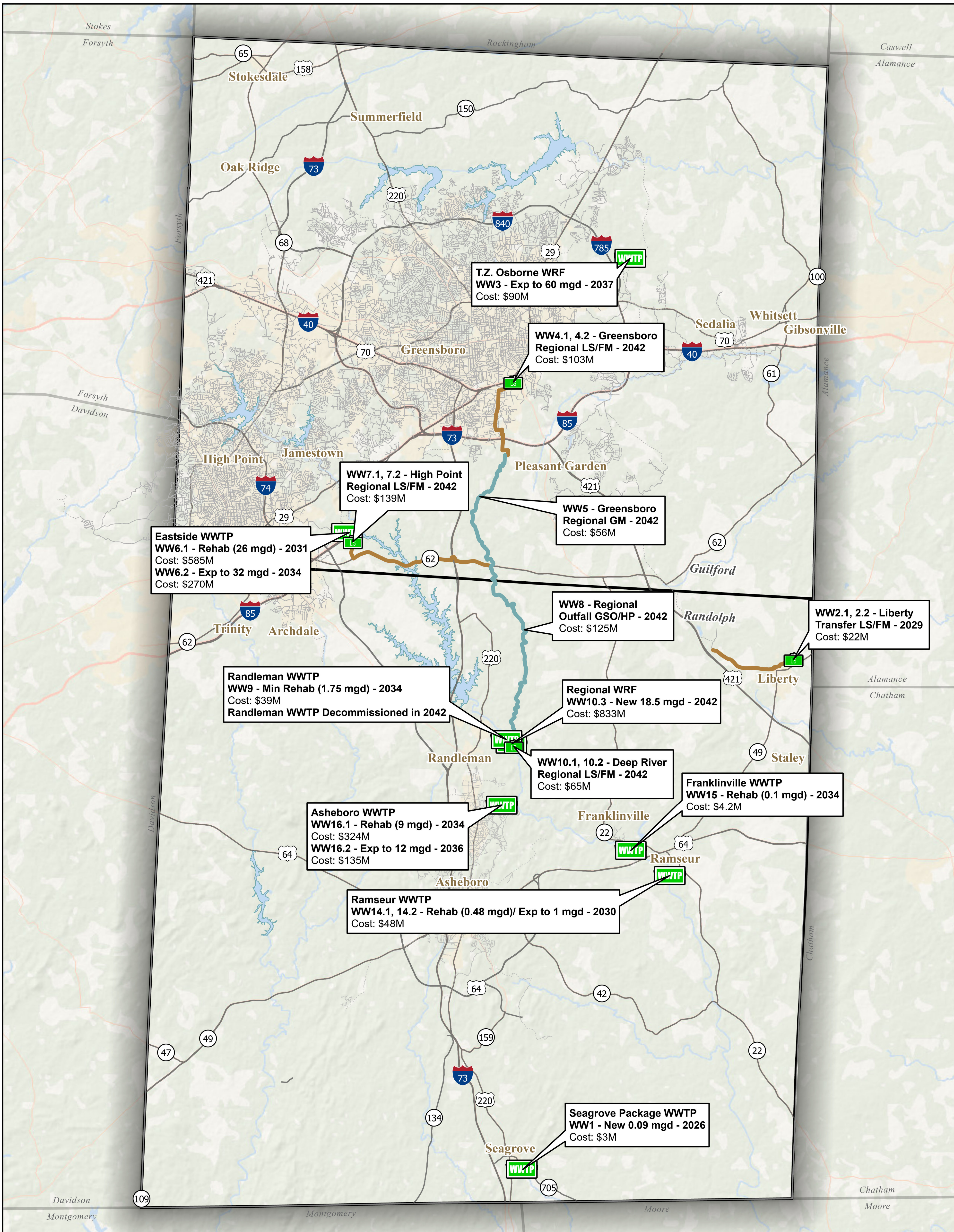
Table 6-7: Meeting Utility Wastewater Needs with Regionalization Alternative 2

Municipality	Current Capacity (MGD)	2022 MM (MGD)	2030 MM (MGD)	2040 MM (MGD)	2050 MM (MGD)	Projects or Plans to Meet Need
Archdale	2.50	1.20	1.68	2.13	2.89	• Invest in Project WW6.1 and WW6.2 to upgrade and expand Eastside WWTP and extend contract with the City of High Point
Asheboro	9.00	4.64	6.81	8.39	10.20	• Complete projects WW16.1 by 2034 and WW16.2 by 2036 to upgrade and expand Asheboro WWTP to 12 MGD
Franklinville	0.1	0.05	0.08	0.09	0.09	• Complete project WW15 by 2034 to upgrade the existing facility
Gibsonville	1.55	0.91	1.74	2.71	3.09	• Extend Agreement with the City of Burlington
Greensboro	56.78	37.51	45.58	52.12	59.70	• Complete Project WW3 by 2037 to expand T.Z. Osborne WRF to 60 MGD. • Complete project WW4.1, WW4.2, WW5, and WW8 by 2042 to convey flow to the Regional WRF. • Complete projects WW10.1, WW10.2, and WW10.3 by 2042 for the Regional WRF with High Point and Randleman for an additional 9 MGD of capacity.
Guilford County	-	-	0.71	0.82	1.63	• Guilford County will contract with the closest utility to meet future needs.
High Point	26	19.81	23.92	27.65	32.32	• Complete Project WW6.1 by 2031 and WW6.2 by 2034 to upgrade and expand Eastside WWTP to 32 MGD. • Complete project WW7.1, WW7.2, and WW8 by 2042 to convey flow to the Regional WRF. • Complete projects WW10.1, WW10.2, and WW10.3 by 2042 for the Regional WRF with Greensboro and Randleman for an additional 7 MGD of capacity.
Jamestown	2	1.82	2.10	2.52	2.95	• Invest in Project WW6.1 and WW6.2 to upgrade and expand Eastside WWTP and extend contract with the City of High Point
Liberty	0.55	0.51	0.62	0.91	1.35	• Complete project WW2.1 and WW2.2 by 2029 to discharge to the City of Greensboro.
Oak Ridge	-	-	0.05	0.09	0.11	• Oak Ridge will need to contract with WSFCU or the City of Greensboro
Pleasant Garden	-	-	0.03	0.06	0.14	• Pleasant Garden will contract with the City of Greensboro
Ramseur	0.48	0.28	0.45	0.95	0.98	• Complete projects WW14.1 and WW14.2 by 2030 to upgrade and expand Ramseur WWTP to 1 MGD
Randleman	1.87	0.77	0.93	1.31	1.70	• Complete minimal rehabilitation project WW9 by 2034 to delay to Regional WRF completion • Complete project WW10.3 by 2042 for the Regional WRF with Greensboro and High Point for a 2.2 MGD of capacity. The existing Randleman WWTP will be decommissioned in 2042.
Randolph County	-	-	0.13	0.51	1.13	• Randolph County will contract with the nearest utility to meet future needs
Seagrove-Ulah MWD	0.03	0.03	0.11	0.12	0.13	• Complete project WW1 by 2026
Sedalia	-	-	0.02	0.05	0.08	• Sedalia will contract with the City of Greensboro for 0.2 MGD
Stokesdale	-	-	0.02	0.03	0.04	• Stokesdale will contract with WSFCU, Rockingham County or the City of Greensboro
Summerfield	-	-	0.28	0.43	0.64	• Summerfield will contract with the City of Greensboro
Trinity	1	0.27	1.14	1.17	1.19	• Trinity will contract with High Point's Westside WWTP

Table 6-8: Capital Projects Required for Regionalization Alternative 2

Utility Resp. for Upgrade	CY Project Comp. By	Project ID	Wastewater Capital Project Description	Est. Total Project Cost
Seagrove-Ulah MWD	2026	WW1	Seagrove 0.09 MGD Package WWTP	$3,000,000
Liberty	2029	WW2.1	Liberty Transfer Lift Station to Greensboro	$12,600,000
Liberty	2029	WW2.2	Liberty Sewer Force Main to Greensboro	$9,500,000
Ramseur	2030	WW14.1	Ramseur WWTP Upgrade of Existing 0.46 MGD	$20,200,000
Ramseur	2030	WW14.2	Ramseur WWTP Expansion to 1 MGD	$27,300,000
High Point	2031	WW6.1	High Point Eastside WWTP Upgrade of Existing 26 MGD	$585,000,000
High Point	2034	WW6.2	High Point Eastside WWTP Expansion to 32 MGD	$270,000,000
Randleman	2034	WW9	Randleman WWTP Minimal Upgrade of Existing 1.745 MGD	$39,300,000
Franklinville	2034	WW15	Franklinville WWTP Upgrade of Existing 0.1 MGD	$4,200,000
Asheboro	2034	WW16.1	Asheboro WWTP Upgrade of Existing 9 MGD	$324,000,000
Asheboro	2036	WW16.2	Asheboro WWTP Expansion to 12 MGD	$135,000,000
Greensboro	2037	WW3	Greensboro TZO WRF Expansion to 60 MGD	$90,000,000
Greensboro	2042	WW4.1	Greensboro Regional Lift Station	$40,800,000
Greensboro	2042	WW4.2	Greensboro Regional Force Main	$62,100,000
Greensboro	2042	WW5	Greensboro Regional Gravity Main	$55,700,000
High Point	2042	WW7.1	High Point Regional Lift Station	$28,400,000
High Point	2042	WW7.2	High Point Regional Force Main	$110,100,000
Greensboro/High Point	2042	WW8	Regional Gravity Outfall GSO/HP	$125,000,000
Greensboro/High Point	2042	WW10.1	Deep River Regional Lift Station (GSO, HP)	$56,800,000
Regional Authority	2042	WW10.2	Deep River Regional Force Main (GSO, HP)	$8,000,000
Regional Authority	2042	WW10.3	New Deep River WRF 18.5 MGD	$832,500,000
			Total: Wastewater Alternative 2 Capital Project Costs	**$2,839,500,000**

The project sheets, Figure 6-7, consists of the detailed descriptions of the projects listed above for Regionalization Alternative 2 including project maps, the utilities involved with each upgrade and their percentage of financial responsibility.



Legend

- Guilford and Randolph County
- WWTP
- Proposed Lift Station
- Proposed Sewer Force Main
- Proposed Sewer Gravity Main
- Major Waterbodies

N

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Wastewater Treatment and Collection Alternative 2

Figure 6-7

December 2025

Piedmont Triad Regional Water Authority

PATH: O:\GIS\Projects\31645\31645-002\ArcGISPro\PTRWA_SB\PTRWA_SB.aprx; Layout: PTRWA Basemap Portrait; User: SBailey

WW1 - Seagrove Package WWTP

Project Location

Site Description: Proposed 0.09 mgd Package WWTP on existing property on NC-705 in Seagrove, operated by the Seagrove Ulah Metropolitan Water District.

Project Summary

Seagrove Ulah Metropolitan Water District operates an existing 0.03 mgd package WWTP. The facility has repeatedly reached its treatment capacity over the past few years, necessitating the need for an expansion. A new 0.09 mgd package WWTP is proposed to replace the existing facility and be able to meet the localized projected growth in Seagrove. A portion of Seagrove wastewater flow is directed to the Asheboro sewer system through the new Uwharrie Charter Lift Station, which provides additional wastewater capacity in the area.

Current Capacity (mgd)	**0.03**
New Capacity (mgd)	**0.09**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Seagrove**
Potential Funding Sources	**Randolph County State Budget Allocation**

WWTP

Construction Cost	**$2,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$300,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$500,000**
Total Cost	**$3,000,000**

Timeline

Beginning of Design	**2023**
Beginning of Construction	**2025**
End of Construction	**2026**

WW2 - Liberty Transfer Lift Station and Force Main

Project Location

Site Description: Proposed sewer lift station at existing Liberty WWTP on Highfill St in Liberty, connecting to proposed force main along Starmount Rd to southern end of the Toyota Facility.

Project Summary

The Town of Liberty has an existing 0.55 mgd non-discharge wastewater treatment and spray irrigation facility. The Town has struggled with high flows due to inflow and infiltration (I&I) to the collection system, and has reported multiple bypasses of nontreated wastewater from treatment units since 2018. To address these concerns and accomodate projected growth in the region, Liberty will decommission their WWTP/sprayfields and pump wastewater through a new transfer lift station to the Greensboro sewer system, through the existing transfer lift station at the Toyota site.

Pipe Diameter (in)	**12**
Pump Size (mgd)	**2.8**
Pipe Length (ft)	**25,000**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Liberty**
Potential Funding Sources	**Randolph County State Budget Allocation**

WW2.1 - Lift Station

Construction Cost	**$8,400,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$1,300,000**
Permitting/Admin. (10% of Const. Cost)	**$800,000**
Project Contingency (20% of All Costs)	**$2,100,000**
Total Cost	**$12,600,000**

WW2.2 - Force Main

Construction Cost	**$6,000,000**
Easements (7.5% of Const. Cost)	**$500,000**
Engineering (15% of Const. Cost)	**$900,000**
Permitting/Admin. (10% of Const. Cost)	**$600,000**
Project Contingency (20% of All Costs)	**$1,500,000**
Total Cost	**$9,500,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2027**
End of Construction	**2029**

WW3 - Greensboro TZ Osborne WRF Expansion

Project Location

Site Description: Existing TZ Osborne WRF on Huffine Mill Rd in McLeansville, operated by the City of Greensboro.

Project Summary

The existing Greensboro TZO WRF completed a major facility upgrade and expansion to a maximum month capacity of 56 mgd in 2021. A re-rate study completed in 2023, showed the facility could be expanded to 60 mgd with limited additional new infrastructure. TZO WRF discharges to South Buffalo Creek in the Haw River sub-basin and is subject to mass-based nutrient limits of 891,272 lb/year and 112,044 lb/year for TN and TP, respectively, as set forth by the Jordan Lake Water Supply Nutrient Management Strategy. Based on the City's previous discussions with NCDEQ, 60 mgd is expected to be the capacity expansion limit for TZO WRF. This project expands the capacity of TZO WRF to 60 mgd with a minor upgrade project.

Current Capacity (mgd)	**56**
Expanded Capacity (mgd)	**60**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

WRF Expansion

Construction Cost	**$60,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$9,000,000**
Permitting/Admin. (10% of Const. Cost)	**$6,000,000**
Project Contingency (20% of All Costs)	**$15,000,000**
Total Cost	**$90,000,000**

Timeline

Beginning of Design	**2032**
Beginning of Construction	**2034**
End of Construction	**2037**

WW4 - Greensboro Regional Lift Station and Force Main (Alt 1,2)

Project Location

Site Description: Proposed sewer lift station near Broome Rd in Greensboro, connecting the proposed sewer force main along S Elm Eugene St to proposed gravity main on Ritters Lake Rd.

Project Summary

The City of Greensboro will need new infrastructure to convey wastewater from Greensboro's existing sewer system south to a new Regional WRF. This will provide Greensboro with additional capacity to supplement the expanded TZO WRF capacity (60 mgd MM). This project includes constructing a new sewer lift station and force main to convey wastewater from Greensboro's existing sewer system to the high elevation point in the proposed alignment at Ritters Lake Rd. The lift station and force main are sized to convey Greensboro's projected 2050 peak hour flow (24 mgd) that is proposed to be treated at the new Regional WRF in Randleman.

Pipe Diameter (in)	**42**
Pump Size (mgd)	**24**
Pipe Length (ft)	**23,500**
Trenchless Crossings (ft)	**600**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

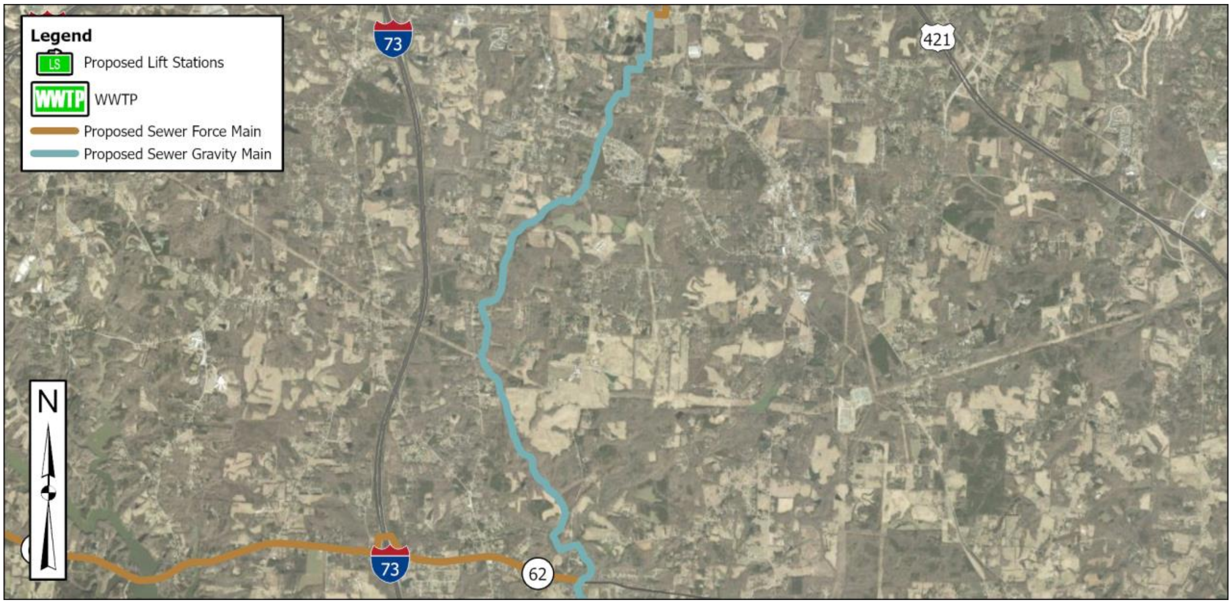
WW4.1 - Lift Station		**WW4.2 - Force Main**	
Construction Cost	**$25,500,000**	Construction Cost	**$38,800,000**
Easements (7.5% of Const. Cost)	**$2,000,000**	Easements (7.5% of Const. Cost)	**$3,000,000**
Engineering (15% of Const. Cost)	**$3,900,000**	Engineering (15% of Const. Cost)	**$5,900,000**
Permitting/Admin. (10% of Const. Cost)	**$2,600,000**	Permitting/Admin. (10% of Const. Cost)	**$4,000,000**
Project Contingency (20% of All Costs)	**$6,800,000**	Project Contingency (20% of All Costs)	**$10,400,000**
Total Cost	**$40,800,000**	**Total Cost**	**$62,100,000**

Timeline

Beginning of Design	**2036**
Beginning of Construction	**2038**
End of Construction	**2042**

WW5 - Greensboro Regional Gravity Main (Alt 1,2)

Project Location



Site Description: Proposed sewer gravity main along Polecat Creek from proposed Greensboro force main tie-in at Ritters Lake Rd to proposed tie-in to the High Point force main at NC Hwy 62.

Project Summary

The City of Greensboro will need new infrastructure to convey wastewater from Greensboro's existing sewer system south to a new Regional WRF. This will provide Greensboro with additional capacity to supplement the expanded TZO WRF capacity (60 mgd MM). This project includes constructing a new gravity sewer main that will connect to Greensboro's proposed sewer force main at Ritters Lake Rd and continue to convey wastewater to the tie-in point with High Point's new proposed sewer force main at NC Hwy 62. The gravity sewer main is sized to convey Greensboro's projected 2050 peak hour flow (24 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**60**
Capacity (mgd)	**24**
Pipe Length (ft)	**33,490**
Trenchless Crossings (ft)	**500**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

Gravity Line

Construction Cost	**$34,800,000**
Easements (7.5% of Const. Cost)	**$2,700,000**
Engineering (15% of Const. Cost)	**$5,300,000**
Permitting/Admin. (10% of Const. Cost)	**$3,600,000**
Project Contingency (20% of All Costs)	**$9,300,000**
Total Cost	**$55,700,000**

Timeline

Beginning of Design	**2036**
Beginning of Construction	**2038**
End of Construction	**2042**

WW6 - High Point Eastside WWTP Rehabilitation and Expansion (Alt 2)

Project Location

Site Description: Existing Eastside WWTP on Riverdale Dr in Jamestown, operated by the City of High Point.

Project Summary

The existing High Point Eastside WWTP has a maximum month capacity of 26 mgd and needs to address ageing infrastructure through a rehabilitation project. High Point received speculative limits from NCDEQ in 2022 for an expansion of Eastside WWTP to 32 mgd. Since Randleman Lake, Eastside's discharge water body, is a water supply lake, 32 mgd is expected to be the capacity expansion limit. Under this Alternative, Eastside WWTP will expand to 32 mgd to help treat the projected future wastewater flows. The facility will need to undergo an improvement project to meet anticipated lower total nitrogen (TN) and total phosphorus (TP) discharge limits.

Current Capacity (mgd)	**26**
Expanded Capacity (mgd)	**32**

Project Funding and Timeline

Funding

Asset Owner(s) **High Point (82.7%), Archdale (9.6%), Jamestown (7.7%)**

Asset Owner(s) **City of High Point**

WW6.1 - 26 mgd Rehabilitation

Construction Cost	**$390,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$58,500,000**
Permitting/Admin. (10% of Const. Cost)	**$39,000,000**
Project Contingency (20% of All Costs)	**$97,500,000**
Total Cost	**$585,000,000**

WW6.2 - 32 mgd Expansion

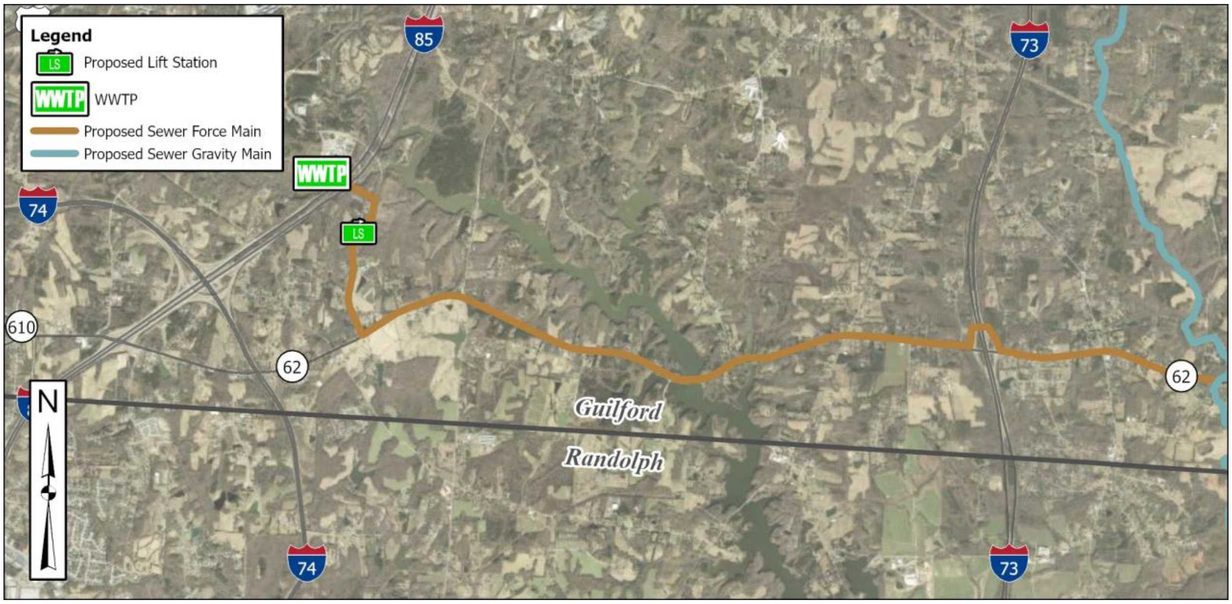
Construction Cost	**$180,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$27,000,000**
Permitting/Admin. (10% of Const. Cost)	**$18,000,000**
Project Contingency (20% of All Costs)	**$45,000,000**
Total Cost	**$270,000,000**

Timeline

Beginning of Design	**2026**	Beginning of Design	**2028**
Beginning of Construction	**2028**	Beginning of Construction	**2030**
End of Construction	**2031**	End of Construction	**2034**

WW7 - High Point Regional Lift Station and Force Main (Alt 2)

Project Location



Site Description: Proposed sewer lift station at Eastside WWTP on Riverdale Dr in Jamestown, connecting the proposed sewer force main along NC Hwy 62 to proposed gravity main tie-on with the Greensboro gravity main along Polecat Creek.

Project Summary

The City of High Point will need new infrastructure to convey wastewater from High Point's existing sewer system south to a new Regional WRF. This will provide High Point with additional capacity to supplement the expanded Eastside WWTP capacity (32 mgd MM). This project includes constructing a new sewer lift station and force main to convey wastewater from High Point's existing sewer system to the tie-in location with Greensboro's new proposed gravity main along Polecat Creek. The lift station and force main are sized to convey High Point's projected 2050 peak hour flow (18 mgd) that is proposed to be treated at the new Regional WRF under this alternative.

Pipe Diameter (in)	**36**
Pump Size (mgd)	**18**
Pipe Length (ft)	**42,400**
Trenchless Crossings (ft)	**4,450**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of High Point**
Potential Funding Sources	

WW7.1 - Lift Station

Construction Cost	**$17,800,000**
Easements (7.5% of Const. Cost)	**$1,300,000**
Engineering (15% of Const. Cost)	**$2,700,000**
Permitting/Admin. (10% of Const. Cost)	**$1,800,000**
Project Contingency (20% of All Costs)	**$4,800,000**
Total Cost	**$28,400,000**

WW7.2 - Force Main

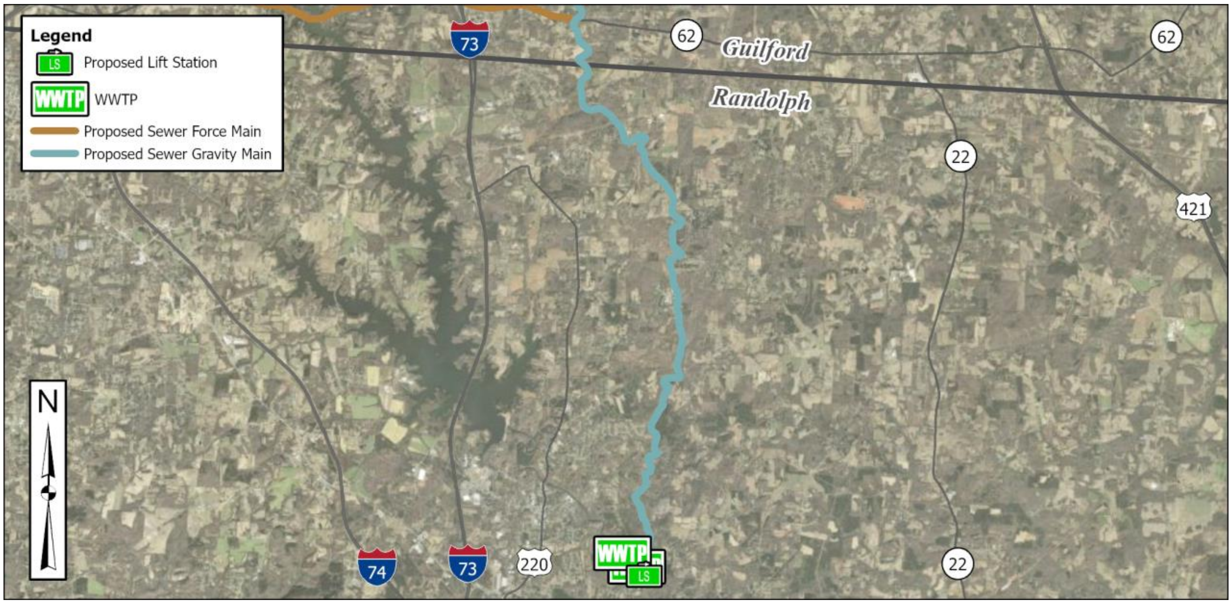
Construction Cost	**$69,100,000**
Easements (7.5% of Const. Cost)	**$5,200,000**
Engineering (15% of Const. Cost)	**$10,400,000**
Permitting/Admin. (10% of Const. Cost)	**$7,000,000**
Project Contingency (20% of All Costs)	**$18,400,000**
Total Cost	**$110,100,000**

Timeline

Beginning of Design	**2036**
Beginning of Construction	**2038**
End of Construction	**2042**

WW8 - Regional Outfall for Greensboro and High Point (Alt 2)

Project Location



Site Description: Proposed sewer gravity main along Polecat Creek from proposed High Point force main tie-in at NC Hwy 62 to proposed Regional WRF influent lift station in Randleman.

Project Summary

Greensboro and High Point will need new infrastructure to convey wastewater from their existing sewer systems south to a new Regional WRF. This project includes constructing a new gravity sewer main that will connect at the proposed tie-in point of Greensboro's gravity main and High Point's force main at the intersection of NC Hwy 62 and Polecat Creek, and continue to convey wastewater to the proposed Regional WRF influent lift station. The gravity sewer main is sized to convey the sum of Greensboro's projected 2050 peak hour flow (24 mgd) and High Point's projected 2050 peak hour flow (18 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**60**
Capacity (mgd)	**42**
Pipe Length (ft)	**55,050**
Trenchless Crossings (ft)	**1,125**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (40%) and High Point (60%)**
Potential Funding Sources	

Gravity Line

Construction Cost	**$78,700,000**
Easements (7.5% of Const. Cost)	**$5,900,000**
Engineering (15% of Const. Cost)	**$11,800,000**
Permitting/Admin. (10% of Const. Cost)	**$7,800,000**
Project Contingency (20% of All Costs)	**$20,800,000**
Total Cost	**$125,000,000**

Timeline

Beginning of Design	**2036**
Beginning of Construction	**2038**
End of Construction	**2042**

WW9 - Randleman WWTP Minimal Rehabilitation (Alt 2)

Project Location

Site Description: Existing Randleman WWTP on Applewood Rd in Randleman, operated by the City of Randleman.

Project Summary

The existing Randleman WWTP has a maximum month capacity of 1.745 mgd and needs to address ageing infrastructure. Under this Alternative, a new Regional WRF will be constructed on the facility property in 2042 and will replace the existing WWTP. Therefore this project involves only a minimal rehabilitation project by 2034 to address infrastructure that is not expected to last another 17 years. With the new state-of-the-art Regional WRF coming online by 2042, the existing Randleman WWTP will not need to perform upgrades to meet anticipated total nitrogen and total phosphorus discharge limits

Current Capacity (mgd)	**1.745**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Randleman**
Potential Funding Sources	

WWTP

Construction Cost	**$26,200,000**
Easements (7.5% of Const. Cost)	**-**
Engineering Design (15% of Const. Cost)	**$3,900,000**
Permitting and Admin. (10% of Const. Cost)	**$2,600,000**
Project Contingency (20% of All Costs)	**$6,600,000**
Total Cost	**$39,300,000**

Timeline

Beginning of Design	**2030**
Beginning of Construction	**2032**
End of Construction	**2034**

WW10 - Regional WRF Influent Pump Station in Randleman (Alt 2)

Project Location

Site Description: Proposed sewer lift station located on the east side of Polecat Creek in Randleman, connecting to proposed force main pumping across Polecat Creek to new Regional WRF in Randleman.

Project Summary

Greensboro and High Point will need new infrastructure to convey wastewater from their existing sewer systems south to a new Regional WRF located in Randleman. This project includes constructing a new sewer lift station and force main to convey wastewater from the new regional outfall installed along the east side of Polecat Creek to the new Regional WRF located at the existing Randleman WWTP property. The lift station and force main is sized to convey the sum of Greensboro's and High Point's projected 2050 peak hour flows (24 mgd, 18 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**36**
Pump Size (mgd)	**42**
Pipe Length (ft)	**3,577**
Trenchless Crossings (ft)	**0**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (40%), High Point (60%)**
Potential Funding Sources	

WW10.1 - Lift Station

Construction Cost	**$35,600,000**
Easements (7.5% of Const. Cost)	**$2,700,000**
Engineering (15% of Const. Cost)	**$5,400,000**
Permitting/Admin. (10% of Const. Cost)	**$3,600,000**
Project Contingency (20% of All Costs)	**$9,500,000**
Total Cost	**$56,800,000**

WW10.2 - Force Main

Construction Cost	**$4,800,000**
Easements (7.5% of Const. Cost)	**$400,000**
Engineering (15% of Const. Cost)	**$800,000**
Permitting/Admin. (10% of Const. Cost)	**$600,000**
Project Contingency (20% of All Costs)	**$1,400,000**
Total Cost	**$8,000,000**

Timeline

Beginning of Design	**2037**
Beginning of Construction	**2039**
End of Construction	**2042**

WW10 - New Regional WRF in Randleman (Alt 2)

Project Location

Site Description: New Regional WRF located on the property of the existing Randleman WWTP on Applewood Rd in Randleman.

Project Summary

A new state-of-the-art Regional WRF will be constructed to treat wastewater from Greensboro, High Point, and Randleman. The initial maximum month capacity of the WRF will be 18.5 mgd and is projected to come online in 2042 to meet the capacity needs of the participating members through 2050. The capacity of the new Regional WRF was calculated by setting the summarized maximum month capacity needs of the participating members in 2050 as 90% of the WRF rated maximum month capacity. In this Alternative, the existing Randleman WWTP would be decommissioned.

Initial Capacity (mgd)	**18.5**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (50%), High Point (38%), Randleman (12%)**
Potential Funding Sources	

<u>WW10.3 - New Regional WRF</u>

Construction Cost	**$555,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering Design (15% of Const. Cost)	**$83,300,000**
Permitting/Admin. (10% of Const. Cost)	**$55,600,000**
Project Contingency (20% of All Costs)	**$138,600,000**
Total Cost	**$832,500,000**

Timeline

Beginning of Design	**2037**
Beginning of Construction	**2039**
End of Construction	**2042**

WW14 - Ramseur WWTP Rehabilitation and Expansion to 1.0 mgd (Alt 0,1,2)

Project Location

Site Description: Existing Ramseur WWTP on Roundleaf Rd in Ramseur, operated by the Town of Ramseur.

Project Summary

The existing Ramseur WWTP has a maximum month capacity of 0.48 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits. The Ramseur WWTP will need to be expanded to 1.0 mgd by 2030 to treat the projected 2050 wastewater flows for Ramseur.

Current Capacity (mgd)	**0.48**
Expanded Capacity (mgd)	**1**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Ramseur**
Potential Funding Sources	

WW14.1 - Rehabilitation and Upgrades		**WW14.2 - Expansion of Facility**	
Construction Cost	**$13,500,000**	Construction Cost	**$18,200,000**
Easements (7.5% of Const. Cost)	**-**	Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$2,000,000**	Engineering (15% of Const. Cost)	**$2,700,000**
Permitting/Admin. (10% of Const. Cost)	**$1,400,000**	Permitting/Admin. (10% of Const. Cost)	**$1,800,000**
Project Contingency (20% of All Costs)	**$3,300,000**	Project Contingency (20% of All Costs)	**$4,600,000**
Total Cost	**$20,200,000**	**Total Cost**	**$27,300,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2028**
End of Construction	**2030**

WW15 - Franklinville WWTP Rehabilitation and Upgrade (Alt 0,1,2)

Project Location

Site Description: Existing Franklinville WWTP on Rising Sun Way in Franklinville, operated by the Town of Franklinville.

Project Summary

The existing Franklinville WWTP has a maximum month capacity of 0.1 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits.

Current Capacity (mgd)	**0.1**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Franklinville**
Potential Funding Sources	**Randolph County State Budget Allocation**

WWTP Upgrades

Construction Cost	**$2,800,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$400,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$800,000**
Total Cost	**$4,200,000**

Timeline

Beginning of Design	**2030**
Beginning of Construction	**2032**
End of Construction	**2034**

WW16 - Asheboro WWTP Rehabilitation and Expansion to 12.0 mgd (Alt 0,1,2)

Project Location

Site Description: Existing Asheboro WWTP on Bonkemeyer Dr in Asheboro, operated by the City of Asheboro.

Project Summary

The existing Asheboro WWTP has a maximum month capacity of 9.0 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits. The Asheboro WWTP will need to be expanded to 12.0 mgd by 2036 to treat the projected 2050 wastewater flows for Asheboro.

Current Capacity (mgd)	**9**
Expanded Capacity (mgd)	**12**

Project Funding and Timeline

Funding for 9 mgd Upgrades

Asset Owner(s)	**City of Asheboro**
Potential Funding Sources	
WW16.1 - Rehabilitation and Upgrades	
Construction Cost	**$216,000,000**
Easements (7.5% of Const. Cost)	-
Engineering (15% of Const. Cost)	**$32,400,000**
Permitting/Admin. (10% of Const. Cost)	**$21,600,000**
Project Contingency (20% of All Costs)	**$54,000,000**
Total Cost	**$324,000,000**

Funding for 12 mgd Expansion

Asset Owner(s)	**City of Asheboro**
Potential Funding Sources	
WW16.2 - Expansion of Facility	
Construction Cost	**$90,000,000**
Easements (7.5% of Const. Cost)	-
Engineering (15% of Const. Cost)	**$13,500,000**
Permitting/Admin. (10% of Const. Cost)	**$9,000,000**
Project Contingency (20% of All Costs)	**$22,500,000**
Total Cost	**$135,000,000**

Timeline for 9 mgd Upgrades

Beginning of Design	**2029**
Beginning of Construction	**2031**
End of Construction	**2034**

Timeline for 12 mgd Expansion

Beginning of Design	**2031**
Beginning of Construction	**2033**
End of Construction	**2036**

6.2.3.3 Alternative 3

Alternative 3 provides increased regional collaboration, compared to Alternatives 1 and 2, and includes the construction of a new Regional WRF located near Asheboro, with Greensboro, High Point, Asheboro and Randleman participating. Asheboro's and Randleman's existing wastewater treatment plants would be decommissioned and replaced by their expanded allocated share in the new state-of-the-art regional facility prepared to treat to the limits of technology for nutrients and contaminants of emerging concern. This removes two ageing facilities from the region and consolidates its service.

The new Regional WRF in Alternative 3 is projected to be needed by 2034 and has an initial maximum month capacity of 30 MGD. This will provide the additional capacity needed by Greensboro, High Point, Asheboro, Randleman, Liberty, Jamestown, and Archdale to get through the first 18 years of the 25-year planning period. The Regional WRF is projected to expand to a 43 MGD facility by 2043 to meet the additional capacity needs of the participating members through 2050. The capacity of the new Regional WRF in Alternative 3 was calculated by setting the summarized maximum month capacity needs of the participating members in 2050 as 90% of the WRF rated maximum month capacity.

<u>New Regional WRF Initial Capacity of 30 MGD (2034)</u>

- Greensboro (Liberty): 6.9 MGD
- High Point (Jamestown, Archdale): 6.9 MGD
- Randleman: 2.2 MGD
- Asheboro: 14 MGD

<u>New Regional WRF Expanded Capacity of 43 MGD (2043)</u>

- Greensboro (Liberty): 13.4 MGD
- High Point (Jamestown, Archdale): 13.4 MGD
- Randleman: 2.2 MGD
- Asheboro: 14 MGD

In Alternative 3, Ramseur and Franklinville would not participate in the new Regional WRF, however Franklinville's existing WWTP would be decommissioned, and their wastewater flows would be pumped to the Ramseur WWTP. The existing Ramseur WWTP would be rehabilitated and expanded from 0.46 MGD to 1.25 MGD maximum month capacity by 2034.

The summary of wastewater collection and treatment projects included in Alternative 3 are shown in Figure 6-8. Detailed project descriptions, projected project costs and estimated timelines for the design and construction of each proposed project follow Figure 6-8.

Table 6-9 illustrates the capacity required in future planning years and the anticipated projects to meet those needs. Table 6-10 includes further detail on the projects required in Regionalization Alternative 3 to reach the maximum month capacity from the existing infrastructure and proposed upgrade projects sorted by year the project is required to be completed.

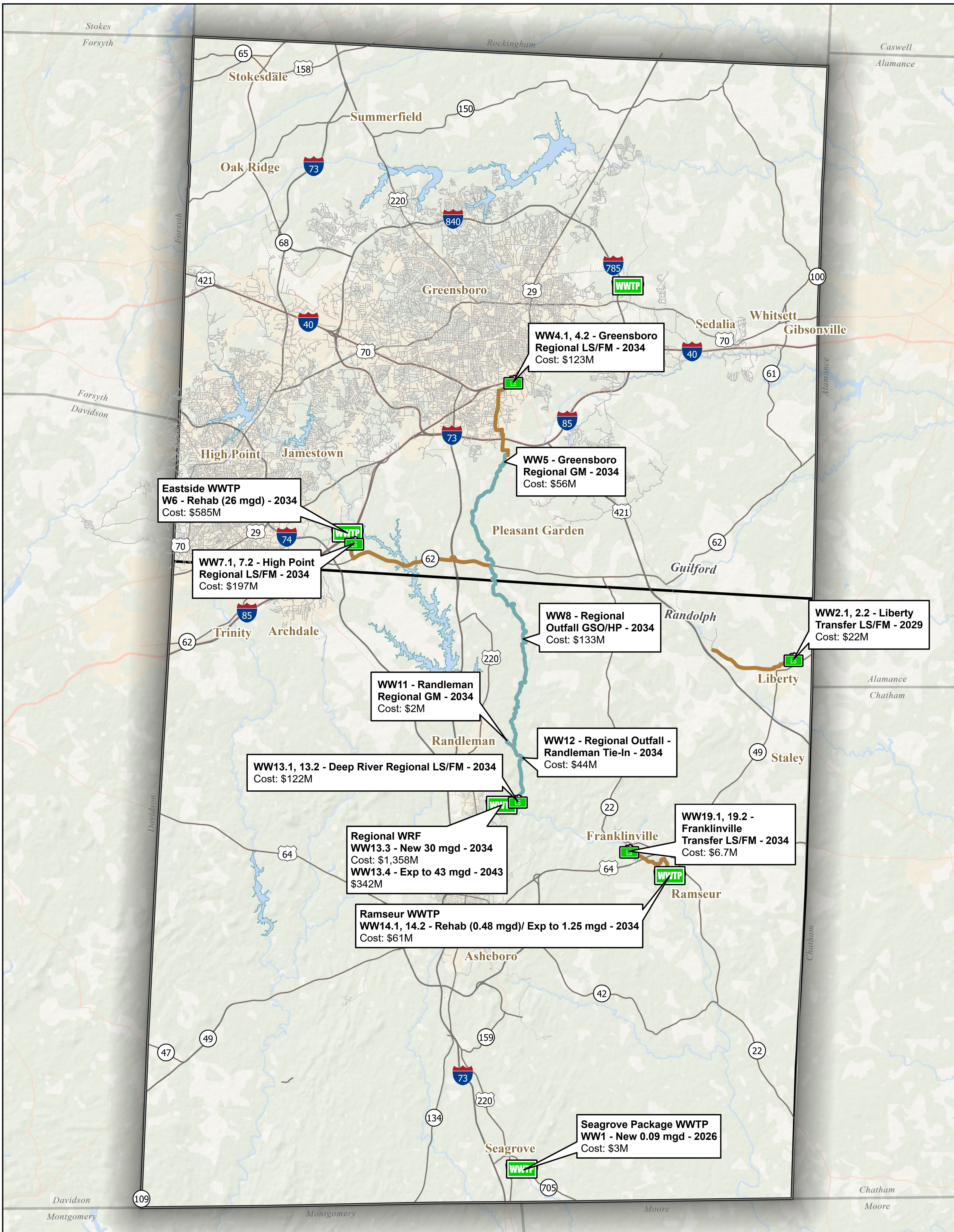
Table 6-9: Meeting Utility Wastewater Needs with Regionalization Alternative 3

Municipality	Current Capacity (MGD)	2022 MM (MGD)	2030 MM (MGD)	2040 MM (MGD)	2050 MM (MGD)	Projects or Plans to Meet Need
Archdale	2.50	1.20	1.68	2.13	2.89	• Invest in Project WW6 to upgrade Eastside WWTP and extend contract with the City of High Point
Asheboro	9.00	4.64	6.81	8.39	10.20	• Participate in Project WW13.3 by 2034 to construct the Regional WRF for 14MGD capacity. The existing Asheboro WWTP will be decommissioned in 2034.
Franklinville	0.1	0.05	0.08	0.09	0.09	• Complete projects WW19.1 and WW19.2 and participate in WW14.2 by 2034 to transfer flow to Ramseur WWTP. The existing Franklinville WWTP will be decommissioned in 2034.
Gibsonville	1.55	0.91	1.74	2.71	3.09	• Extend Agreement with the City of Burlington
Greensboro	56.78	37.51	45.58	52.12	59.70	• Complete Project WW4.1, WW4.2, WW5, WW8, WW12, WW13.1, WW13.2, and WW13.3 by 2034 for 7MGD capacity at the Regional WRF. • Complete Project WW13.4 by 2043 to expand the Regional WRF for an additional 6.5MGD capacity.
Guilford County	-	-	0.71	0.82	1.63	• Guilford County will contract with the closest utility to meet future needs.
High Point	26	19.81	23.92	27.65	32.32	• Complete Project WW6 by 2034 to upgrade Eastside WWTP • Complete Project WW7.1, WW7.2, WW8, WW12, WW13.1, WW13.2 and WW13.3 by 2034 for 7MGD capacity at the Regional WRF • Complete Project WW13.4 to expand the Regional WRF for an additional 6.5MGD capacity
Jamestown	2	1.82	2.10	2.52	2.95	• Invest in Project WW6 to upgrade Eastside WWTP and extend contract with the City of High Point
Liberty	0.55	0.51	0.62	0.91	1.35	• Complete project WW2.1 and WW2.2 by 2029 to discharge to the City of Greensboro.
Oak Ridge	-	-	0.05	0.09	0.11	• Oak Ridge will need to contract with WSFCU or the City of Greensboro
Pleasant Garden	-	-	0.03	0.06	0.14	• Pleasant Garden will contract with the City of Greensboro
Ramseur	0.48	0.28	0.45	0.95	0.98	• Complete projects WW14.1 and WW14.2 by 2034 to upgrade and expand Ramseur WWTP to 1.25 MGD
Randleman	1.87	0.77	0.93	1.31	1.70	• Complete Project WW11, WW12, WW13.1, WW13.2, WW13.3 by 2034 for 2.2 MGD at the Regional WRF. The existing Randleman WWTP will be decommissioned in 2034.
Randolph County	-	-	0.13	0.51	1.13	• Randolph County will contract with the nearest utility to meet future needs
Seagrove-Ulah MWD	0.03	0.03	0.11	0.12	0.13	• Complete project WW1 by 2026
Sedalia	-	-	0.02	0.05	0.08	• Sedalia will contract with the City of Greensboro for 0.2 MGD
Stokesdale	-	-	0.02	0.03	0.04	• Stokesdale will contract with WSFCU, Rockingham County or the City of Greensboro
Summerfield	-	-	0.28	0.43	0.64	• Summerfield will contract with the City of Greensboro
Trinity	1	0.27	1.14	1.17	1.19	• Trinity will contract with High Point's Westside WWTP

Table 6-10: Capital Projects Required for Regionalization Alternative 3

Utility Resp. for Upgrade	CY Project Comp. By	Project ID	Wastewater Capital Project Description	Est. Total Project Cost
Seagrove-Ulah MWD	2026	WW1	Seagrove 0.09 MGD Package WWTP	$3,000,000
Liberty	2029	WW2.1	Liberty Transfer Lift Station to Greensboro	$12,600,000
Liberty	2029	WW2.2	Liberty Sewer Force Main to Greensboro	$9,500,000
Greensboro	2034	WW4.1	Greensboro Regional Lift Station	$61,200,000
Greensboro	2034	WW4.2	Greensboro Regional Force Main	$62,100,000
Greensboro	2034	WW5	Greensboro Regional Gravity Main	$55,700,000
High Point	2034	WW6	High Point Eastside WWTP Upgrade of Existing 26 MGD	$585,000,000
High Point	2034	WW7.1	High Point Regional Lift Station	$57,300,000
High Point	2034	WW7.2	High Point Regional Force Main	$140,000,000
Greensboro/High Point	2034	WW8	Regional Gravity Outfall GSO/HP	$133,000,000
Randleman	2034	WW11	Randleman Regional Gravity Main	$2,000,000
Regional Authority	2034	WW12	Regional Gravity Outfall Randleman Tie-In	$44,200,000
Regional Authority	2034	WW13.1	Deep River Regional Lift Station (GSO, HP, Rand)	$106,200,000
Regional Authority	2034	WW13.2	Deep River Regional Force Main (GSO, HP, Rand)	$16,200,000
Regional Authority	2034	WW13.3	New Deep River WRF 30 MGD	$1,357,700,000
Ramseur	2034	WW14.1	Ramseur WWTP Upgrade of Existing 0.46 MGD	$19,300,000
Ramseur	2034	WW14.2	Ramseur WWTP Expansion to 1.25 MGD	$41,500,000
Franklinville	2034	WW19.1	Franklinville Transfer Lift Station to Ramseur	$2,700,000
Franklinville	2034	WW19.2	Franklinville Sewer Force Main to Ramseur	$4,000,000
Regional Authority	2043	WW13.4	Deep River WRF Expansion to 43 MGD	$342,100,000
			Total: Wastewater Alternative 3 Capital Project Costs	**$3,055,300,000**

The project sheets, Figure 6-8, consists of the detailed descriptions of the projects listed above for Regionalization Alternative 3 including project maps, the utilities involved with each upgrade and their percentage of financial responsibility.



Legend

- Guilford and Randolph County
- WWTP
- Proposed Lift Stations
- Proposed Sewer Force Main
- Proposed Sewer Gravity Main
- Major Waterbodies

N

0 5 10 Miles

Wastewater Treatment and Collection Alternative 3

Figure 6-8

December 2025

Piedmont Triad Regional Water Authority

PATH: O:\GIS\Projects\31645\31645-002\ArcGISPro\PTRWA_SB\PTRWA_SB.aprx; Layout: PTRWA Basemap Portrait; User: SBailey

WW1 - Seagrove Package WWTP

Project Location

Site Description: Proposed 0.09 mgd Package WWTP on existing property on NC-705 in Seagrove, operated by the Seagrove Ulah Metropolitan Water District.

Project Summary

Seagrove Ulah Metropolitan Water District operates an existing 0.03 mgd package WWTP. The facility has repeatedly reached its treatment capacity over the past few years, necessitating the need for an expansion. A new 0.09 mgd package WWTP is proposed to replace the existing facility and be able to meet the localized projected growth in Seagrove. A portion of Seagrove wastewater flow is directed to the Asheboro sewer system through the new Uwharrie Charter Lift Station, which provides additional wastewater capacity in the area.

Current Capacity (mgd)	**0.03**
New Capacity (mgd)	**0.09**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Seagrove**
Potential Funding Sources	**Randolph County State Budget Allocation**

WWTP

Construction Cost	**$2,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$300,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$500,000**
Total Cost	**$3,000,000**

Timeline

Beginning of Design	**2023**
Beginning of Construction	**2025**
End of Construction	**2026**

WW2 - Liberty Transfer Lift Station and Force Main

Project Location

Site Description: Proposed sewer lift station at existing Liberty WWTP on Highfill St in Liberty, connecting to proposed force main along Starmount Rd to southern end of the Toyota Facility.

Project Summary

The Town of Liberty has an existing 0.55 mgd non-discharge wastewater treatment and spray irrigation facility. The Town has struggled with high flows due to inflow and infiltration (I&I) to the collection system, and has reported multiple bypasses of nontreated wastewater from treatment units since 2018. To address these concerns and accomodate projected growth in the region, Liberty will decommission their WWTP/sprayfields and pump wastewater through a new transfer lift station to the Greensboro sewer system, through the existing transfer lift station at the Toyota site.

Pipe Diameter (in)	**12**
Pump Size (mgd)	**2.8**
Pipe Length (ft)	**25,000**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Liberty**
Potential Funding Sources	**Randolph County State Budget Allocation**

WW2.1 - Lift Station

Construction Cost	**$8,400,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$1,300,000**
Permitting/Admin. (10% of Const. Cost)	**$800,000**
Project Contingency (20% of All Costs)	**$2,100,000**
Total Cost	**$12,600,000**

WW2.2 - Force Main

Construction Cost	**$6,000,000**
Easements (7.5% of Const. Cost)	**$500,000**
Engineering (15% of Const. Cost)	**$900,000**
Permitting/Admin. (10% of Const. Cost)	**$600,000**
Project Contingency (20% of All Costs)	**$1,500,000**
Total Cost	**$9,500,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2027**
End of Construction	**2029**

WW4 - Greensboro Regional Lift Station and Force Main (Alt 3,4)

Project Location

Site Description: Proposed sewer lift station near Broome Rd in Greensboro, connecting the proposed sewer force main along S Elm Eugene St to proposed gravity main on Ritters Lake Rd.

Project Summary

The City of Greensboro will need new infrastructure to convey wastewater from Greensboro's existing sewer system south to a new Regional WRF. This will provide Greensboro with additional capacity to supplement the existing TZO WRF capacity (56 mgd MM). This project includes constructing a new sewer lift station and force main to convey wastewater from Greensboro's existing sewer system to the high elevation point in the proposed alignment at Ritters Lake Rd. The lift station and force main are sized to convey Greensboro's projected 2050 peak hour flow (36 mgd) that is proposed to be treated at the new Regional WRF in Asheboro.

Pipe Diameter (in)	**42**
Pump Size (mgd)	**36**
Pipe Length (ft)	**23,500**
Trenchless Crossings (ft)	**600**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

WW4.1 - Lift Station

Construction Cost	**$38,300,000**
Easements (7.5% of Const. Cost)	**$2,900,000**
Engineering (15% of Const. Cost)	**$5,800,000**
Permitting/Admin. (10% of Const. Cost)	**$4,000,000**
Project Contingency (20% of All Costs)	**$10,200,000**
Total Cost	**$61,200,000**

WW4.2 - Force Main

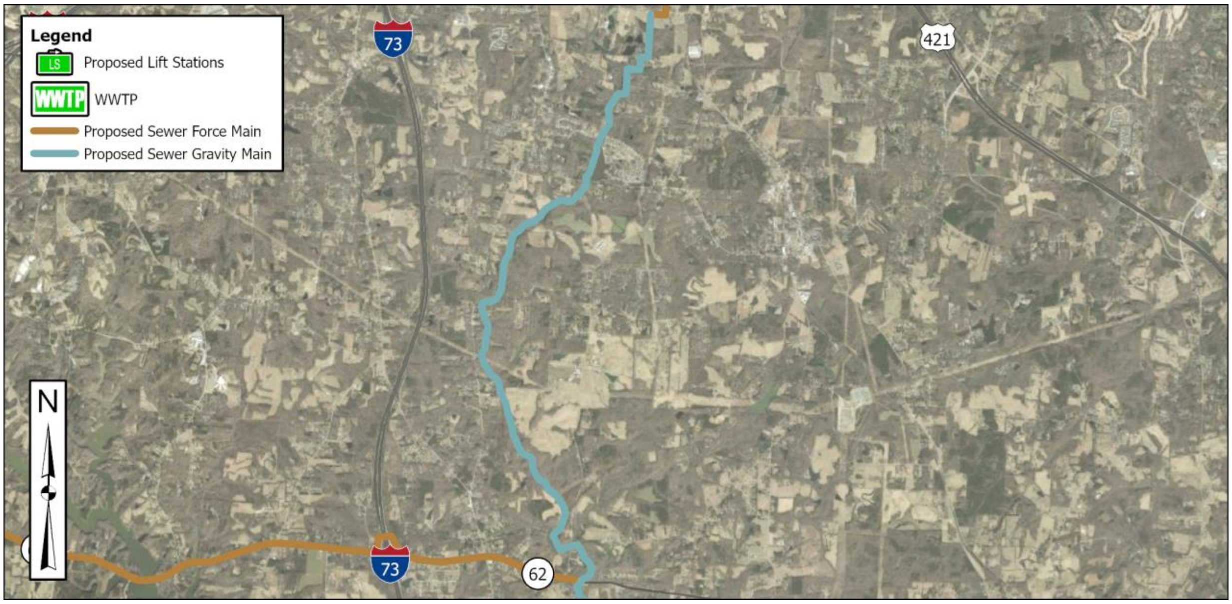
Construction Cost	**$38,800,000**
Easements (7.5% of Const. Cost)	**$3,000,000**
Engineering (15% of Const. Cost)	**$5,900,000**
Permitting/Admin. (10% of Const. Cost)	**$4,000,000**
Project Contingency (20% of All Costs)	**$10,400,000**
Total Cost	**$62,100,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW5 - Greensboro Regional Gravity Main (Alt 3,4)

Project Location



Site Description: Proposed sewer gravity main along Polecat Creek from proposed Greensboro force main tie-in at Ritters Lake Rd to proposed tie-in to the High Point force main at NC Hwy 62.

Project Summary

The City of Greensboro will need new infrastructure to convey wastewater from Greensboro's existing sewer system south to a new Regional WRF. This will provide Greensboro with additional capacity to supplement the existing TZO WRF capacity (56 mgd MM). This project includes constructing a new gravity sewer main that will connect to Greensboro's proposed sewer force main at Ritters Lake Rd and continue to convey wastewater to the tie-in point with High Point's new proposed sewer force main at NC Hwy 62. The gravity sewer main is sized to convey Greensboro's projected 2050 peak hour flow (36 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**60**
Capacity (mgd)	**36**
Pipe Length (ft)	**33,490**
Trenchless Crossings (ft)	**500**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

Gravity Line

Construction Cost	**$34,800,000**
Easements (7.5% of Const. Cost)	**$2,700,000**
Engineering (15% of Const. Cost)	**$5,300,000**
Permitting/Admin. (10% of Const. Cost)	**$3,600,000**
Project Contingency (20% of All Costs)	**$9,300,000**
Total Cost	**$55,700,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW6 - High Point Eastside WWTP Rehabilitation (Alt 1,3,4)

Project Location

Site Description: Existing Eastside WWTP on Riverdale Dr in Jamestown, operated by the City of High Point.

Project Summary

The existing High Point Eastside WWTP has a maximum month capacity of 26 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo an improvement project to meet anticipated lower total nitrogen (TN) and total phosphorus (TP) discharge limits. Eastside WWTP will need to reduce TN from 6 mg/L and TP from 0.4 mg/L to lower concentrations to share available nutrient allocation in the Deep River Basin with the new Regional WRF.

Current Capacity (mgd)	**26**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**High Point (82.7%), Archdale (9.6%), Jamestown (7.7%)**

WWTP Upgrade

Construction Cost	**$390,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$58,500,000**
Permitting/Admin. (10% of Const. Cost)	**$39,000,000**
Project Contingency (20% of All Costs)	**$97,500,000**
Total Cost	**$585,000,000**

Timeline

Beginning of Design	**2030**
Beginning of Construction	**2032**
End of Construction	**2034**

WW7 - High Point Regional Lift Station and Force Main (Alt 1,3,4)

Project Location

Site Description: Proposed sewer lift station at Eastside WWTP on Riverdale Dr in Jamestown, connecting the proposed sewer force main along NC Hwy 62 to proposed gravity main tie-on with the Greensboro gravity main along Polecat Creek.

Project Summary

The City of High Point will need new infrastructure to convey wastewater from High Point's existing sewer system south to a new Regional WRF. This will provide High Point with additional capacity to supplement the existing Eastside WWTP capacity (26 mgd MM). This project includes constructing a new sewer lift station and force main to convey wastewater from High Point's existing sewer system to the tie-in location with Greensboro's new proposed gravity main along Polecat Creek. The lift station and force main are sized to convey High Point's projected 2050 peak hour flow (36 mgd) that is proposed to be treated at the new Regional WRF under this alternative.

Pipe Diameter (in)	**42**
Pump Size (mgd)	**36**
Pipe Length (ft)	**42,400**
Trenchless Crossings (ft)	**4,450**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of High Point**
Potential Funding Sources	

WW7.1 - Lift Station

Construction Cost	**$36,000,000**
Easements (7.5% of Const. Cost)	**$2,700,000**
Engineering (15% of Const. Cost)	**$5,400,000**
Permitting/Admin. (10% of Const. Cost)	**$3,600,000**
Project Contingency (20% of All Costs)	**$9,600,000**
Total Cost	**$57,300,000**

WW7.2 - Force Main

Construction Cost	**$88,000,000**
Easements (7.5% of Const. Cost)	**$6,600,000**
Engineering (15% of Const. Cost)	**$13,200,000**
Permitting/Admin. (10% of Const. Cost)	**$8,800,000**
Project Contingency (20% of All Costs)	**$23,400,000**
Total Cost	**$140,000,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW8 - Regional Outfall for Greensboro and High Point (Alt 3,4)

Project Location

Site Description: Proposed sewer gravity main along Polecat Creek from proposed High Point force main tie-in at NC Hwy 62 to proposed Randleman gravity main tie-in along Deep River near Beck Country Dr.

Project Summary

Greensboro and High Point will need new infrastructure to convey wastewater from their existing sewer systems south to a new Regional WRF. This project includes constructing a new gravity sewer main that will connect at the proposed tie-in point of Greensboro's gravity main and High Point's force main at the intersection of NC Hwy 62 and Polecat Creek, and continue to convey wastewater to the tie-in point with Randleman's new proposed gravity main along Deep River. The gravity sewer main is sized to convey the sum of Greensboro's projected 2050 peak hour flow (36 mgd) and High Point's projected 2050 peak hour flow (36 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**78**
Capacity (mgd)	**72**
Pipe Length (ft)	**55,050**
Trenchless Crossings (ft)	**1,125**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (50%) and High Point (50%)**
Potential Funding Sources	

Gravity Line

Construction Cost	**$83,600,000**
Easements (7.5% of Const. Cost)	**$6,300,000**
Engineering (15% of Const. Cost)	**$12,600,000**
Permitting/Admin. (10% of Const. Cost)	**$8,400,000**
Project Contingency (20% of All Costs)	**$22,100,000**
Total Cost	**$133,000,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW11 - Randleman Regional Gravity Main

Project Location

Site Description: Proposed gravity sewer main along Deep River from existing Randleman WWTP on Applewood Rd in Randleman, to proposed tie-in location to the regional gravity outfall near the intersection of Polecat Creek and Deep River.

Project Summary

In this Alternative, existing 1.745 mgd Randleman WWTP would be decommissioned and all of the City of Randleman's wastewater would be conveyed to a new Regional WRF located in Asheboro. This project includes constructing a new gravity sewer main from the existing Randleman WWTP to the tie-in location of the proposed combined Greensboro/High Point gravity main at the intersection of Polecat Creek and Deep River. The gravity sewer main is sized to convey Randleman's projected 2050 peak hour flow (6.3 mgd).

Pipe Diameter (in)	**30**
Capacity (mgd)	**6.3**
Pipe Length (ft)	**2,280**
Trenchless Crossings (ft)	**0**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Randleman**
Potential Funding Sources	

Gravity Line

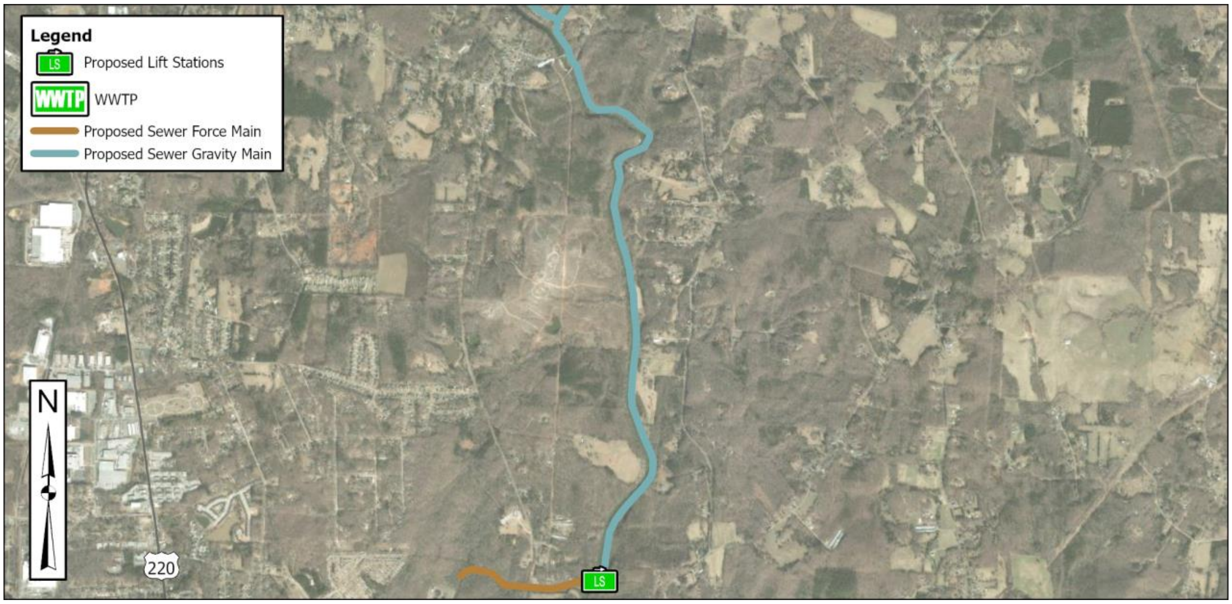
Construction Cost	**$1,100,000**
Easements (7.5% of Const. Cost)	**$100,000**
Engineering (15% of Const. Cost)	**$200,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$400,000**
Total Cost	**$2,000,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW12 - Regional Outfall from Randleman Tie-In to Regional WRF Influent Lift Station

Project Location



Site Description: Proposed sewer gravity main along Deep River from proposed gravity main tie-in at the intersection of Polecat Creek and Deep River to the proposed Regional WRF influent lift station.

Project Summary

Greensboro, High Point, and Randleman will need new infrastructure to convey wastewater from their existing sewer systems south to a new Regional WRF located in Asheboro. This project includes constructing a new gravity sewer main from the tie-in location of the Randleman gravity main with the combined Greensboro/High Point gravity main at the intersection of Polecat Creek and Deep River, to the proposed Regional WRF influent lift station. The gravity sewer main is sized to convey the sum of Greensboro's, High Point's, and Randleman's projected 2050 peak hour flows (36 mgd, 36 mgd, 6.3 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**84**
Capacity (mgd)	**78.3**
Pipe Length (ft)	**14,750**
Trenchless Crossings (ft)	**475**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (46%), High Point (46%), Randleman**
Potential Funding Sources	**(8%)**

Gravity Line

Construction Cost	**$27,700,000**
Easements (7.5% of Const. Cost)	**$2,100,000**
Engineering (15% of Const. Cost)	**$4,200,000**
Permitting/Admin. (10% of Const. Cost)	**$2,800,000**
Project Contingency (20% of All Costs)	**$7,400,000**
Total Cost	**$44,200,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW13 - Regional WRF Lift Station and Force Main Across Deep River

Project Location

Site Description: Proposed sewer lift station located on the east side of Deep River in Asheboro, connecting to proposed force main pumping across Deep River to new Regional WRF in Asheboro.

Project Summary

Greensboro, High Point, and Randleman will need new infrastructure to convey wastewater from their existing sewer systems south to a new Regional WRF located in Asheboro. This project includes constructing a new sewer lift station and force main to convey wastewater from the new regional outfall installed along the east side of Deep River to the new Regional WRF located at the existing Asheboro WWTP property. The lift station and force main is sized to convey the sum of Greensboro's, High Point's and Randleman's projected 2050 peak hour flows (36 mgd, 36 mgd, 6.3 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**60**
Pump Size (mgd)	**78.3**
Pipe Length (ft)	**3,580**
Trenchless Crossings (ft)	**350**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (46%), High Point (46%), and Randleman (8%)**

WW13.1 - Lift Station

Construction Cost	**$66,900,000**
Easements (7.5% of Const. Cost)	**$5,000,000**
Engineering (15% of Const. Cost)	**$10,000,000**
Permitting/Admin. (10% of Const. Cost)	**$6,600,000**
Project Contingency (20% of All Costs)	**$17,700,000**
Total Cost	**$106,200,000**

WW13.2 - Force Main

Construction Cost	**$10,200,000**
Easements (7.5% of Const. Cost)	**$800,000**
Engineering (15% of Const. Cost)	**$1,500,000**
Permitting/Admin. (10% of Const. Cost)	**$1,000,000**
Project Contingency (20% of All Costs)	**$2,700,000**
Total Cost	**$16,200,000**

Timeline

Beginning of Design	**2029**
Beginning of Construction	**2031**
End of Construction	**2034**

WW13 - New Regional WRF and Expansion (Alt 3)

Project Location

Site Description: New Regional WRF located on the property of the existing Asheboro WWTP on Bonkemeyer Dr in Asheboro.

Project Summary

A new state-of-the-art Regional WRF will be constructed to treat wastewater from Greensboro, High Point, Asheboro and Randleman. The initial maximum month capacity of the WRF will be 30 mgd and is projected to come online in 2034. A future expansion of the Regional WRF to 43 mgd is projected to take place in 2043 to meet the additional capacity needs of the participating members through 2050. The capacity of the new Regional WRF was calculated by setting the summarized maximum month capacity needs of the participating members in 2050 as 90% of the WRF rated maximum month capacity. In this Alternative, the existing Asheboro WWTP and Randleman WWTP would both be decommissioned.

Initial Capacity (mgd)	**30**
Expanded Capacity (mgd)	**43**

Project Funding and Timeline

Funding for New 30 mgd Facility		Funding for 43 mgd Expansion	
Asset Owner(s)	**Greensboro (23%), High Point (23%), Randleman (7%), and Asheboro (47%)**	Asset Owner(s)	**Greensboro (50%), High Point (50%)**

WW13.3 - New Regional WRF		**WW13.4 - Expansion of Regional WRF**	
Construction Cost	**$905,100,000**	Construction Cost	**$228,100,000**
Easements (7.5% of Const. Cost)	**-**	Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$135,800,000**	Engineering (15% of Const. Cost)	**$34,200,000**
Permitting/Admin. (10% of Const. Cost)	**$90,600,000**	Permitting/Admin. (10% of Const. Cost)	**$22,800,000**
Project Contingency (20% of All Costs)	**$226,200,000**	Project Contingency (20% of All Costs)	**$57,000,000**
Total Cost	**$1,357,700,000**	**Total Cost**	**$342,100,000**

Timeline for New 30 mgd Facility		Timeline for 43 mgd Expansion	
Beginning of Design	**2029**	Beginning of Design	**2038**
Beginning of Construction	**2031**	Beginning of Construction	**2040**
End of Construction	**2034**	End of Construction	**2043**

WW14 - Ramseur WWTP Rehabilitation and Expansion to 1.25 mgd (Alt 3)

Project Location

Site Description: Existing Ramseur WWTP on Roundleaf Rd in Ramseur, operated by the Town of Ramseur.

Project Summary

The existing Ramseur WWTP has a maximum month capacity of 0.48 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo a large improvement project at their WWTP to meet anticipated total nitrogen and total phosphorus discharge limits. Under this alternative, wastewater from Franklinville will be conveyed to and treated at the Ramsuer WWTP. The Ramseur WWTP will need to be expanded to 1.25 mgd by 2034 to treat the projected 2050 wastewater flows for Franklinville and Ramseur.

Current Capacity (mgd)	**0.48**
Expanded Capacity (mgd)	**1.25**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Ramseur**
Potential Funding Sources	

WW14.1 - Rehabilitation and Upgrades

Construction Cost	**$12,900,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$1,900,000**
Permitting/Admin. (10% of Const. Cost)	**$1,200,000**
Project Contingency (20% of All Costs)	**$3,300,000**
Total Cost	**$19,300,000**

WW14.2 - Expansion of Facility

Construction Cost	**$27,700,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$4,200,000**
Permitting/Admin. (10% of Const. Cost)	**$2,800,000**
Project Contingency (20% of All Costs)	**$6,800,000**
Total Cost	**$41,500,000**

Timeline

Beginning of Design	**2030**
Beginning of Construction	**2032**
End of Construction	**2034**

WW19 - Franklinville Lift Station and Force Main to Ramseur WWTP (Alt 3)

Project Location

Site Description: Proposed lift station at the existing Franklinville WWTP on Rising Sun Way in Franklinville, connecting the proposed force main along Deep River to the Ramseur WWTP on Roundleaf Rd in Ramseur.

Project Summary

In this Alternative, existing 0.1 mgd Franklinville WWTP would be decommissioned and all of the Town of Franklinville's wastewater would be conveyed to the existing Ramseur WWTP. This project includes constructing new sewer lift station and force main to convey wastewater from Franklinville's existing sewer system to Ramseur WWTP. The lift station and force main are sized to convey Franklinville's projected 2050 peak hour flow (0.6 mgd).

Pipe Diameter (in)	**8**
Pump Size (mgd)	**0.6**
Pipe Length (ft)	**15,900**
Trenchless Crossings (ft)	**425**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Franklinville**
Potential Funding Sources	**Randolph County State Budget Allocation**

WW19.1 - Lift Station

Construction Cost	**$1,700,000**
Easements (7.5% of Const. Cost)	**$100,000**
Engineering (15% of Const. Cost)	**$300,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$400,000**
Total Cost	**$2,700,000**

WW19.2 - Force Main

Construction Cost	**$2,700,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$400,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$700,000**
Total Cost	**$4,000,000**

Timeline

Beginning of Design	**2031**
Beginning of Construction	**2033**
End of Construction	**2034**

6.2.3.4 Alternative 4

Alternative 4 serves as the alternative with greatest amount of regional cooperation and includes the construction of a new Regional WRF located near Asheboro, with Greensboro, High Point, Asheboro, Ramseur, Franklinville and Randleman participating. The wastewater treatment facilities in Asheboro, Ramseur, Franklinville and Randleman would be decommissioned and replaced by their expanded allocated share in the new state-of-the-art regional facility prepared to treat to the limits of technology for nutrients and contaminants of emerging concern. This removes the four largest ageing facilities in Randolph County and consolidates its service.

The new Regional WRF in Alternative 4 is projected to be needed in 2034 and has an initial maximum month capacity of 31 MGD. This will provide the additional capacity needed by Greensboro, High Point, Asheboro, Ramseur, Franklinville, Randleman, Liberty, Jamestown, and Archdale to get through the first 18 years of the 25-year planning period. The Regional WRF is projected to expand to a 44 MGD facility by 2043 to meet the additional capacity needs of the participating members through 2050. The capacity of the new Regional WRF in Alternative 4 was calculated by setting the summarized maximum month capacity needs of the participating members in 2050 as 90% of the WRF rated maximum month capacity.

<u>New Regional WRF Initial Capacity of 31 MGD (2034)</u>

- Greensboro (Liberty): 6.8 MGD
- High Point (Jamestown, Archdale): 6.8 MGD
- Randleman: 2.2 MGD
- Asheboro: 14 MGD
- Ramseur: 1.0 MGD
- Franklinville: 0.25 MGD

<u>New Regional WRF Expanded Capacity of 44 MGD (2043)</u>

- Greensboro (Liberty): 13.4 MGD
- High Point (Jamestown, Archdale): 13.4 MGD
- Randleman: 2.2 MGD
- Asheboro: 14 MGD
- Ramseur: 1.0 MGD
- Franklinville: 0.25 MGD

The summary of wastewater collection and treatment projects included in Alternative 4 are shown in Figure 6-9. Detailed project descriptions, projected project costs and estimated timelines for the design and construction of each proposed project follow Figure 6-9.

Table 6-11 illustrates the capacity required in future planning years and the anticipated projects to meet those needs. Table 6-12 includes further detail on the projects required in Regionalization Alternative 1 to reach the maximum month capacity from the existing infrastructure and proposed upgrade projects sorted by year the project is required to be completed.

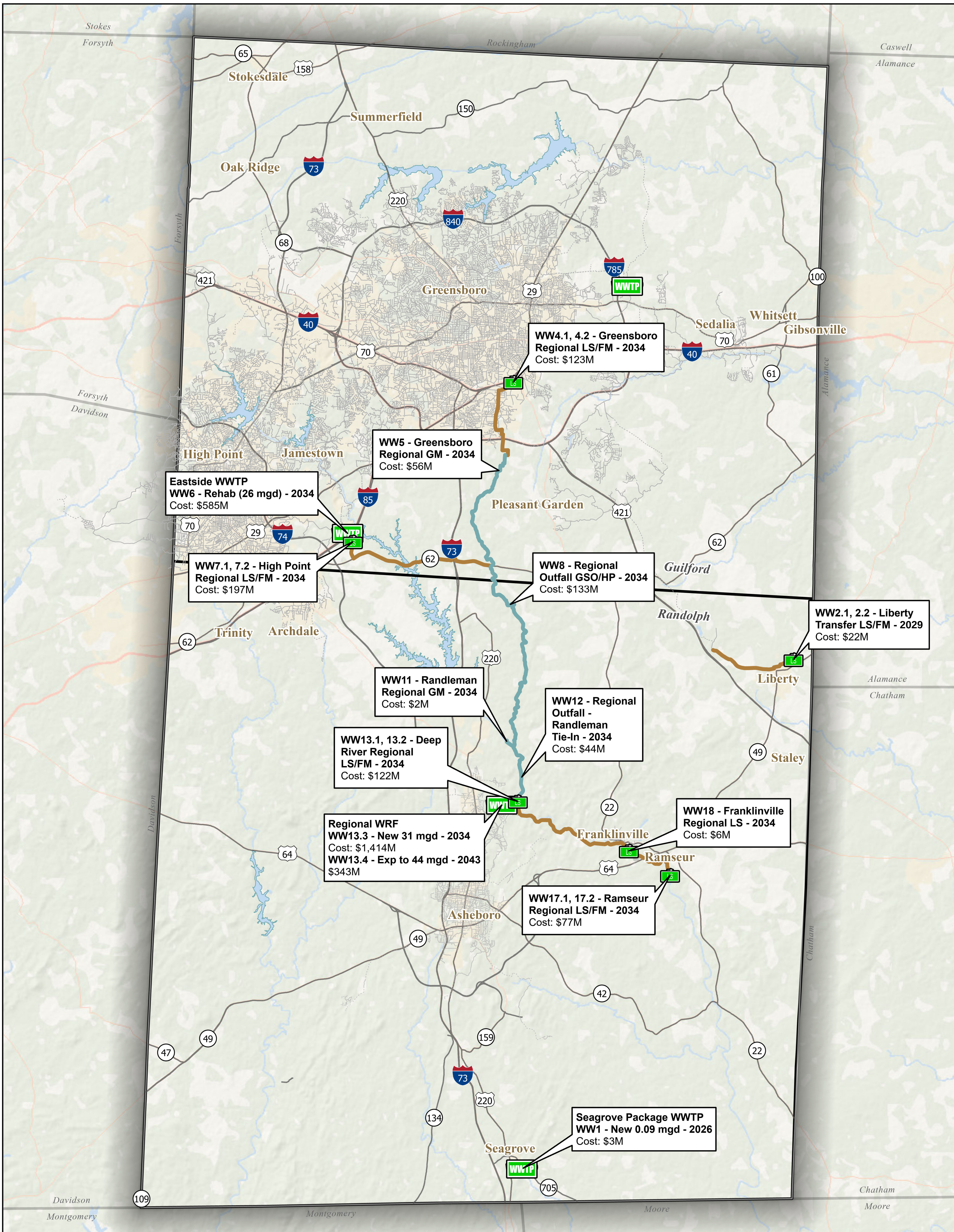
Table 6-11: Meeting Utility Wastewater Needs with Regionalization Alternative 4

Municipality	Current Capacity (MGD)	2022 MM (MGD)	2030 MM (MGD)	2040 MM (MGD)	2050 MM (MGD)	Projects or Plans to Meet Need
Archdale	2.50	1.20	1.68	2.13	2.89	• Invest in Project WW6 to upgrade Eastside WWTP and extend contract with the City of High Point
Asheboro	9.00	4.64	6.81	8.39	10.20	• Participate in Project WW13.3 by 2034 to construct the Regional WRF for 14MGD capacity. The existing Asheboro WWTP will be decommissioned in 2034.
Franklinville	0.1	0.05	0.08	0.09	0.09	• Complete project WW18.1 and WW13.3 by 2034 for 0.25 MGD at the Regional WRF. The existing Franklinville WWTP will be decommissioned in 2034.
Gibsonville	1.55	0.91	1.74	2.71	3.09	• Extend Agreement with the City of Burlington
Greensboro	56.78	37.51	45.58	52.12	59.70	• Complete Project WW4.1, WW4.2, WW5, WW8, WW12, WW13.1, WW13.2, and WW13.3 by 2034 for 7MGD capacity at the Regional WRF. • Complete Project WW13.4 by 2043 to expand the Regional WRF for an additional 6.5MGD capacity.
Guilford County	-	-	0.71	0.82	1.63	• Guilford County will contract with the closest utility to meet future needs.
High Point	26	19.81	23.92	27.65	32.32	• Complete Project WW6 by 2034 to upgrade Eastside WWTP • Complete Project WW7.1, WW7.2, WW8, WW12, WW13.1, WW13.2 and WW13.3 by 2034 for 7MGD capacity at the Regional WRF • Complete Project WW13.4 to expand the Regional WRF for an additional 6.5MGD capacity
Jamestown	2	1.82	2.10	2.52	2.95	• Invest in Project WW6 to upgrade Eastside WWTP and extend contract with the City of High Point
Liberty	0.55	0.51	0.62	0.91	1.35	• Complete project WW2.1 and WW2.2 by 2029 to discharge to the City of Greensboro.
Oak Ridge	-	-	0.05	0.09	0.11	• Oak Ridge will need to contract with WSFCU or the City of Greensboro
Pleasant Garden	-	-	0.03	0.06	0.14	• Pleasant Garden will contract with the City of Greensboro
Ramseur	0.48	0.28	0.45	0.95	0.98	• Complete projects WW17.1, WW17.2, and WW13.3 by 2034 to convey flow to the Regional WRF for 1 MGD of capacity. The existing Ramseur WWTP will be decommissioned in 2034.
Randleman	1.87	0.77	0.93	1.31	1.70	• Complete Project WW11, WW12, WW13.1, WW13.2, WW13.3 by 2034 for 2.2 MGD at the Regional WRF. The existing Randleman WWTP will be decommissioned in 2034.
Randolph County	-	-	0.13	0.51	1.13	• Randolph County will contract with the nearest utility to meet future needs
Seagrove-Ulah MWD	0.03	0.03	0.11	0.12	0.13	• Complete project WW1 by 2026
Sedalia	-	-	0.02	0.05	0.08	• Sedalia will contract with the City of Greensboro for 0.2 MGD
Stokesdale	-	-	0.02	0.03	0.04	• Stokesdale will contract with WSFCU, Rockingham County or the City of Greensboro
Summerfield	-	-	0.28	0.43	0.64	• Summerfield will contract with the City of Greensboro
Trinity	1	0.27	1.14	1.17	1.19	• Trinity will contract with High Point's Westside WWTP

Table 6-12: Capital Projects Required for Regionalization Alternative 4

Utility Resp. for Upgrade	CY Project Comp. By	Project ID	Wastewater Capital Project Description	Est. Total Project Cost
Seagrove-Ulah MWD	2026	WW1	Seagrove 0.09 MGD Package WWTP	$3,000,000
Liberty	2029	WW2.1	Liberty Transfer Lift Station to Greensboro	$12,600,000
Liberty	2029	WW2.2	Liberty Sewer Force Main to Greensboro	$9,500,000
Greensboro	2034	WW4.1	Greensboro Regional Lift Station	$61,200,000
Greensboro	2034	WW4.2	Greensboro Regional Force Main	$62,100,000
Greensboro	2034	WW5	Greensboro Regional Gravity Main	$55,700,000
High Point	2034	WW6	High Point Eastside WWTP Upgrade of Existing 26 MGD	$585,000,000
High Point	2034	WW7.1	High Point Regional Lift Station	$57,300,000
High Point	2034	WW7.2	High Point Regional Force Main	$140,000,000
Greensboro/High Point	2034	WW8	Regional Gravity Outfall GSO/HP	$133,000,000
Randleman	2034	WW11	Randleman Regional Gravity Main	$2,000,000
Regional Authority	2034	WW12	Regional Gravity Outfall Randleman Tie-In	$44,200,000
Regional Authority	2034	WW13.1	Deep River Regional Lift Station (GSO, HP, Rand)	$106,200,000
Regional Authority	2034	WW13.2	Deep River Regional Force Main (GSO, HP, Rand)	$16,200,000
Regional Authority	2034	WW13.3	New Deep River WRF 31 MGD	$1,413,900,000
Ramseur	2034	WW17.1	Ramseur Regional Lift Station	$17,000,000
Ramseur	2034	WW17.2	Ramseur Regional Force Main	$60,300,000
Franklinville	2034	WW18.1	Franklinville Regional Lift Station/Force Main	$5,700,000
Regional Authority	2043	WW13.4	Deep River WRF Expansion to 44 MGD	$342,600,000
			Total: Wastewater Alternative 4 Capital Project Costs	**$3,127,500,000**

The project sheets, Figure 6-9, consists of the detailed descriptions of the projects listed above for Regionalization Alternative 4 including project maps, the utilities involved with each upgrade and their percentage of financial responsibility.



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Legend

- Guilford and Randolph County
- WWTP
- Proposed Lift Station
- Proposed Sewer Force Main
- Proposed Sewer Gravity Main
- Major Waterbodies

Wastewater Treatment and Collection Alternative 4

0 5 10 Miles

Figure 6-9

December 2025

Piedmont Triad Regional Water Authority

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WW1 - Seagrove Package WWTP

Project Location

Site Description: Proposed 0.09 mgd Package WWTP on existing property on NC-705 in Seagrove, operated by the Seagrove Ulah Metropolitan Water District.

Project Summary

Seagrove Ulah Metropolitan Water District operates an existing 0.03 mgd package WWTP. The facility has repeatedly reached its treatment capacity over the past few years, necessitating the need for an expansion. A new 0.09 mgd package WWTP is proposed to replace the existing facility and be able to meet the localized projected growth in Seagrove. A portion of Seagrove wastewater flow is directed to the Asheboro sewer system through the new Uwharrie Charter Lift Station, which provides additional wastewater capacity in the area.

Current Capacity (mgd)	**0.03**
New Capacity (mgd)	**0.09**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Seagrove**
Potential Funding Sources	**Randolph County State Budget Allocation**

WWTP

Construction Cost	**$2,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$300,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$500,000**
Total Cost	**$3,000,000**

Timeline

Beginning of Design	**2023**
Beginning of Construction	**2025**
End of Construction	**2026**

WW2 - Liberty Transfer Lift Station and Force Main

Project Location

Site Description: Proposed sewer lift station at existing Liberty WWTP on Highfill St in Liberty, connecting to proposed force main along Starmount Rd to southern end of the Toyota Facility.

Project Summary

The Town of Liberty has an existing 0.55 mgd non-discharge wastewater treatment and spray irrigation facility. The Town has struggled with high flows due to inflow and infiltration (I&I) to the collection system, and has reported multiple bypasses of nontreated wastewater from treatment units since 2018. To address these concerns and accomodate projected growth in the region, Liberty will decommission their WWTP/sprayfields and pump wastewater through a new transfer lift station to the Greensboro sewer system, through the existing transfer lift station at the Toyota site.

Pipe Diameter (in)	**12**
Pump Size (mgd)	**2.8**
Pipe Length (ft)	**25,000**
Trenchless Crossings (ft)	**Not Evaluated**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Liberty**
Potential Funding Sources	**Randolph County State Budget Allocation**

WW2.1 - Lift Station

Construction Cost	**$8,400,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$1,300,000**
Permitting/Admin. (10% of Const. Cost)	**$800,000**
Project Contingency (20% of All Costs)	**$2,100,000**
Total Cost	**$12,600,000**

WW2.2 - Force Main

Construction Cost	**$6,000,000**
Easements (7.5% of Const. Cost)	**$500,000**
Engineering (15% of Const. Cost)	**$900,000**
Permitting/Admin. (10% of Const. Cost)	**$600,000**
Project Contingency (20% of All Costs)	**$1,500,000**
Total Cost	**$9,500,000**

Timeline

Beginning of Design	**2026**
Beginning of Construction	**2027**
End of Construction	**2029**

WW4 - Greensboro Regional Lift Station and Force Main (Alt 3,4)

Project Location

Site Description: Proposed sewer lift station near Broome Rd in Greensboro, connecting the proposed sewer force main along S Elm Eugene St to proposed gravity main on Ritters Lake Rd.

Project Summary

The City of Greensboro will need new infrastructure to convey wastewater from Greensboro's existing sewer system south to a new Regional WRF. This will provide Greensboro with additional capacity to supplement the existing TZO WRF capacity (56 mgd MM). This project includes constructing a new sewer lift station and force main to convey wastewater from Greensboro's existing sewer system to the high elevation point in the proposed alignment at Ritters Lake Rd. The lift station and force main are sized to convey Greensboro's projected 2050 peak hour flow (36 mgd) that is proposed to be treated at the new Regional WRF in Asheboro.

Pipe Diameter (in)	**42**
Pump Size (mgd)	**36**
Pipe Length (ft)	**23,500**
Trenchless Crossings (ft)	**600**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

WW4.1 - Lift Station

Construction Cost	**$38,300,000**
Easements (7.5% of Const. Cost)	**$2,900,000**
Engineering (15% of Const. Cost)	**$5,800,000**
Permitting/Admin. (10% of Const. Cost)	**$4,000,000**
Project Contingency (20% of All Costs)	**$10,200,000**
Total Cost	**$61,200,000**

WW4.2 - Force Main

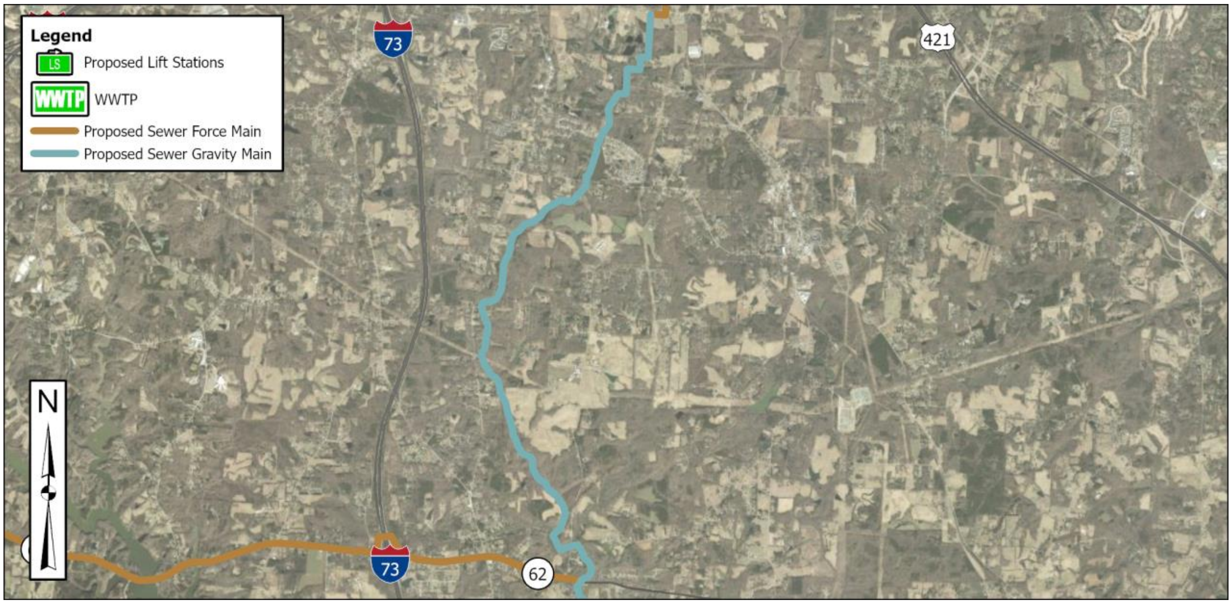
Construction Cost	**$38,800,000**
Easements (7.5% of Const. Cost)	**$3,000,000**
Engineering (15% of Const. Cost)	**$5,900,000**
Permitting/Admin. (10% of Const. Cost)	**$4,000,000**
Project Contingency (20% of All Costs)	**$10,400,000**
Total Cost	**$62,100,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW5 - Greensboro Regional Gravity Main (Alt 3,4)

Project Location



Site Description: Proposed sewer gravity main along Polecat Creek from proposed Greensboro force main tie-in at Ritters Lake Rd to proposed tie-in to the High Point force main at NC Hwy 62.

Project Summary

The City of Greensboro will need new infrastructure to convey wastewater from Greensboro's existing sewer system south to a new Regional WRF. This will provide Greensboro with additional capacity to supplement the existing TZO WRF capacity (56 mgd MM). This project includes constructing a new gravity sewer main that will connect to Greensboro's proposed sewer force main at Ritters Lake Rd and continue to convey wastewater to the tie-in point with High Point's new proposed sewer force main at NC Hwy 62. The gravity sewer main is sized to convey Greensboro's projected 2050 peak hour flow (36 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**60**
Capacity (mgd)	**36**
Pipe Length (ft)	**33,490**
Trenchless Crossings (ft)	**500**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Greensboro**
Potential Funding Sources	

Gravity Line

Construction Cost	**$34,800,000**
Easements (7.5% of Const. Cost)	**$2,700,000**
Engineering (15% of Const. Cost)	**$5,300,000**
Permitting/Admin. (10% of Const. Cost)	**$3,600,000**
Project Contingency (20% of All Costs)	**$9,300,000**
Total Cost	**$55,700,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW6 - High Point Eastside WWTP Rehabilitation (Alt 1,3,4)

Project Location

Site Description: Existing Eastside WWTP on Riverdale Dr in Jamestown, operated by the City of High Point.

Project Summary

The existing High Point Eastside WWTP has a maximum month capacity of 26 mgd and needs to address ageing infrastructure through a rehabilitation project. In addition to addressing ageing infrastructure, the facility will need to undergo an improvement project to meet anticipated lower total nitrogen (TN) and total phosphorus (TP) discharge limits. Eastside WWTP will need to reduce TN from 6 mg/L and TP from 0.4 mg/L to lower concentrations to share available nutrient allocation in the Deep River Basin with the new Regional WRF.

Current Capacity (mgd)	**26**
Expanded Capacity (mgd)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**High Point (82.7%), Archdale (9.6%), Jamestown (7.7%)**

WWTP Upgrade

Construction Cost	**$390,000,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$58,500,000**
Permitting/Admin. (10% of Const. Cost)	**$39,000,000**
Project Contingency (20% of All Costs)	**$97,500,000**
Total Cost	**$585,000,000**

Timeline

Beginning of Design	**2030**
Beginning of Construction	**2032**
End of Construction	**2034**

WW7 - High Point Regional Lift Station and Force Main (Alt 1,3,4)

Project Location

Site Description: Proposed sewer lift station at Eastside WWTP on Riverdale Dr in Jamestown, connecting the proposed sewer force main along NC Hwy 62 to proposed gravity main tie-on with the Greensboro gravity main along Polecat Creek.

Project Summary

The City of High Point will need new infrastructure to convey wastewater from High Point's existing sewer system south to a new Regional WRF. This will provide High Point with additional capacity to supplement the existing Eastside WWTP capacity (26 mgd MM). This project includes constructing a new sewer lift station and force main to convey wastewater from High Point's existing sewer system to the tie-in location with Greensboro's new proposed gravity main along Polecat Creek. The lift station and force main are sized to convey High Point's projected 2050 peak hour flow (36 mgd) that is proposed to be treated at the new Regional WRF under this alternative.

Pipe Diameter (in)	**42**
Pump Size (mgd)	**36**
Pipe Length (ft)	**42,400**
Trenchless Crossings (ft)	**4,450**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of High Point**
Potential Funding Sources	

WW7.1 - Lift Station		**WW7.2 - Force Main**	
Construction Cost	**$36,000,000**	Construction Cost	**$88,000,000**
Easements (7.5% of Const. Cost)	**$2,700,000**	Easements (7.5% of Const. Cost)	**$6,600,000**
Engineering (15% of Const. Cost)	**$5,400,000**	Engineering (15% of Const. Cost)	**$13,200,000**
Permitting/Admin. (10% of Const. Cost)	**$3,600,000**	Permitting/Admin. (10% of Const. Cost)	**$8,800,000**
Project Contingency (20% of All Costs)	**$9,600,000**	Project Contingency (20% of All Costs)	**$23,400,000**
Total Cost	**$57,300,000**	**Total Cost**	**$140,000,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW8 - Regional Outfall for Greensboro and High Point (Alt 3,4)

Project Location

Site Description: Proposed sewer gravity main along Polecat Creek from proposed High Point force main tie-in at NC Hwy 62 to proposed Randleman gravity main tie-in along Deep River near Beck Country Dr.

Project Summary

Greensboro and High Point will need new infrastructure to convey wastewater from their existing sewer systems south to a new Regional WRF. This project includes constructing a new gravity sewer main that will connect at the proposed tie-in point of Greensboro's gravity main and High Point's force main at the intersection of NC Hwy 62 and Polecat Creek, and continue to convey wastewater to the tie-in point with Randleman's new proposed gravity main along Deep River. The gravity sewer main is sized to convey the sum of Greensboro's projected 2050 peak hour flow (36 mgd) and High Point's projected 2050 peak hour flow (36 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**78**
Capacity (mgd)	**72**
Pipe Length (ft)	**55,050**
Trenchless Crossings (ft)	**1,125**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (50%) and High Point (50%)**
Potential Funding Sources	

Gravity Line

Construction Cost	**$83,600,000**
Easements (7.5% of Const. Cost)	**$6,300,000**
Engineering (15% of Const. Cost)	**$12,600,000**
Permitting/Admin. (10% of Const. Cost)	**$8,400,000**
Project Contingency (20% of All Costs)	**$22,100,000**
Total Cost	**$133,000,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW11 - Randleman Regional Gravity Main

Project Location

Site Description: Proposed gravity sewer main along Deep River from existing Randleman WWTP on Applewood Rd in Randleman, to proposed tie-in location to the regional gravity outfall near the intersection of Polecat Creek and Deep River.

Project Summary

In this Alternative, existing 1.745 mgd Randleman WWTP would be decommissioned and all of the City of Randleman's wastewater would be conveyed to a new Regional WRF located in Asheboro. This project includes constructing a new gravity sewer main from the existing Randleman WWTP to the tie-in location of the proposed combined Greensboro/High Point gravity main at the intersection of Polecat Creek and Deep River. The gravity sewer main is sized to convey Randleman's projected 2050 peak hour flow (6.3 mgd).

Pipe Diameter (in)	**30**
Capacity (mgd)	**6.3**
Pipe Length (ft)	**2,280**
Trenchless Crossings (ft)	**0**

Project Funding and Timeline

Funding

Asset Owner(s)	**City of Randleman**
Potential Funding Sources	

Gravity Line

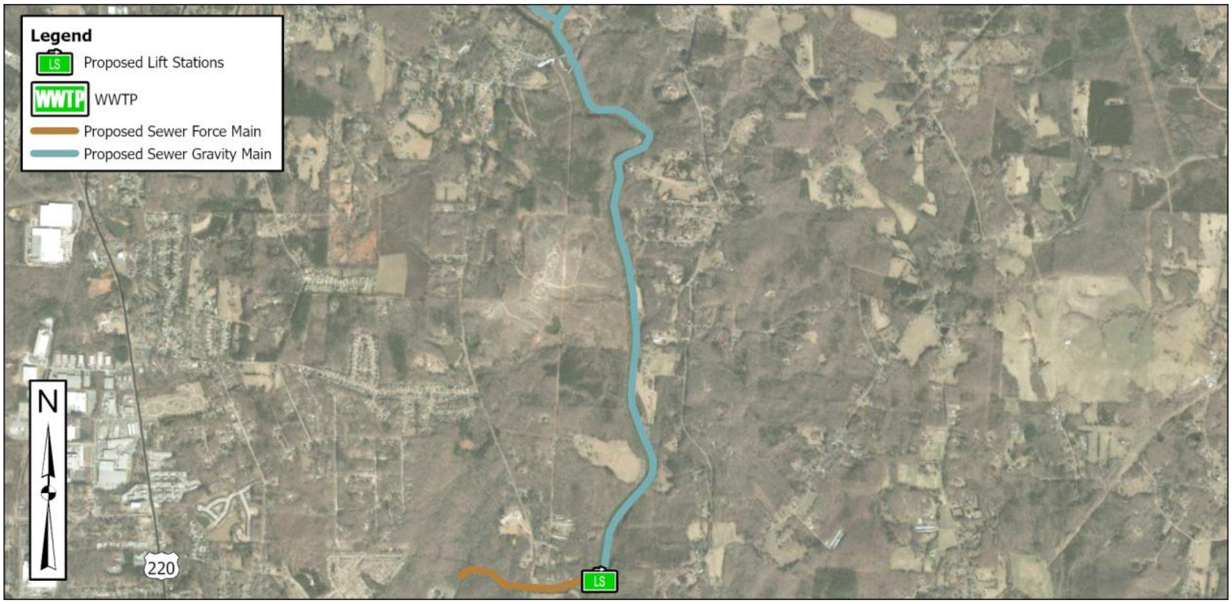
Construction Cost	**$1,100,000**
Easements (7.5% of Const. Cost)	**$100,000**
Engineering (15% of Const. Cost)	**$200,000**
Permitting/Admin. (10% of Const. Cost)	**$200,000**
Project Contingency (20% of All Costs)	**$400,000**
Total Cost	**$2,000,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW12 - Regional Outfall from Randleman Tie-In to Regional WRF Influent Lift Station

Project Location



Site Description: Proposed sewer gravity main along Deep River from proposed gravity main tie-in at the intersection of Polecat Creek and Deep River to the proposed Regional WRF influent lift station.

Project Summary

Greensboro, High Point, and Randleman will need new infrastructure to convey wastewater from their existing sewer systems south to a new Regional WRF located in Asheboro. This project includes constructing a new gravity sewer main from the tie-in location of the Randleman gravity main with the combined Greensboro/High Point gravity main at the intersection of Polecat Creek and Deep River, to the proposed Regional WRF influent lift station. The gravity sewer main is sized to convey the sum of Greensboro's, High Point's, and Randleman's projected 2050 peak hour flows (36 mgd, 36 mgd, 6.3 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**84**
Capacity (mgd)	**78.3**
Pipe Length (ft)	**14,750**
Trenchless Crossings (ft)	**475**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (46%), High Point (46%), Randleman (8%)**
Potential Funding Sources	

Gravity Line

Construction Cost	**$27,700,000**
Easements (7.5% of Const. Cost)	**$2,100,000**
Engineering (15% of Const. Cost)	**$4,200,000**
Permitting/Admin. (10% of Const. Cost)	**$2,800,000**
Project Contingency (20% of All Costs)	**$7,400,000**
Total Cost	**$44,200,000**

Timeline

Beginning of Design	**2028**
Beginning of Construction	**2030**
End of Construction	**2034**

WW13 - Regional WRF Lift Station and Force Main Across Deep River

Project Location

Site Description: Proposed sewer lift station located on the east side of Deep River in Asheboro, connecting to proposed force main pumping across Deep River to new Regional WRF in Asheboro.

Project Summary

Greensboro, High Point, and Randleman will need new infrastructure to convey wastewater from their existing sewer systems south to a new Regional WRF located in Asheboro. This project includes constructing a new sewer lift station and force main to convey wastewater from the new regional outfall installed along the east side of Deep River to the new Regional WRF located at the existing Asheboro WWTP property. The lift station and force main is sized to convey the sum of Greensboro's, High Point's and Randleman's projected 2050 peak hour flows (36 mgd, 36 mgd, 6.3 mgd) that is proposed to be treated at the new Regional WRF.

Pipe Diameter (in)	**60**
Pump Size (mgd)	**78.3**
Pipe Length (ft)	**3,580**
Trenchless Crossings (ft)	**350**

Project Funding and Timeline

Funding

Asset Owner(s)	**Greensboro (46%), High Point (46%), and Randleman (8%)**

WW13.1 - Lift Station

Construction Cost	**$66,900,000**
Easements (7.5% of Const. Cost)	**$5,000,000**
Engineering (15% of Const. Cost)	**$10,000,000**
Permitting/Admin. (10% of Const. Cost)	**$6,600,000**
Project Contingency (20% of All Costs)	**$17,700,000**
Total Cost	**$106,200,000**

WW13.2 - Force Main

Construction Cost	**$10,200,000**
Easements (7.5% of Const. Cost)	**$800,000**
Engineering (15% of Const. Cost)	**$1,500,000**
Permitting/Admin. (10% of Const. Cost)	**$1,000,000**
Project Contingency (20% of All Costs)	**$2,700,000**
Total Cost	**$16,200,000**

Timeline

Beginning of Design	**2029**
Beginning of Construction	**2031**
End of Construction	**2034**

WW13 - New Regional WRF and Expansion (Alt 4)

Project Location

Site Description: New Regional WRF located on the property of the existing Asheboro WWTP on Bonkemeyer Dr in Asheboro.

Project Summary

A new state-of-the-art Regional WRF will be constructed to treat wastewater from Greensboro, High Point, Asheboro, Randleman, Ramseur, and Franklinville. The initial maximum month capacity of the WRF will be 31 mgd and is projected to come online in 2034. A future expansion of the Regional WRF to 44 mgd is projected to take place in 2043 to meet the additional capacity needs of the participating members through 2050. The capacity of the new Regional WRF was calculated by setting the summarized maximum month capacity needs of the participating members in 2050 as 90% of the WRF rated maximum month capacity. In this Alternative, the existing Asheboro WWTP, Randleman WWTP, Ramseur WWTP and Franklinville WWTP would all be decommissioned.

Initial Capacity (mgd)	**31**
Expanded Capacity (mgd)	**44**

Project Funding and Timeline

Funding for New 31 mgd Facility	
Asset Owner(s)	**Greensboro (22%), High Point (22%), Randleman (7%), Asheboro (45%), Ramseur (3.2%), and Franklinville (0.8%)**
WW13.3 - New Regional WRF	
Construction Cost	**$942,600,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$141,400,000**
Permitting/Admin. (10% of Const. Cost)	**$94,200,000**
Project Contingency (20% of All Costs)	**$235,700,000**
Total Cost	**$1,413,900,000**

Funding for 44 mgd Expansion	
Asset Owner(s)	**Greensboro (50%), High Point (50%)**
WW13.4 - Expansion of Regional WRF	
Construction Cost	**$228,400,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$34,300,000**
Permitting/Admin. (10% of Const. Cost)	**$22,800,000**
Project Contingency (20% of All Costs)	**$57,100,000**
Total Cost	**$342,600,000**

Timeline for New 31 mgd Facility	
Beginning of Design	**2029**
Beginning of Construction	**2031**
End of Construction	**2034**

Timeline for 44 mgd Expansion	
Beginning of Design	**2038**
Beginning of Construction	**2040**
End of Construction	**2043**

WW17 - Ramseur Lift Station and Force Main to New Regional WRF (Alt 4)

Project Location

Site Description: Proposed lift station at the existing Ramseur WWTP on Roundleaf Rd in Ramseur, connecting the proposed sewer force main to the new Regional WRF in Asheboro.

Project Summary

In this Alternative, the existing 0.48 mgd Ramseur WWTP would be decommissioned and all of the Town of Ramseur's wastewater would be conveyed to the new Regional WRF located in Asheboro. This project includes constructing a new sewer lift station and force main to convey wastewater from Ramseur's and Franklinville's existing sewer systems to the new Regional WRF in Asheboro. The lift station is sized to convey Ramseur's projected 2050 peak hour flow, and the two parallel force mains are sized to convey the sum of Ramseur's and Franklinville's projected 2050 peak hour flow to the new Regional WRF. Two parallel 18" force mains were chosen due to the high head conditions required to pump flow from Ramseur/Franklinville up to Asheboro.

Pipe Diameter (in)	**18**	**Two Parallel 18" Pipes**
Pump Size (mgd)	**5**	
Pipe Length (ft)	**100,880**	
Trenchless Crossings (ft)	**950**	

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Ramseur**	Asset Owner(s)	**Ramseur (80%), Franklinville (20%)**
Potential Funding Sources			

WW17.1 - Lift Station		**WW17.2 - Force Main**	
Construction Cost	**$11,300,000**	Construction Cost	**$37,900,000**
Easements (7.5% of Const. Cost)	**-**	Easements (7.5% of Const. Cost)	**$2,800,000**
Engineering (15% of Const. Cost)	**$1,700,000**	Engineering (15% of Const. Cost)	**$5,700,000**
Permitting/Admin. (10% of Const. Cost)	**$1,200,000**	Permitting/Admin. (10% of Const. Cost)	**$3,800,000**
Project Contingency (20% of All Costs)	**$2,800,000**	Project Contingency (20% of All Costs)	**$10,100,000**
Total Cost	**$17,000,000**	**Total Cost**	**$60,300,000**

Timeline

Beginning of Design	**2030**
Beginning of Construction	**2032**
End of Construction	**2034**

WW18 - Franklinville Lift Station to New Regional WRF (Alt 4)

Project Location

Site Description: Proposed lift station at the existing Franklinville WWTP on Rising Sun Way in Franklinville.

Project Summary

In this Alternative, the existing 0.1 mgd Franklinville WWTP would be decommissioned and all of the Town of Franklinville's wastewater would be conveyed to the new Regional WRF located in Asheboro. This project includes constructing a new sewer lift station to convey wastewater from Franklinville's existing sewer system to the proposed combined Ramseur-Franklinville sewer force main. The lift station is sized to convey Franklinville's projected 2050 peak hour flow.

Pipe Diameter (in)	**N/A**
Pump Size (mgd)	**1**
Pipe Length (ft)	**N/A**
Trenchless Crossings (ft)	**N/A**

Project Funding and Timeline

Funding

Asset Owner(s)	**Town of Franklinville**
Potential Funding Sources	**Randolph County State Budget Allocation**

Lift Station

Construction Cost	**$3,800,000**
Easements (7.5% of Const. Cost)	**-**
Engineering (15% of Const. Cost)	**$600,000**
Permitting/Admin. (10% of Const. Cost)	**$400,000**
Project Contingency (20% of All Costs)	**$900,000**
Total Cost	**$5,700,000**

Timeline

Beginning of Design	**2031**
Beginning of Construction	**2033**
End of Construction	**2034**

6.2.3.5 Alternatives Summary

Table 6-13 and Table 6-14 presents the total wastewater capacity in the study area in 2050 under each alternative and breaks the capacity down by treatment facility and municipality, respectively. Alternatives 3 and 4 provide the greatest amount of capacity for the study area.

Table 6-13: Wastewater Capacity Comparison of Alternatives by Facility

Facility	Total Wastewater Capacity in 2050 (MGD)				
	"Go-it-Alone"	Alternative 1	Alternative 2	Alternative 3	Alternative 4
T.Z. Osborne WRF	60.0	60.0	60.0	56.0	56.0
Eastside WWTP	32.0	26.0	32.0	26.0	26.0
Randleman WWTP	1.75	-	-	-	-
Asheboro WWTP	12	12	12	-	-
Liberty WWTP	-	-	-	-	-
Franklinville WWTP	0.1	0.1	0.1	-	-
Ramseur WWTP	1.0	1.0	1.0	1.25	-
Seagrove-Ulah WWTP	0.09	0.09	0.09	0.09	0.09
New Regional WRF	-	25	18.5	43.0	44.3
Total	**106.9**	**124.2**	**123.7**	**126.3**	**126.3**

Table 6-14: Wastewater Capacity Comparison of Alternatives by Municipality

Municipality	Total Wastewater Capacity in 2050 (MGD)				
	"Go-it-Alone"	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Greensboro	58.4	67.5	67.7	67.7	67.7
High Point	25.5	32.7	32.0	32.4	32.4
Asheboro	12.0	12.0	12.0	14.0	14.0
Randleman	1.7	2.2	2.2	2.2	2.2
Ramseur	1.0	1.0	1.0	1.2	1.2
Franklinville	0.1	0.1	0.1	0.1	0.1
Liberty	1.6	1.6	1.6	1.6	1.6
Archdale	3.2	3.5	3.5	3.5	3.5
Jamestown	3.3	3.5	3.5	3.5	3.5
Seagrove	0.09	0.09	0.09	0.09	0.09
Total	**106.9**	**124.2**	**123.7**	**126.3**	**126.3**

Table 6-15 presents a comparative summary of the total project costs, the added wastewater capacity in the region, and the projected year the region will reach 90% of its available wastewater capacity for the "Go-it-Alone" Alternative and the four regionalization alternatives.

Table 6-15: Summary of Regional Alternatives

Alternatives	Added Wastewater Capacity	Regional Sewer Related Capital Cost Through 2050	90% of Wastewater Capacity Reached with Planned Expansions	Regional Water Related Capital Cost Through 2050
"Go-it-Alone": • No Regional Facility • Individual Utility Expansions	**14 MGD** 4 MGD –Greensboro 0.52 MGD - Ramseur 6 MGD – High Point 3 MGD – Asheboro 0.06 MGD - Seagrove	**$1.6 B**	**2042**	**$1.5 B**
Alternative 1: • Regional Facility Greensboro (Expansion at TZO) High Point Randleman	**31 MGD** 25 MGD – Regional 0.52 MGD - Ramseur 4 MGD – Greensboro 3 MGD – Asheboro 0.06 MGD Seagrove *(Replaces 1.75 MGD at Randleman)*	**$2.6 B**	**2050 +**	**$1.5 B**
Alternative 2: • Regional Facility Greensboro (Expansion at TZO) High Point (Expansion at Eastside) Randleman	**30 MGD** 18.5 MGD –Regional 0.52 MGD -Ramseur 4 MGD – Greensboro 3 MGD – Asheboro 6 MGD – High Point 0.06 MGD - Seagrove *(Replaces 1.75 MGD at Randleman)*	**$2.8 B**	**2050 +**	**$1.5 B**
Alternative 3: • Regional Facility Greensboro High Point Randleman Asheboro	**33 MGD** 43 MGD – Regional 0.77 MGD – Ramseur 0.06 MGD - Seagrove *(Replaces 1.75 MGD at Randleman)* *(Replaces 9 MGD at Asheboro)* *(Replaces 0.1 MGD at Franklinville)*	**$3.1 B**	**2050 +**	**$1.5 B**
Alternative 4: • Regional Facility Greensboro High Point Randleman Asheboro Ramseur Franklinville	**33 MGD** 44 MGD – Regional, 0.06 MGD - Seagrove *(Replaces 1.75 MGD at Randleman)* *(Replaces 9 MGD at Asheboro)* *(Replaces 0.1 MGD at Franklinville)* *(Replaces 0.48 MGD at Ramseur)*	**$3.1 B**	**2050 +**	**$1.5 B**

6.2.3.6 Nutrient Management Comparison of Alternatives

Building on the assumptions of the NCDEQ US Hwy 421 Corridor Concept Plan, this Study assumes that the Cape Fear River basin would be subject to nutrient removal criteria by 2050 due to nutrient impaired waters. Each facility in the Haw River sub-basin would remain at its current allocation, while all other facilities in the Deep River sub-basin would operate with no net increase or a “hold the load” strategy, defined as the annual average discharged nutrient, TN and TP load over calendar years 2022-2024 or 2021-2023 as reported by the facility. The existing annual average discharged nutrient loads of the facilities in the study area discharging to the Deep River sub-basin were presented in Section 4.2.2.

Table 6-16 through Table 6-20 below present conceptual nutrient concentrations that could be successful solutions to attaining additional wastewater flow capacity in the basin without increasing the total nutrient load to the Deep River. The concentrations below are theoretical concentrations for all the facilities in each of the alternatives being evaluated. Actual allocation of nutrient load would vary upon future modeling and assessment of the river basin.

A reduction in overall mass nutrient loading by NCDEQ in discharges to the Deep River would further emphasize the need for a new facility, built to the limits of technology, with advanced secondary and tertiary processes.

Table 6-16: “Go-it-Alone” Scenario Nutrient Budgeting

Facility Status	Flow (MGD)		Current TN Load (lbs/yr)	Current TP Load (lbs/yr)	2050 TN Conc. (mg/L)	2050 TN Load (lbs/yr)	2050 TP Conc. (mg/L)	2050 TP Load (lbs/yr)
	Current	Proposed (2050)						
High Point Eastside WWTP Expanded	26	32	474,865	39,420	4.68	474,865	0.40	39,420
Randleman WWTP	1.745	1.745	15,936	4,155	3.00	15,936	0.78	4,155
Asheboro WWTP Expanded	9	12	211,574	13,698	5.79	211,574	0.38	13,698
Franklinville WWTP	0.1	0.1	2,795	1,311	9.18	2,795	4.31	1,311
Ramseur Expanded	0.48	1	6,255	2,148	2.05	6,255	0.71	2,148
Liberty Decommissioned	0.55	0	5,023	837	-	0	-	0
Seagrove Expanded	0.036	0.09	329	55	1.20	329	0.20	55
Total Flow (MGD) and Total Load (lbs/yr)	**37.9**	**46.9**	**716,777**	**61,624**		**711,755**		**60,787**

Table 6-17: Alternative 1 Nutrient Budgeting

Facility Status	Flow (MGD)		Current TN Load (lbs/yr)	Current TP Load (lbs/yr)	2050 TN Conc. (mg/L)	2050 TN Load (lbs/yr)	2050 TP Conc. (mg/L)	2050 TP Load (lbs/yr)
	Current	Proposed (2050)						
High Point Eastside WWTP	26	26	474,865	39,420	3.38	267,516	0.31	24,456
Randleman WWTP Decommissioned	1.745	0	15,936	4,155	-	0	-	0
Asheboro WWTP Expanded	9	12	211,574	13,698	5.79	211,574	0.38	13,698
Franklinville WWTP	0.1	0.1	2,795	1,311	9.18	2,795	4.31	1,311
Ramseur Expanded	0.48	1	6,255	2,148	2.05	6,255	0.71	2,148
Liberty Decommissioned	0.55	0	5,023	837	-	0	-	0
Seagrove Expanded	0.036	0.09	329	55	1.20	329	0.20	55
Total Flow (MGD) and Total Load (lbs/yr)	**37.9**	**64.2**	**716,777**	**61,624**		**716,777**		**61,608**

Table 6-18: Alternative 2 Nutrient Budgeting

Facility Status	Flow (MGD)		Current TN Load (lbs/yr)	Current TP Load (lbs/yr)	2050 TN Conc. (mg/L)	2050 TN Load (lbs/yr)	2050 TP Conc. (mg/L)	2050 TP Load (lbs/yr)
	Current	Proposed (2050)						
High Point Eastside WWTP Expanded	26	32	474,865	39,420	3.35	326,328	0.30	29,613
Randleman WWTP Decommissioned	1.745	0	15,936	4,155	-	0	-	0
Asheboro WWTP Expanded	9	12	211,574	13,698	5.79	211,574	0.38	13,698
Franklinville WWTP	0.1	0.1	2,795	1,311	9.18	2,795	4.31	1,311
Ramseur Expanded	0.48	1	6,255	2,148	2.05	6,255	0.71	2,148
Liberty Decommissioned	0.55	0	5,023	837	-	0	-	0
Seagrove Expanded	0.036	0.09	329	55	1.20	329	0.20	55
New Regional Facility	0	18.5	-	-	3.00	168,948	0.26	14,755
Total Flow (MGD) and Total Load (lbs/yr)	**37.9**	**63.7**	**716,777**	**61,624**		**716,777**		**61,580**

Table 6-19: Alternative 3 Nutrient Budgeting

Facility Status	Flow (MGD)		Current TN Load (lbs/yr)	Current TP Load (lbs/yr)	2050 TN Conc. (mg/L)	2050 TN Load (lbs/yr)	2050 TP Conc. (mg/L)	2050 TP Load (lbs/yr)
	Current	Proposed (2050)						
High Point Eastside WWTP	26	26	474,865	39,420	3.93	310,965	0.29	22,873
Randleman WWTP Decommissioned	1.745	0	15,936	4,155	-	0	-	0
Asheboro WWTP - Decommissioned	9	0	211,574	13,698	-	0	-	0
Franklinville WWTP Decommissioned	0.1	0	2,795	1,311	-	0	-	0
Ramseur Expanded	0.48	1.25	6,255	2,148	3.93	14,950	0.29	1,100
Liberty Decommissioned	0.55	0	5,023	837	-	0	-	0
Seagrove Decommissioned	0.036	0	329	55	-	0	-	0
New Regional Facility	0	42.8	-	-	3.00	390,862	0.29	37,652
Total Flow (MGD) and Total Load (lbs/yr)	**37.9**	**70.1**	**716,777**	**61,624**		**716,777**		**61,624**

Table 6-20: Alternative 4 Nutrient Budgeting

Facility Status	Flow (MGD)		Current TN Load (lbs/yr)	Current TP Load (lbs/yr)	2050 TN Conc. (mg/L)	2050 TN Load (lbs/yr)	2050 TP Conc. (mg/L)	2050 TP Load (lbs/yr)
	Current	Proposed (2050)						
High Point Eastside WWTP	26	26	474,865	39,420	3.97	314,043	0.29	22,856
Randleman WWTP Decommissioned	1.745	0	15,936	4,155	-	0	-	0
Asheboro WWTP - Decommissioned	9	0	211,574	13,698	-	0	-	0
Franklinville WWTP - Decommissioned	0.1	0	2,795	1,311	-	0	-	0
Ramseur WWTP - Decommissioned	0.48	0	6,255	2,148	-	0	-	0
Liberty Decommissioned	0.55	0	5,023	837	-	0	-	0
Seagrove Decommissioned	0.036	0	329	55	-	0	-	0
New Regional Facility	0	44.1	-	-	3.00	402,734	0.29	38,768
Total Flow (MGD) and Total Load (lbs/yr)	**37.9**	**70.1**	**716,777**	**61,624**		**716,777**		**61,624**

6.3 Review of Biosolids and Regional Approach

6.3.1 Trends in the Industry

The biosolids industry is experiencing significant change and uncertainty, driven largely by concerns over PFAS. Biosolids land application is governed at the federal level by EPA under the "Part 503 Rule" (40 CFR 503) that establishes minimum standards that must be met for biosolids land application and surface disposal. For land application, the rule establishes minimum requirements for pathogen density, vector attraction reduction, and criteria pollutants (i.e., metals), management practices, minimum frequency of monitoring, record keeping, and reporting. In November 2018, the Office of Inspector General (OIG) published a report weighing the ability of the existing Part 503 regulations to safeguard public health and the environment. The OIG Report identified 352 pollutants, including PFAS, to be potential cause of concern. In response, EPA committed to developing a risk assessment for PFOA and PFOS to understand any potential health impacts associated with exposure to biosolids which was released in January 2025.

In the draft risk assessment, EPA recommended a multi-pronged approach to monitoring and mitigation. States and wastewater treatment facilities were encouraged to actively monitor biosolids for PFAS contamination to better understand and manage potential risks. Additionally, the EPA advised implementing industrial pretreatment programs to identify and control sources of PFAS before it enters wastewater systems. EPA has yet to finalize the risk assessment and received many public comments on the draft. Any changes to regulation will follow risk assessment finalization.

The lack of federal regulatory change has led to a patchwork of state-level actions: Michigan and New York have set regulatory limits on PFAS and imposed restrictions on land application, Maine and Connecticut have banned land application entirely, and other states, like North Carolina, are either waiting for federal guidance or adding monitoring requirements to permits.

In addition to uncertainty related to land application, there has also been tightening capacity and increased restrictions for landfill disposal of biosolids. Due to recent slope failures at landfills, landfills across the Southeast are beginning to limit acceptance of sludge mass to 5% – 10% of total municipal solid waste (MSW) mass to protect against hot spots and slope stability issues. In addition, state level regulations on land application are increasing the demand for landfill capacity.

Disposal costs are rising, and utilities are increasingly focused on reducing biosolids mass and volume to prepare for a changing regulatory landscape. Overall, the sector faces growing pressure to balance compliance, cost management, and sustainability in an increasingly complex regulatory environment. Technical decision-makers should focus on building resilience and adaptability to ensure their organizations are prepared to respond effectively to evolving regulations.

6.3.2 Biosolids Projections

Solids production estimates were developed for each WWTP within the study area based on data submitted to EPA as a part of each facility's Biosolids Annual Report. The amount of sewage sludge reported to be produced at each facility in dry metric tons was assumed to be the quantity that would be available for processing at a regional facility. For facilities within the study area that are not required to submit a Biosolids Annual Report, a sludge production rate representative of a typical residential waste stream was utilized.

Table 6-21 shows the estimated sludge production rates for each facility by applying mass-based peaking factors to the estimated annual average sludge production rates for maximum month (MAX30), maximum two-week (MAX14), and maximum week (MAX07) operating conditions. Smaller plants can have higher peaking factors, but because it is not likely that all plants will peak at the same time, typical mass-based peaking factors were used for all facilities.

Table 6-21: WWTP Sludge Production Rates (dry lbs / million gallons at AVG365)

Wastewater Treatment Plant	AVG365	MAX30 (1.30X AVG365)	MAX14 (1.45X AVG365)	MAX07 (1.6X AVG365)
T.Z. Osborne WRF - Greensboro	2,900	3,800	4,200	4,600
Eastside WWTP - High Point	2,400	3,200	3,500	3,900
Asheboro WWTP	1,600	2,100	2,400	2,600
Randleman WWTP[2]	2,000	2,600	2,900	3,200
Ramseur WWTP	800	1,000	1,200	1,300
Franklinville WWTP[2]	2,000	2,600	2,900	3,200
Liberty WWTP[2]	2,000	2,600	2,900	3,200
New Regional WWTP[3]	2,000	2,600	2,900	3,200

[1] High Point Eastside WWTP Solids numbers are representative of combined processing of High Point's Eastside and Westside WWTPs. Therefore, the combined Eastside and Westside flows were used to develop the sludge production rate for the facility.
[2] A biosolids annual report was not submitted for this facility. Therefore, a base sludge production rate of 2,000 lbs/MGAL was assumed.
[3] A base sludge production rate of 2,000 lbs/MGAL was assumed for the new regional facility

In addition, the same methodology was used for potential regional partners that might be interested in sending solids to a regional biosolids facility. Table 6-22 below shows the annual solids production for Graham, Mebane and Burlington.

Table 6-22: WWTP Sludge Production Rates (dry lbs / million gallons at AVG365)

Wastewater Treatment Plant	AVG365	MAX30 (1.30X AVG365)	MAX14 (1.45X AVG365)	MAX07 (1.6X AVG365)
Graham WWTP	700	900	1,000	1,100
Mebane WWTP	1,000	1,300	1,500	1,700
East Burlington WWTP	1,000	1,300	1,500	1,700
South Burlington WWTP	1,100	1,500	1,700	1,800

6.3.3 Biosolids Management

Using the flow projections presented in Section 3.2, and sludge production rates in Section 6.3.2, the solids loading to the regional facility was projected over time along with the solids loading at each individual WWTP. Table 6-23 displays the solids loading over the 20-year time period.

Table 6-23: Mass Loading by WWTP, dry tons per day (dtpd)

Wastewater Treatment Plant	2030	2040	2050
T.Z. Osborne WRF - Greensboro	53.0	50.0	53.4
Eastside WWTP - High Point	20.0	17.5	17.5
Asheboro WWTP	4.0	0.0	0.0
Randleman WWTP	1.0	0.0	0.0
Ramseur WWTP	0.2	0.3	0.3
Franklinville WWTP[1]	0.1	0.0	0.0
Liberty WWTP[2]	0.0	0.0	0.0
New Regional WWTP	0.0	20.5	29.0

[1] Franklinville to send all wastewater flow to Ramseur WWTP by 2040, therefore mass loading by WWTP shown as 0 dtpd and accounted for in Ramseur WWTP mass loading
[2] Liberty WWTP to send all wastewater flow to T.Z. Osborne WRF by 2030, therefore mass loading by WWTP shown as 0 dtpd and accounted for in T.Z. Osborne WRF mass loading

6.3.4 Regional Biosolids Management Alternatives

Three (3) alternatives were developed for the regional biosolids management approach with varying levels of utility participation beyond management of the solids produced at the Regional WWTP alone.

- Biosolids Alternative 1: Management of all solids produced at the Regional WWTP, import of 100% of solids from Ramseur WWTP and 20% of solids from T.Z. Osborne WRF and 20% of solids from Eastside WWTP
- Biosolids Alternative 2: Management of all solids produced at the Regional WWTP and import of 100% of solids from Ramseur WWTP, T.Z. Osborne WRF and Eastside WWTP
- Biosolids Alternative 3: Management of all solids produced at the Regional WWTP and import of 100% of solids from Ramseur WWTP, T.Z. Osborne WRF and Eastside WWTP and import of 100% of solids from external stakeholders of Graham, Mebane and Burlington

The estimated sludge production loads were used to size each process alternative to meet initial and future loading conditions at the proposed Regional Facility for each of the three biosolids alternatives. The portion of solids managed by the regional facility is presented by utility in Table 6-24 to Table 6-26.

Table 6-24: Biosolids Alternative 1: Regional Facility Mass Loading by Utility

Utility	2030 (dtpd)	% of total	2050 (dtpd)	% of total
Greensboro	10.5	52%	22.4	51%
High Point	4.0	20%	11.5	26%
Asheboro	4.3	21%	8.0	18%
Randleman	1.0	5%	1.3	3%
Ramseur	0.2	1%	0.3	1%
Franklinville	0.1	0.5%	0.1	0.2%
Liberty	0.1	0.6%	0.2	0.6%
Total	**20.2**	**100%**	**43.8**	**100%**

Table 6-25: Biosolids Alternative 2: Regional Facility Mass Loading by Utility

Utility	2030 (dtpd)	% of total	2050 (dtpd)	% of total
Greensboro	52.4	67%	63.8	64%
High Point	19.8	25%	25.5	25%
Asheboro	4.3	5%	8.0	8%
Randleman	1.0	1%	1.3	1%
Ramseur	0.2	0.2%	0.3	0.3%
Franklinville	0.1	0.1%	0.1	0.1%
Liberty	0.6	1%	1.2	1%
Total	**78.3**	**100%**	**100.2**	**100%**

Table 6-26: Biosolids Alternative 3: Regional Facility Mass Loading by Utility

Utility	2030 (dtpd)	% of total	2050 (dtpd)	% of total
Greensboro	52.4	56%	63.8	55%
High Point	19.8	21%	25.5	22%
Asheboro	4.3	5%	8.0	7%
Randleman	1.0	1%	1.3	1%
Ramseur	0.2	0.2%	0.3	0.2%
Franklinville	0.1	0.1%	0.1	0.1%
Liberty	0.6	0.6%	1.2	1%
Graham	1.7	2%	1.7	2%
Mebane	2.1	2%	2.1	2%
Burlington	11.8	13%	11.8	10%
Total	**94.1**	**100%**	**115.8**	**100%**

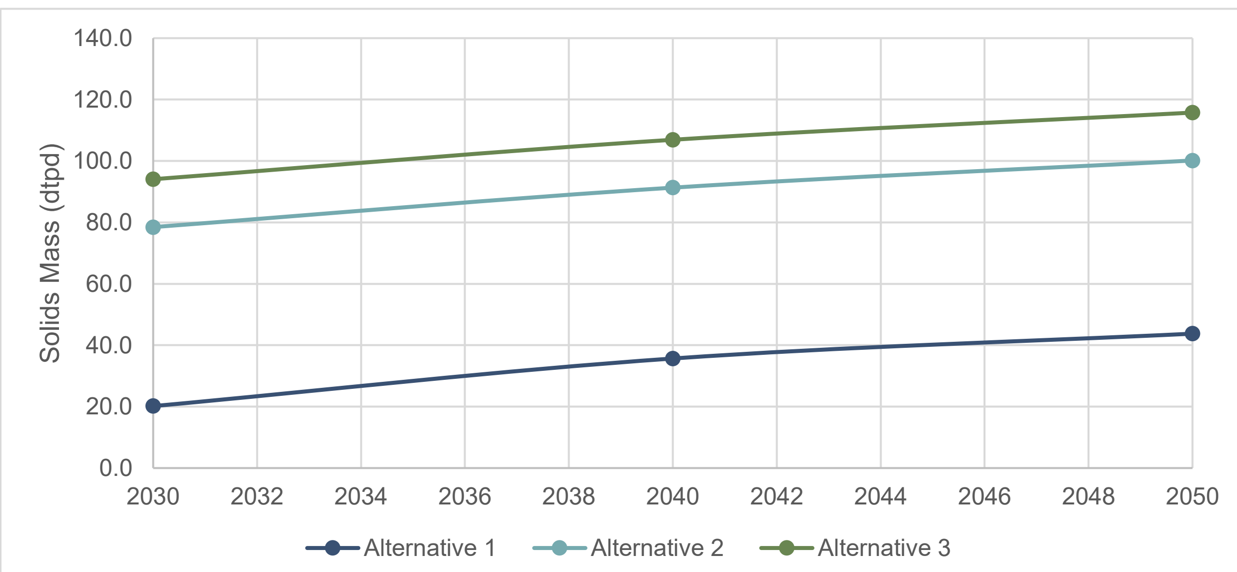


Figure 6-10: Regional Solids Mass Loading by Biosolids Alternative

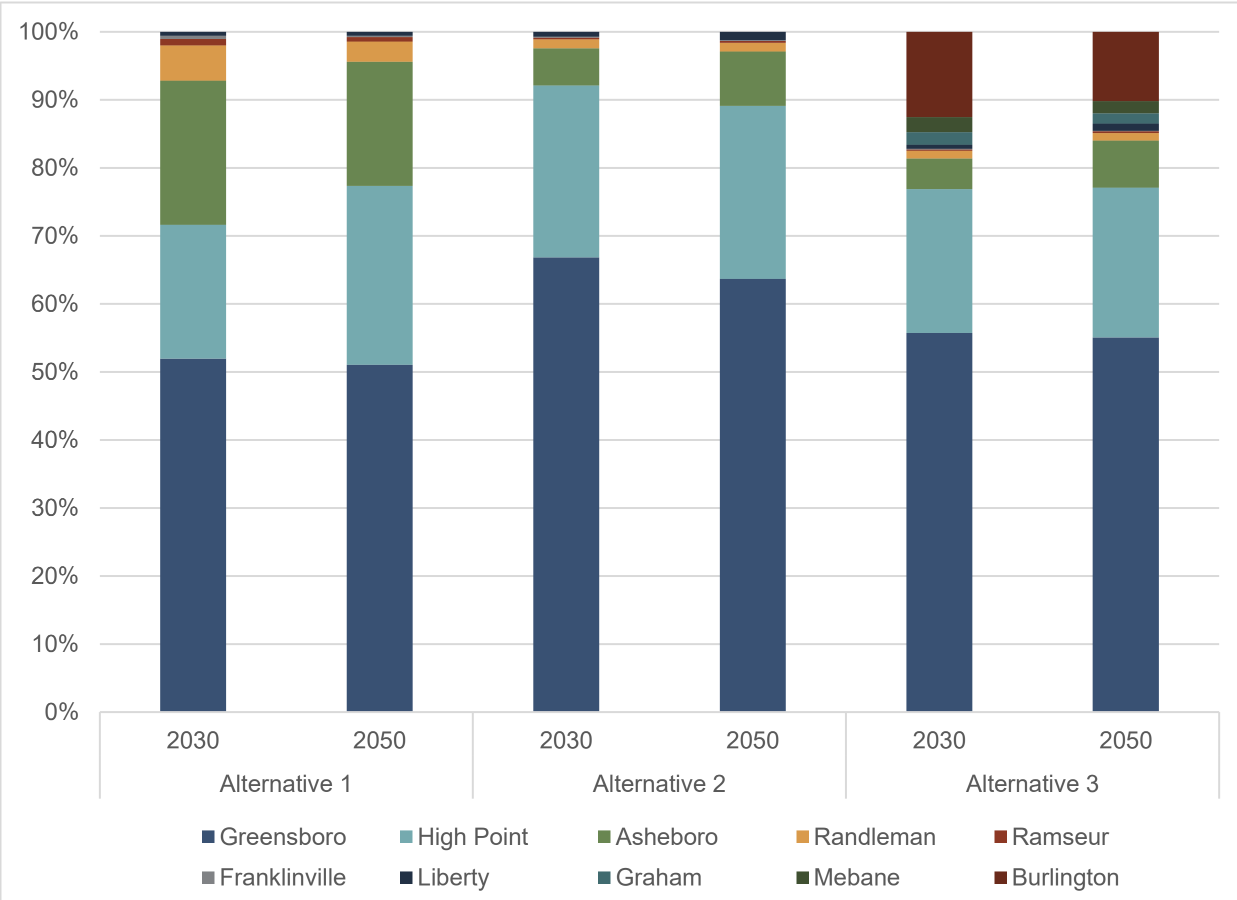


Figure 6-11: Regional Solids Mass Allocation per Utility

It was assumed that the regional biosolids facility would accept dewatered cake import from all facilities. Dewatered cake was assumed to be an average of 20% solids for sizing and cost estimating purposes. Table 6-27 shows the wet tons per day (wtpd) that need to be processed at the regional facility for each biosolids alternative.

Table 6-27: Regional Mass Loading by Biosolids Alternative

Mass Loading	Biosolids Alternative 1	Biosolids Alternative 2	Biosolids Alternative 3
2030 Mass Loading, dtpd	20.2	78.3	94.1
2050 Mass Loading, dtpd	43.8	100.2	115.8
2030 Mass Loading, wtpd	101	392	470
2050 Mass Loading, wtpd	219	503	581

The following two (2) solids processing options were evaluated for a regional biosolids management solution that could be implemented by the Stakeholders:

1. Composting
2. Gasification / Pyrolysis

These two solids processing options were selected to offer two possible solutions with varying degrees of treatment, complexity and long-term viability and each technology is described in detail below. A technology overview, process flow diagram, facility sizing, and pros and cons are presented for each option.

6.3.4.1 Composting

The composting process decomposes organic matter under controlled and aerobic conditions to produce humus-like soil that can be used in landscaping, horticulture and agriculture applications. Any organic matter can be used as a feedstock for the composting process including biosolids. There are several composting technologies available, and the commonly used technologies are:

- Windrow
- Aerated-static pile
- In vessel composting

Regardless of the composting technology, the composting process requires a bulking agent, mixing, active composting phase, screening, and curing process to provide a good quality compost product. Figure 6-12 shows a typical composting process schematic. In the mixing phase, a bulking agent is frequently added to the dewatered biosolids to increase percent solids, provide carbon for the process, improve the material's structural properties and promote adequate air circulation. Types of bulking agents for composting include:

- Woodchips
- Chipped yard waste or green waste
- Saw dust, shredded paper
- Ground waste lumber

Composting begins in the active phase in which the temperature increases to 122°F and continues to rise to more than 131°F. This stage may last between 21 days and 30 days. Constant turning of the compost by forced aeration or agitation is necessary to maintain an aerobic condition in the active composting phase. After active composting, some of the bulking agent is recycled through the screening phase. In the curing phase, the temperature is nearly ambient and continues decomposition of the woody materials to humic compounds.

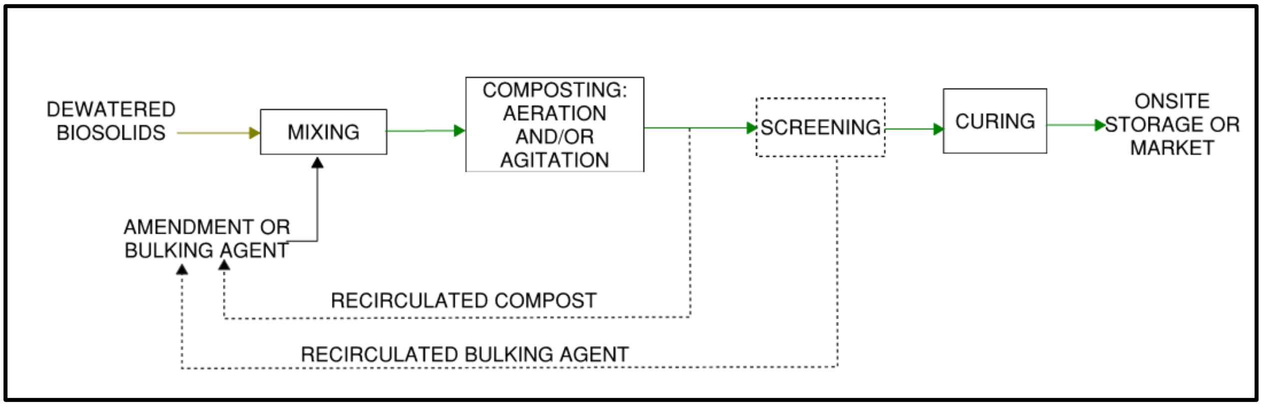


Figure 6-12: General Composting Process Schematic (WEF, 2010)

The composting process is typically labor intensive, requires a significant footprint, and can emit odors depending on selected technology. In biosolids composting, the following variables should be controlled during the composting process to optimize the decomposition and stabilization rate.

a) **Solids content.** The recommended dewatered biosolids concentration before the composting process is between 14% and 30% to achieve a solids content of about 55% to 45% in the compost mixture a bulking agent is typically added.
b) **Carbon to nitrogen ratio (C:N).** The ideal C:N ratio is between 25:1 and 35:1.
c) **Maintaining aerobic condition.** Microbial activity can starve the process of oxygen; thus, good aeration is needed to maintain an aerobic condition during composting.
d) **Maintaining proper temperature.** Microbial activity increases the temperature during composting. Removing excess heat is important to maintain the process in the thermophilic range.

Due to the significant length of time associated with each step of the composting process, a significant amount of storage area is required. Table 6-28 details the recommended processing time and/or storage time recommended for each step of the composting process assuming aerated static pile.

Table 6-28: Composting Storage Considerations

Product	Days	Height	Storage Type
Dewatered Biosolids	1	3-4 ft	Bunker
Bulking Agent	10-30	8-12 ft	Bunker
Recycled Bulking Agent	4-7	8-12 ft	Bunker
Aerated Static Pile	21	8 ft (not including base or cover layers)	Pile/Windrow
Curing	30	8 ft	Pile/Windrow
Product Storage	30-90	8-12 ft	Bunker

The dewatered biosolids would be mixed with a bulking agent prior to transferring to the active compost bays. The amount of total bulking agent (fresh ground green waste and recycled bulking agent) has a ratio of 3:1 to achieve optimal feed mixture to the active composting process. Sources of bulking agent would need to be identified before implementing onsite composting. The solids processing and compost facility requirements are outlined in Table 6-29.

Table 6-29: Compost Facility Requirements for 2050 Annual Average Loading

Facility	Biosolids Alternative 1	Biosolids Alternative 2	Biosolids Alternative 3
Cake Receiving, wtpd	73	360	435
Compost Facility, wtpd	220	500	580

Advantages of implementing the composting process include:

- Fundamentally simple process
- Produces a valuable and marketable product with local outlets
- Biosolids compost is a more acceptable product, thus relatively less restrictions to end use application compared to Class A biosolids
- Provides full control and flexibility of the biosolids management program
- Limited utility requirements

Some disadvantages of composting are:

- Requires 3:1 ratio of bulking agent to the processed biosolids
- Large area requirement to implement composting facility
- Labor intensive process
- Onsite storage of the compost product may be required
- Requires an odor control system

Table 6-30: Compost Facility Opinion Probable Construction Cost

Facility	Biosolids Alternative 1	Biosolids Alternative 2	Biosolids Alternative 3
Total Capital Cost	$50M	$100M	$120M

6.3.4.2 Gasification / Pyrolysis

Gasification and pyrolysis are thermochemical processes that decompose carbonaceous materials by exposing them to high temperatures. The main difference between the two is the amount of oxygen present. Gasification takes place with a limited amount of oxygen, while pyrolysis occurs in the absence of oxygen. Typically, temperatures for gasification are between 1,100-1,800°F (593-982°C), and for pyrolysis are 390-1,100°F (200-593°C) but can vary by technology provider. Both produce heat, a combustible fuel gas (known as "syngas" for gasification and "pyrogas" for pyrolysis) and a charcoal-like solid substance called biochar. Pyrolysis also produces bio-oils and tars, which are typically oxidized for energy production. In many cases with no digestion, the process is thermodynamically favorable, because the generated syn/pyrogas is thermally oxidized allowing for thermal energy to be captured and recycled back into the thermal drying process, which is a required pretreatment step for either gasification or pyrolysis. Additionally, gasification with thermal oxidation has been demonstrated to destroy PFAS compounds in biosolids.

Figure 6-13 presents a process flow diagram of thermal drying and gasification implemented at the Regional WWTP.

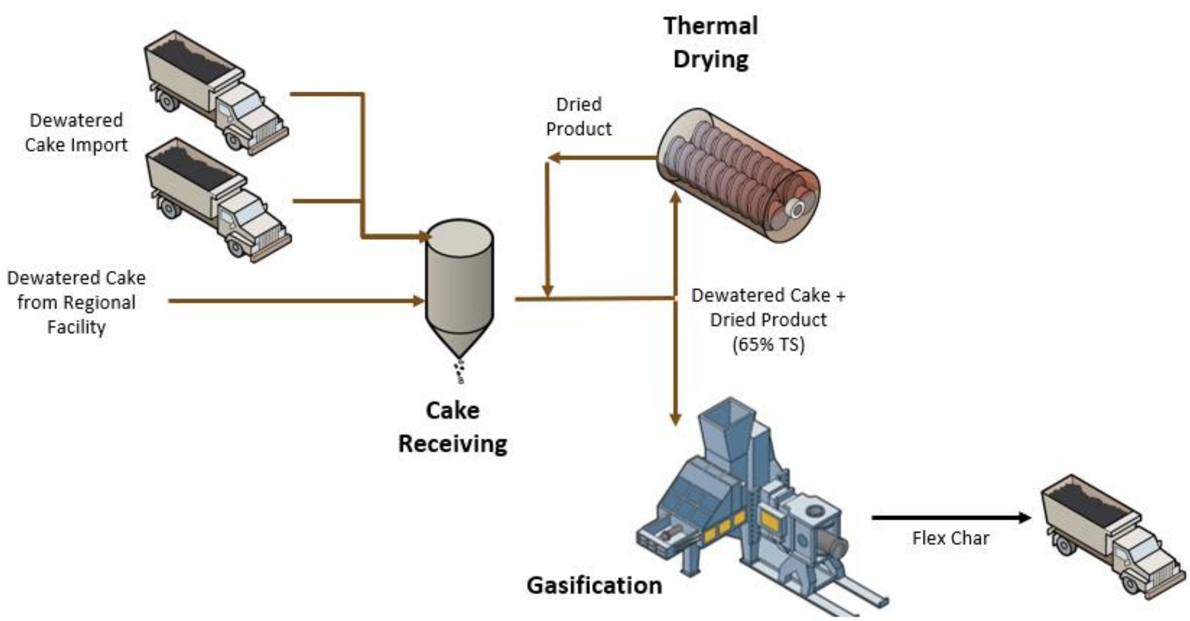


Figure 6-13: Cake Receiving + Thermal Drying + Gasification Process Flow Diagram

The solids processing and gasification requirements are outlined in Table 6-31. The major gasification vendors sell a packaged thermal drying / gasification system.

Table 6-31: Gasification Facility Requirements for 2050 Annual Average Loading

Facility	Biosolids Alternative 1	Biosolids Alternative 2	Biosolids Alternative 3
Cake Receiving, wtpd	73	360	435
Gasification, dtpd	44	101	116

Advantages of implementing gasification include:

- Significant mass and volume reduction of solids
- Ability to meet current and future potential regulations for final product management
- Potential to destroy emerging contaminants (i.e. PFAS)
- Low odor/emissions
- Small footprint

Some disadvantages of gasification are:

- High capital and life cycle costs
- Variability in biochar valuation; market development required
- New technology, no existing full-scale operations
- Process is unfamiliar to stakeholders

Using cost curves developed by the Minnesota Pollution Control Agency for regional pyrolysis / gasification systems, capital costs were developed for each alternative. The estimate was prepared to Class 5 (Association for the Advancement of Cost Engineering (AACE)) accuracy (-50% - +100% range).

Table 6-32: Gasification Facility Opinion Probable Construction Cost

Facility	Biosolids Alternative 1	Biosolids Alternative 2	Biosolids Alternative 3
Total Capital Cost	$140M	$310M	$360M

6.3.5 Next Steps

Due to the uncertainty within the biosolids industry, regionalization on the solids side could be a first step towards the larger regionalization goals of the stakeholders.

7. Capital Cost Summary and Cost Implications of Regionalization Alternatives

7.1 Basis of Cost Estimates

Costs are developed for alternatives for meeting the regional water supply, treatment and conveyance needs within the study area. There are other investments specific to public water and wastewater providers' individual distribution and collection systems that are common to all alternatives, thus are not reflected in this Study and associated costs.

The costs developed for the regional alternatives reflect project costs, thus include assumptions for planning, engineering, and construction. The costs relied upon for this Study are unit prices based on recent costs observed for similar projects in the region. Each individual project will have characteristics and nuances that may not be consistent with the typical costs applied, and further study and cost considerations will be necessary as a follow-up to this Study. The costs provided are considered a Class 5 Concept Screening cost per the AACE. The project definition for this level of cost is 0% to 2% complete, and the expected accuracy range is -20% to -50% and +30% to +100%. Cost estimates developed for concept screening-level project descriptions are routinely based on engineering judgement and a capacity-factored basis, such as the cost per gallon of treatment capacity. The costs presented in the following sections are expressed in 2025 dollars.

Table 7-1: Summary of Cost Assumptions

Construction Cost Assumptions	Unit	Construction Unit Cost	Total Project Unit Cost
Water Transmission and Wastewater Force Mains			
</= 30 inches in diameter	$/in-dia/ft	$20.00	$31.80
>/= 36 inches in diameter	$/in-dia/ft	$30.00	$47.70
Wastewater Pump Stations			
</= 7 MGD	$/gpd	$3.00	$4.50
> 7 MGD	$/gpd	$2.00	$3.00
Water Booster Pump Stations			
</= 10 MGD	$/gpd	$1.00	$1.50
>10 MGD	$/gpd	$0.75	$1.13
Water Treatment Plants			
Conventional Expansion	$/gpd	$13.00	$19.50
Conventional Upgrade Existing	$/gpd	$10.40	$15.60
Advanced Treatment for Contaminants of Emerging Concern (UV/AOP-GAC)	$/gpd	$2.67	$4.00
Advanced Treatment for Contaminants of Emerging Concern (Reverse Osmosis)	$/gpd	$3.67	$5.50
Wastewater Treatment Plants			
Limits of Technology Greenfield (</= 7 MGD)	$/gpd	$35.00	$52.50
Limits of Technology Greenfield (> 7 MGD)	$/gpd	$30.00	$45.00
Limits of Technology Upgrade Existing (</= 7 MGD)	$/gpd	$28.00	$42.00
Limits of Technology Upgrade Existing (> 7 MGD)	$/gpd	$24.00	$36.00
Upgrade of Existing Facilities Already at Limits of Technology	$/gpd	$15.00	$22.50
Project Cost Adders			
A-1: Pipeline Easements		7.5% of Pipeline Construction Cost	
A-2: Planning, Design and Construction Administration		15% of Construction Cost	
A-3: Permits, Approvals, Regulatory Support		5% of Construction Cost	
A-4: Legal and Administrative Support		5% of Construction Cost	
Project Contingency		20% of Construction Costs Including Cost Adders A-1 Through A-4	

7.2 Alternative Cost Summary

Total project capital costs are estimated for each regionalization scenario using the cost assumptions provided in Table 7-2 through Table 7-7 and the following general engineering assumptions regarding infrastructure sizes and capacities:

- Wastewater force mains were sized to convey a peak hour peaking factor of 3.0 over average demands and a velocity of less than 8 feet per second. Pipe lengths are estimated using GIS to follow general corridors and not defined roadways or other rights of way. Gravity mains were sized assuming minimum slopes as required by NCDEQ and peak hour flows would not exceed the top of pipe.
- Water treatment facilities are sized, assuming a maximum day demand. Wastewater treatment facilities are sized assuming a maximum month demand.
- Greenfield (i.e., new) treatment facilities are assumed to include complete liquid and solids treatment trains and typical ancillary facilities such as administration/operations buildings.
- Upgrades to facilities are estimated at 80 percent of greenfield facilities.
- Potential costs associated with the treatment of emerging contaminants in drinking water to meet EPA drinking water standards were contemplated in this report. The costs of meeting these treatment standards will be influenced by what happens upstream, including reducing contamination at the industrial source and treatment for emerging contaminants in wastewater. This Study does not quantify costs of treatment of emerging contaminants at wastewater treatment facilities, but facilities should contemplate costs associated with this treatment and prioritize source reduction.

Table 7-2: Water Project Cost Summary

ID	Water Capital Projects	Total Project Cost	Existing Grant Funding Available[1]	1st Fiscal Year of Debt Payments
W1.1	PTRWA Expansion to 26.7 MGD	$94,100,000		FY 2028
W1.2	PTRWA Advanced Treatment Upgrade 26.7 MGD	$146,900,000		FY 2031
W1.3	PTRWA Residuals Facility Expansion to 26.7 MGD	$42,200,000		FY 2031
W1.4	PTRWA Expansion to 36 MGD	$181,400,000		FY 2034
W1.5	PTRWA Advanced Treatment Upgrade to 36 MGD	$51,200,000		FY 2034
W1.6	PTRWA Residuals Facility Expansion to 36 MGD	$32,700,000		FY 2034
W1.7	PTRWA Expansion to 48 MGD	$234,000,000		FY 2042
W1.8	PTRWA Advanced Treatment Upgrade to 48 MGD	$66,000,000		FY 2042
W1.9	PTRWA Residuals Facility Expansion to 48 MGD	$42,200,000		FY 2042
W2	Water service from PTRWA to Asheboro	$10,400,000	$10,400,000	FY 2026
W3	Asheboro WTP Advanced Treatment Upgrade	$37,400,000	$500,000	FY 2028
W4	High Point Ward WTP Advanced Treatment Upgrade	$95,900,000		FY 2028
W5.1	Mitchell Advanced Treatment Upgrades	$120,000,000		FY 2026
W5.2	Townsend Advanced Treatment Upgrades	$150,000,000		FY 2027
W6.1	Water service from Ramseur to Liberty	$14,200,000	$3,800,000	FY 2027
W6.2	Ramseur to Liberty Booster Pump Station	$1,000,000		FY 2027
W7.1	Liberty Water Line from Greensboro - Toyota facility	$9,500,000	$9,500,000	FY 2028
W7.2	Greensboro to Liberty Booster Pump Station	$1,500,000	$1,500,000	FY 2028
W8	Water service from Greensboro to Franklinville	$9,200,000		FY 2032
W9	Asheboro to Chatham County Water Line Additional Project Funding	$12,000,000	$12,000,000	FY 2026
W10.1	Ramseur WTP Rehabilitation of existing facility	$23,400,000		FY 2028
W10.2	Ramseur WTP Advanced Treatment Upgrade at 1.5MGD	$6,000,000		FY 2028
W10.3	Ramseur WTP Expansion to 3MGD	$29,300,000		FY 2031
W10.4	Ramseur WTP Advanced Treatment Upgrade to 3 MGD	$6,000,000		FY 2031
W11	Water service from Greensboro to North of the Lakes	$22,800,000		FY 2026
W12.1	Greensboro HWY 62 Pump Station Expansion	$1,500,000		FY 2029
W12.2	Parallel Waterline from HWY 62 to Sutton Rd -Hwy 73 GSO	$35,200,000		FY 2029
W12.3	Parallel Waterline from Sutton Rd to S Holden Rd GSO	$14,300,000		FY 2029
Total: Water Capital Project Costs		**$1,490,300,000**	**$37,700,000**	

[1] Known grant funding available for the Water Projects includes Randolph County American Rescue Plan Act (APRA) Funding, Randolph County State Budget Infrastructure Grant ($85M), and Asheboro Bipartisan Infrastructure Law (BIL)-Drinking Water State Revolving Fund funds.

Table 7-3: Wastewater "Go-it-Alone" Scenario Project Cost Summary

ID	Wastewater Capital Projects	Total Project Cost	Existing Grant Funding Available[1]	1st Fiscal Year of Debt Payments
WW1	Seagrove 0.09 MGD Package WWTP	$3,000,000	$3,000,000	FY 2026
WW2.1	Liberty Transfer Lift Station to Greensboro	$12,600,000		FY 2027
WW2.2	Liberty Sewer Force Main to Greensboro	$9,500,000		FY 2027
WW3	Greensboro TZO WRF Expansion to 60 MGD	$90,000,000		FY 2034
WW6.1	High Point Eastside WWTP Upgrade of Existing 26 MGD	$585,000,000		FY 2032
WW6.2	High Point Eastside WWTP Expansion to 32 MGD	$270,000,000		FY 2031
WW9	Randleman WWTP Upgrade of existing 1.745 MGD	$73,300,000	$14,500,000	FY 2031
WW14.1	Ramseur WWTP Upgrade of Existing 0.48 MGD	$20,200,000	$7,700,000	FY 2027
WW14.2	Ramseur WWTP Expansion to 1 MGD	$27,300,000	$27,300,000	FY 2027
WW15	Franklinville WWTP Upgrade of Existing 0.1 MGD	$4,200,000	$4,200,000	FY 2031
WW16.1	Asheboro WWTP Upgrade of Existing 9 MGD	$324,000,000		FY 2031
WW16.2	Asheboro WWTP Expansion to 12 MGD	$135,000,000		FY 2033
Total: Wastewater "Go-it-Alone" Capital Project Costs		**$1,554,100,000**	**$56,700,000**	

[1]Known grant funding available for this alternative includes Randolph County State Budget Infrastructure Grant ($85M).

Table 7-4: Wastewater Alternative 1 Project Cost Summary

ID	Wastewater Capital Projects	Total Project Cost	Existing Grant Funding Available[1]	1st Fiscal Year of Debt Payments
WW1	Seagrove 0.09 MGD Package WWTP	$3,000,000	$3,000,000	FY 2026
WW2.1	Liberty Transfer Lift Station to Greensboro	$12,600,000	$2,500,000	FY 2027
WW2.2	Liberty Sewer Force Main to Greensboro	$9,500,000	$9,500,000	FY 2027
WW3	Greensboro TZO WRF Expansion to 60 MGD	$90,000,000		FY 2034
WW4.1	Greensboro Regional Lift Station	$40,800,000		FY 2031
WW4.2	Greensboro Regional Force Main	$62,100,000		FY 2031
WW5	Greensboro Regional Gravity Main	$55,700,000		FY 2031
WW6	High Point Eastside WWTP Upgrade of Existing 26 MGD	$585,000,000		FY 2032
WW7.1	High Point Regional Lift Station	$57,300,000		FY 2031
WW7.2	High Point Regional Force Main	$140,000,000		FY 2031
WW8	Regional Gravity Outfall GSO/HP	$140,800,000		FY 2031
WW10.1	Deep River Regional Lift Station (GSO, HP)	$81,400,000		FY 2031
WW10.2	Deep River Regional Force Main (GSO, HP)	$11,800,000		FY 2031
WW10.3	New Deep River WRF 9.5 MGD	$427,500,000		FY 2031
WW10.4	Deep River WRF Expansion to 25 MGD	$418,500,000		FY 2039
WW14.1	Ramseur WWTP Upgrade of Existing 0.46 MGD	$20,200,000	$10,200,000	FY 2027
WW14.2	Ramseur WWTP Expansion to 1 MGD	$27,300,000	$27,300,000	FY 2027
WW15	Franklinville WWTP Upgrade of Existing 0.1 MGD	$4,200,000	$4,200,000	FY 2031
WW16.1	Asheboro WWTP Upgrade of Existing 9 MGD	$324,000,000		FY 2031
WW16.2	Asheboro WWTP Expansion to 12 MGD	$135,000,000		FY 2033
Total: Wastewater Alternative 1 Capital Project Costs		**$2,646,700,000**	**$56,700,000**	

[1] Known grant funding available for this alternative includes Randolph County State Budget Infrastructure Grant ($85M).

Table 7-5: Wastewater Alternative 2 Project Cost Summary

ID	Wastewater Capital Projects	Total Project Cost	Existing Grant Funding Available[1]	1st Fiscal Year of Debt Payments
WW1	Seagrove 0.09 MGD Package WWTP	$3,000,000	$3,000,000	FY 2026
WW2.1	Liberty Transfer Lift Station to Greensboro	$12,600,000		FY 2027
WW2.2	Liberty Sewer Force Main to Greensboro	$9,500,000		FY 2027
WW3	Greensboro TZO WRF Expansion to 60 MGD	$90,000,000		FY 2034
WW4.1	Greensboro Regional Lift Station	$40,800,000		FY 2036
WW4.2	Greensboro Regional Force Main	$62,100,000		FY 2038
WW5	Greensboro Regional Gravity Main	$55,700,000		FY 2038
WW6.1	High Point Eastside WWTP Upgrade of Existing 26 MGD	$585,000,000		FY 2032
WW6.2	High Point Eastside WWTP Expansion to 32 MGD	$270,000,000		FY 2032
WW7.1	High Point Regional Lift Station	$28,400,000		FY 2038
WW7.2	High Point Regional Force Main	$110,100,000		FY 2038
WW8	Regional Gravity Outfall GSO/HP	$125,000,000		FY 2038
WW9	Randleman WWTP Minimal Upgrade of Existing 1.745 MGD	$39,300,000	$14,500,000	FY 2031
WW10.1	Deep River Regional Lift Station (GSO, HP)	$56,800,000		FY 2038
WW10.2	Deep River Regional Force Main (GSO, HP)	$8,000,000		FY 2038
WW10.3	New Deep River WRF 18.5 MGD	$832,500,000		FY 2038
WW14.1	Ramseur WWTP Upgrade of Existing 0.46 MGD	$20,200,000	$7,700,000	FY 2027
WW14.2	Ramseur WWTP Expansion to 1 MGD	$27,300,000	$27,300,000	FY 2027
WW15	Franklinville WWTP Upgrade of Existing 0.1 MGD	$4,200,000	$4,200,000	FY 2031
WW16.1	Asheboro WWTP Upgrade of Existing 9 MGD	$324,000,000		FY 2031
WW16.2	Asheboro WWTP Expansion to 12 MGD	$135,000,000		FY 2033
Total: Wastewater Alternative 2 Capital Project Costs		**$2,839,500,000**	**$56,700,000**	

[1] Known grant funding available for this alternative includes Randolph County State Budget Infrastructure Grant ($85M).

Table 7-6: Wastewater Alternative 3 Project Cost Summary

ID	Wastewater Capital Projects	Total Project Cost	Existing Grant Funding Available[1]	1st Fiscal Year of Debt Payments
WW1	Seagrove 0.09 MGD Package WWTP	$3,000,000	$3,000,000	FY 2026
WW2.1	Liberty Transfer Lift Station to Greensboro	$12,600,000	$2,500,000	FY 2027
WW2.2	Liberty Sewer Force Main to Greensboro	$9,500,000	$9,500,000	FY 2027
WW4.1	Greensboro Regional Lift Station	$61,200,000		FY 2030
WW4.2	Greensboro Regional Force Main	$62,100,000		FY 2030
WW5	Greensboro Regional Gravity Main	$55,700,000		FY 2030
WW6	High Point Eastside WWTP Upgrade of Existing 26 MGD	$585,000,000		FY 2032
WW7.1	High Point Regional Lift Station	$57,300,000		FY 2030
WW7.2	High Point Regional Force Main	$140,000,000		FY 2030
WW8	Regional Gravity Outfall GSO/HP	$133,000,000		FY 2030
WW11	Randleman Regional Gravity Main	$2,000,000		FY 2030
WW12	Regional Gravity Outfall Randleman Tie-In	$44,200,000		FY 2030
WW13.1	Deep River Regional Lift Station (GSO, HP, Rand)	$106,200,000		FY 2031
WW13.2	Deep River Regional Force Main (GSO, HP, Rand)	$16,200,000		FY 2031
WW13.3	New Deep River WRF 30 MGD	$1,357,700,000		FY 2031
WW13.4	Deep River WRF Expansion to 43 MGD	$342,100,000		FY 2040
WW14.1	Ramseur WWTP Upgrade of Existing 0.46 MGD	$19,300,000		FY 2032
WW14.2	Ramseur WWTP Expansion to 1.25 MGD	$41,500,000	$35,000,000	FY 2032
WW19.1	Franklinville Transfer Lift Station to Ramseur	$2,700,000	$2,700,000	FY 2033
WW19.2	Franklinville Sewer Force Main to Ramseur	$4,000,000	$4,000,000	FY 2033
Total: Wastewater Alternative 3 Capital Project Costs		**$3,055,300,000**	**$56,700,000**	

[1] Known grant funding available for this alternative includes Randolph County State Budget Infrastructure Grant ($85M).

Table 7-7: Wastewater Alternative 4 Project Cost Summary

ID	Wastewater Capital Projects	Total Project Cost	Existing Grant Funding Available[1]	1st Fiscal Year of Debt Payments
WW1	Seagrove 0.09 MGD Package WWTP	$3,000,000	$3,000,000	FY 2026
WW2.1	Liberty Transfer Lift Station to Greensboro	$12,600,000	$2,500,000	FY 2027
WW2.2	Liberty Sewer Force Main to Greensboro	$9,500,000	$9,500,000	FY 2027
WW4.1	Greensboro Regional Lift Station	$61,200,000		FY 2030
WW4.2	Greensboro Regional Force Main	$62,100,000		FY 2030
WW5	Greensboro Regional Gravity Main	$55,700,000		FY 2030
WW6.1	High Point Eastside WWTP Upgrade of Existing 26 MGD	$585,000,000		FY 2032
WW7.1	High Point Regional Lift Station	$57,300,000		FY 2030
WW7.2	High Point Regional Force Main	$140,000,000		FY 2030
WW8	Regional Gravity Outfall GSO/HP	$133,000,000		FY 2030
WW11	Randleman Regional Gravity Main	$2,000,000		FY 2030
WW12	Regional Gravity Outfall Randleman Tie-In	$44,200,000		FY 2030
WW13.1	Deep River Regional Lift Station (GSO, HP, Rand)	$106,200,000		FY 2031
WW13.2	Deep River Regional Force Main (GSO, HP, Rand)	$16,200,000		FY 2031
WW13.3	New Deep River WRF 31 MGD	$1,413,900,000		FY 2031
WW13.4	Deep River WRF Expansion to 44 MGD	$342,600,000		FY 2040
WW17.1	Ramseur Regional Lift Station	$17,000,000	$17,000,000	FY 2032
WW17.2	Ramseur Regional Force Main	$60,300,000	$19,000,000	FY 2032
WW18.1	Franklinville Regional Lift Station/Force Main	$5,700,000	$5,700,000	FY 2033
Total: Wastewater Alternative 4 Capital Project Costs		**$3,127,500,000**	**$56,700,000**	

[1] Known grant funding available for this alternative includes Randolph County State Budget Infrastructure Grant ($85M).

Table 7-8: Summary Comparison of Alternative Project Costs

Alternative	Water Capital Project Cost	Wastewater Capital Project Cost	Total Capital Project Cost
"Go-it-Alone" Alternative	$1,490,400,000	$1,554,300,000	**$3,044,500,000**
Alternative 1	$1,490,400,000	$2,645,900,000	**$4,137,100,000**
Alternative 2	$1,490,400,000	$2,840,100,000	**$4,339,900,000**
Alternative 3	$1,490,400,000	$3,055,400,000	**$4,545,700,000**
Alternative 4	$1,490,400,000	$3,127,600,000	**$4,617,900,000**

7.3 Funding Sources and Recently State Awarded Grants

There are various funding options through NCDEQ's Division of Water Infrastructure (DWI) that could be utilized to achieve the needs of the utility providers in Guilford and Randolph County. Some of these funds will likely be required to achieve some of the recommendations in this report, when appropriate. DWI provides low-interest loans and grants for local governments and certain other non-profit entities for water and wastewater infrastructure through the following programs:

- State Wastewater & Drinking Water Reserve Programs: Provides grants for technical assistance and for construction of critical needs for wastewater collection systems, wastewater treatment works, and public water system projects.
- Clean Water State Revolving Fund (CWSRF): Provides low-interest loans to local government units to fund wastewater collection and treatment facilities as well as programs associated with estuary and non-point sources.
- Drinking Water State Revolving Fund (DWSRF): Provides low-interest loans to local government units, non-profit water corporations and investor-owned drinking water companies for projects to provide safe drinking water.
- Community Development Block Grant – Infrastructure: Provides grants to local government units to address water and wastewater infrastructure needs in housing and urban development (HUD) qualified low-to-moderate income communities.
- Merger/Regionalization Feasibility Grant Program: Provides grants for studies to evaluate the potential consolidation of two or more systems into one system and the potential physical interconnection with another system for regional wastewater treatment or regional water supply.
- Asset Inventory and Assessment Grant Program: Provides grants for developing asset inventories, condition assessment of critical assets, and other components of a comprehensive asset management program.
- Viable Utilities Program: Provides grant funding to build a path toward viable utility systems using long-term solutions for distressed water and wastewater units in North Carolina.

- Lead Service Line Replacement Funding: Provides zero-interest loans and principal forgiveness funding to local government units, non-profit water corporations and investor-owned drinking water companies specifically to identify, inventory, and replace lead service lines and lead connectors throughout water systems.
- Emerging Contaminants (PFAS) Funding: Provides funding to local government units, non-profit water corporations, and investor-owned drinking water companies to evaluate/assess solutions and/or construction of solutions to address PFAS contamination in drinking water systems, wastewater systems, and publicly owned landfills.

In three session laws between 2021 and 2023, the State of North Carolina appropriated over $4.2 billion for drinking water, wastewater, and stormwater projects statewide, in addition to other federal and state funding made available for infrastructure projects. This includes over $600 million in directed grant infrastructure funding. Other federal, state, and local funds are also being invested in the study area on infrastructure projects in addition to the funds being administered by DWI.

As Guilford and Randolph County grow and develop during the planning period it will be imperative for the combined success of the region that directed grants and other funding sources be leveraged to ensure that infrastructure projects create regional value to meet the goals and address the challenges outlined in this report.

7.4 Cost Impacts

As a part of the Study, a methodology was developed to evaluate the impact of capital investment associated with four regionalization alternatives on water and wastewater rates for nine utilities in Guilford and Randolph County through 2050. The local government owned utilities in the Study include Archdale, Asheboro, Franklinville, Greensboro, High Point, Jamestown, Liberty, Ramseur, and Randleman. To evaluate the impact on water and wastewater rates, the team developed a unit cost analysis model which provides a detailed review of the escalating total annual costs for each utility system in relation to the growing customer demand for services. The unit cost in the Study analysis is expressed as the total projected annual system cost per 1,000 gal (kgal) of water or wastewater demand. The annual percent change in the water or wastewater unit cost represents the necessary increase in revenues, and therefore user rates, in order to meet the total annual water or wastewater system cost. The unit cost analysis assumed that utilities existing FY2026 user rates were sufficient to recover total annual system costs in FY2026. To equitably compare the impact of rate increases amongst utilities, Raftelis utilized a “typical” monthly residential bill for water and wastewater services of 5,000 gallons. Figure 7-1 exhibits the existing FY2026 monthly residential bill for water and wastewater for each utility based on 5,000 gallons.

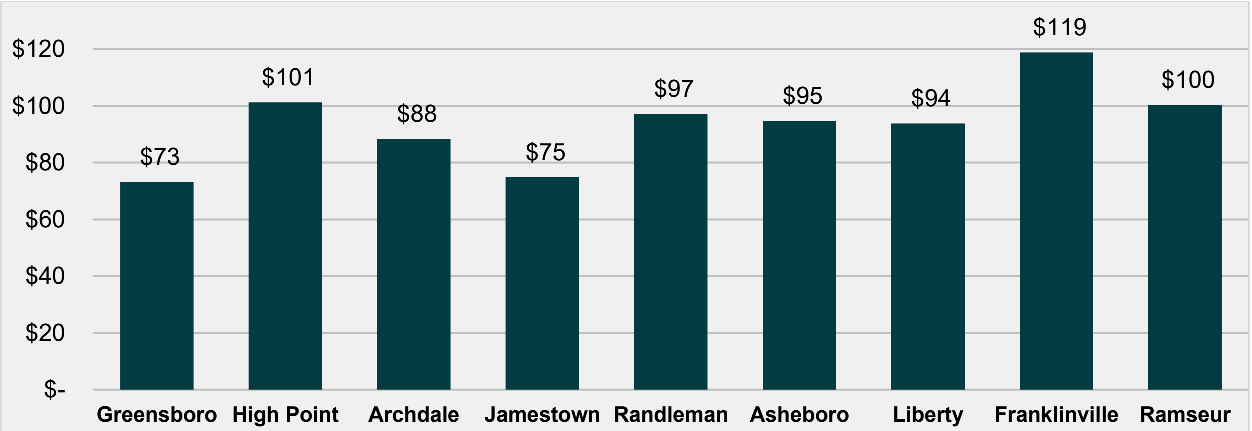


Figure 7-1: Combined Current FY26 Residential Monthly Bill Comparison (5 kgal)

Using the existing monthly bills (based on a 5,000 gal/month usage) as a baseline, future costs associated with each utility's revenue requirements were applied which include existing operating expenses, debt service, and funding of capital improvement projects. Figure 7-2 shows the projected water and wastewater combined 5,000-gallon monthly bills in FY2050 if the utilities do not participate in any of the regionalization alternatives. This scenario is also referred to as the "Go-it-Alone" scenario and assumes all system revenue requirement costs are executed and funded with user rate charges. It should also be noted that the "Go-it-Alone" scenario does not provide a full solution for wastewater demand where all nine (9) utilities would have adequate capacity through FY2050. Both Greensboro and High Point would become capacity limited on wastewater before FY2050 without one of the four alternatives being implemented. While water and wastewater rates should be expected to increase significantly over the next 25 years due to increases in operating and capital investment costs, several of the forecasted utility bills shown in Figure 7-2 are forecasted to need to increase over 6% on average annually through 2050 in a "Go-it-Alone" scenario. Because a majority of the capital project costs are projected to be incurred over the next 10 years, several of the immediate forecasted rate increases are much higher than 6%.

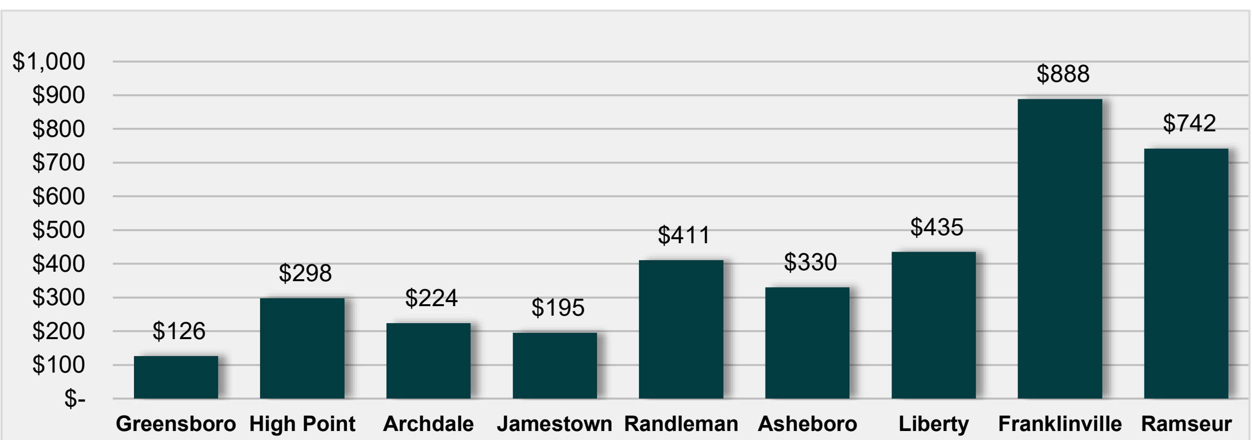


Figure 7-2: Projected FY50 Residential Monthly Bills "Go-it-Alone" (5 kgal)

To determine the impacts associated with each of the alternatives, the Study computed the estimated rate impacts of adding the capital and operational cost of each regional alternative to the "Go-it-Alone" scenario, removing any existing ("Go-it-Alone") project costs which were eliminated due to a particular regionalization alternative. The capital expense associated with replacing existing treatment capacity at brand-new, regional facilities is projected to be significantly more expensive than simply executing incremental upgrades and improvements at the current, existing utility plants. Due to these comprehensive capital cost assumptions embedded within the alternatives, the total financial impact on utility rates for each utility is generally projected to be the same or higher in the regional alternatives compared to the "Go-it-Alone" solution, unless substantial outside funding support is successfully secured. This means that utility bills will project the same or higher in each of the alternatives, because of added project cost, without outside funding support. Figure 7-3 shows the projected water and wastewater combined 5,000-gallon monthly bills in FY2050 if the utilities participate in a regionalization alternative.

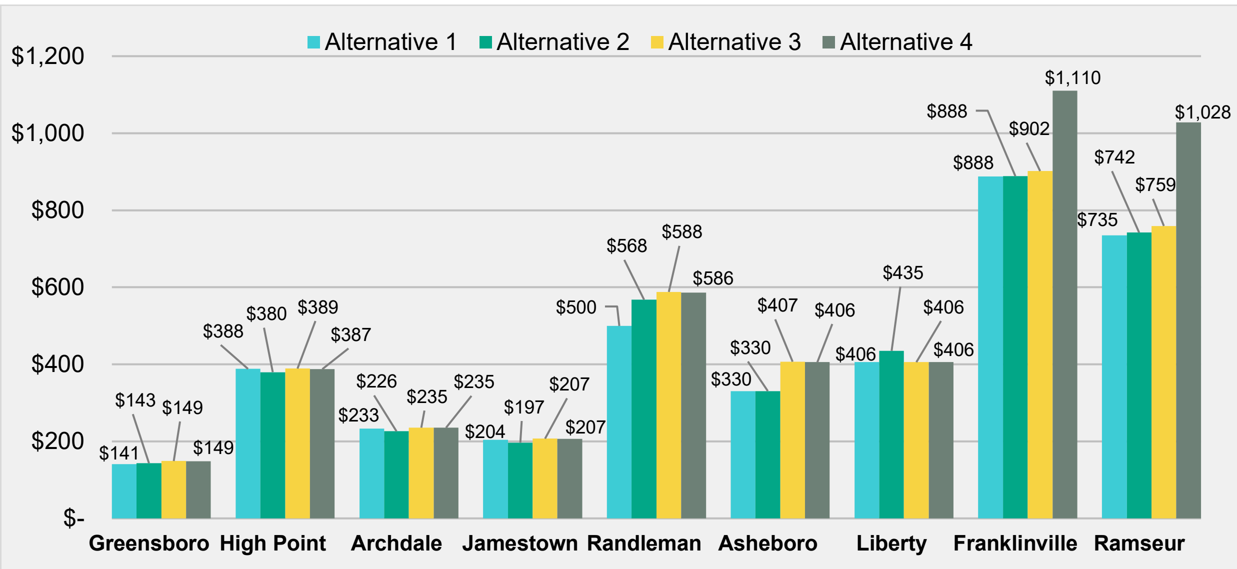


Figure 7-3: Projected FY50 Residential Monthly Bills by Alternative (5 kgal)

Figure 7-3 illustrates that without some level of outside funding support, proceeding with a regionalized alternative would have the same if not worse impact on water and wastewater user rates compared to the "Go-it-Alone" scenario, making monthly utility bills in FY2050 particularly unreasonable for the smaller communities in Randolph County.

7.4.1 Financial Recommendations

Based on the unit cost analysis comparing the "typical" utility bill impacts for the four regionalization alternative against the "Go-it-Alone" scenario, the following strategic financial recommendations are crucial for ensuring the successful implementation of the preferred alternative.

- **Financial Planning:** Each individual utility should conduct detailed financial planning and rate analysis using the project costs that develop from the PTRWA Regional Alternative Regionalization Study. This will provide a level of detailed financial evaluation that will be comprehensive enough to provide more accurate insights to the extent in which utilities are willing to participate in various alternatives.

- **Acquire Outside Funding Support:** For any regional alternative to be feasible, as it pertains to the financial viability and reasonability of projected "typical" customer bills, a level of outside funding support is needed to subsidize the capital cost for the most vulnerable communities. It should be noted that outside funding support will also be required in the "Go-it-Alone" scenario, otherwise vulnerable utilities will continue to defer necessary capital maintenance and improvements. While individual utilities in the "Go-it-Alone" scenario could potentially acquire grant funding, the North Carolina State Legislature has indicated a clear strategic preference for supporting regional solutions, as demonstrated by House Bill 694, which directs the UNC Environmental Finance Center to study regionalization with the intention of identifying pathways to lower the cost of utility services across the State. Therefore, for the purposes of this comparative analysis, it is conservatively assumed that the "Go-it-Alone" scenario would not receive outside funding support, while a regionalization Alternative would likely be positioned to receive and leverage a higher level of external financial assistance. Table 7-9 displays the identified level of outside funding support required for each utility in each alternative for projected water and wastewater charges to remain reasonable in FY2050.

Table 7-9: Identified Level of Funding Support

Utility Provider	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Greensboro				
High Point	$ 234.3 M	$ 314.2 M	$ 315.0 M	$ 314.5 M
Archdale				
Jamestown				
Randleman	$ 83.7 M	$ 134.3 M	$ 124.5 M	$ 124.5 M
Asheboro			$ 472.6 M	$ 473.0 M
Liberty	$ 21.6 M	$ 33.6 M	$ 21.6 M	$ 21.6 M
Franklinville	$ 9.2 M	$ 9.2 M	$ 9.2 M	$ 21.9 M
Ramseur	$ 74.9 M	$ 77.4 M	$ 90.5 M	$ 156.6 M
Total Funding Support	**$ 423.7 M**	**$ 568.7 M**	**$ 1,033.4 M**	**$ 1,112.1 M**

- **Acquire Outside Funding Support (cont.):** Every dollar of regional alternative project cost for Liberty, Franklinville, and Ramseur is identified to require outside funding. The outside funding support for the designated utilities will significantly reduce the burden of the large upfront capital investment that is required in all alternatives. The impacts the funding support will have on the FY2050 "typical" water and wastewater residential customer bills is shown in Figure 7-4 and Figure 7-5. It is crucial to highlight that, with the outside funding support, Figure 7-5 illustrates the Guilford County utilities paying at or above the "Go-it-Alone" scenario for their alternative Regionalization Study capital projects and a majority of the Randolph County utilities paying at or below for theirs. It should be noted that Alternatives 1-4 are more expensive for Greensboro and High Point because they are acquiring more wastewater capacity than in the "Go-it-Alone" scenario. The "Go-it-Alone" scenario does not address the full future wastewater demands for the region.

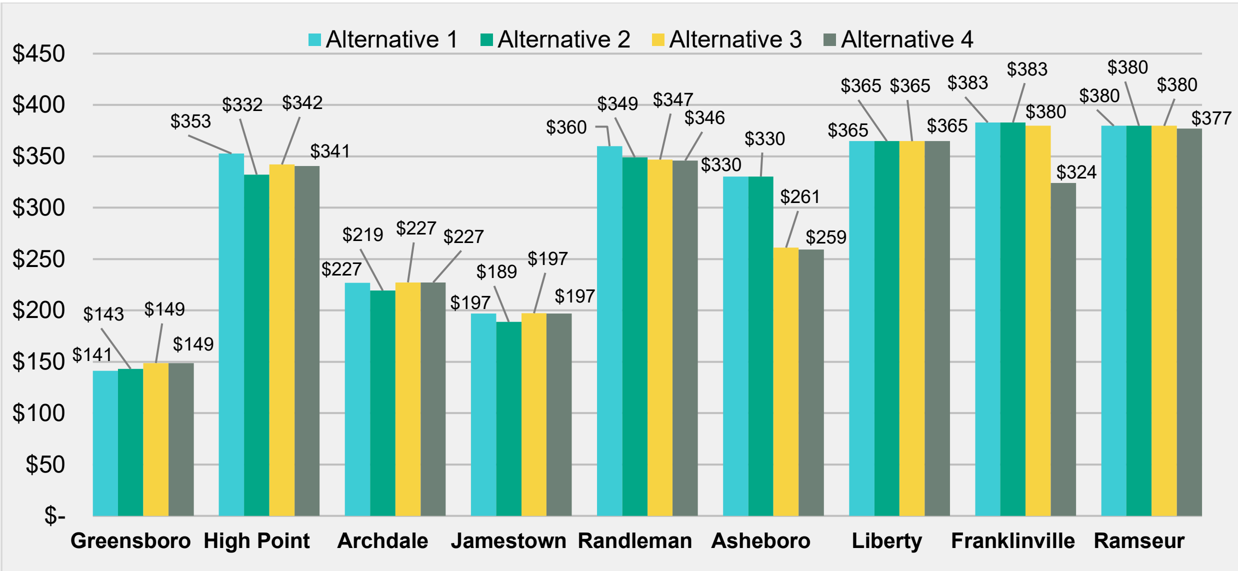


Figure 7-4: Projected FY50 Monthly Bills by Alternative with Support (5 kgal)

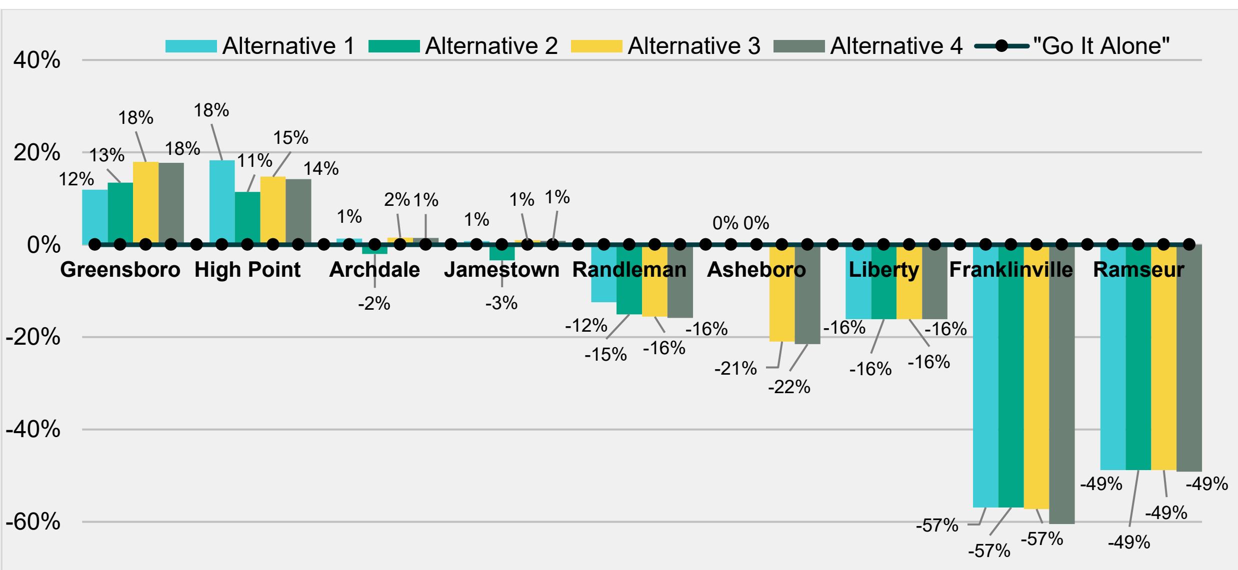


Figure 7-5: Alternatives with Support vs. "Go-it-Alone" FY50 Monthly Bills % Difference

*The "Go-it-Alone" scenario does not address the full wastewater demands for the region through 2050

- **Pursue Alternative:** Each of the nine utilities will need to work with PTRWA and/or the planned utility provider to begin the engineering, financial, and governance processes for the implementation of the selected alternative. Communication of financial objectives and challenges will be key to the success of Guilford and Randolph County water and wastewater regionalization efforts.
- **Explore Additional Regionalization Solutions:** The PTRWA Regionalization Study alternatives present regional solutions in the framework of wholesale water and wastewater capacity allocations, as is currently the model for water treatment at PTRWA. Other formal partnerships such as interlocal agreements for purchasing treatment or contracting of infrastructure management can alleviate the high cost of maintaining and operating a full utility system, especially for the communities that lack the economies of scale to effectively do so. If a stakeholder's primary regional objective is to achieve regional rate parity with peers, consolidation of the utility services is the most practical regional solution.

8. Regionalization Governance Approaches

Successfully addressing the long-term water and wastewater needs outlined in this Regionalization Study will require an increased level of regional cooperation. This increased cooperation must be forward-thinking and designed to address considerations that include management of resources like biosolids and exploring future potential areas like reclaimed water. To support this cooperation will, in turn, require new institutional frameworks and policies to help all participating jurisdictions move beyond fragmented, local control of existing water resources toward a more unified, sustainable approach. As the existing regional authority, PTRWA is ideally positioned to lead the continued regional cooperation, and doing so will likely require modifications of its current governance approach.

PTRWA must consider how changes to its membership and governing body can ensure the responsible and integrated governance of regional services and resources while maintaining shared decision-making across all existing and potential future participants. This section provides an overview of the current situation and offers several governance considerations and options as PTRWA charts its path forward.

8.1 Background on Governance

PTRWA is a public body established in December 1986 under Chapter 162A of the General Statutes of North Carolina. Its original organizing political subdivisions included the City of Greensboro, the City of High Point, the City of Archdale, the City of Randleman, the Town of Jamestown, and the County of Randolph.

PTRWA's original focus was to provide sustainable and dependable drinking water resources, initially focused on developing and administering the Randleman Lake water supply. While that initial focus remains true today, the organization's recently developed Strategic Plan provides an expanded mission, which states that *"PTRWA exists for the benefit of the citizens of Randolph and Guilford Counties and partners with the region's communities to plan, advocate for, develop, and deliver high-quality water, wastewater, and related services."*

Further, the 2024 Strategic Plan established a roadmap to guide organizational actions and decisions with a central vision: *To support community and economic vitality through regional leadership by effectively managing high-quality water and wastewater resources.*

The development of this Regionalization Study supports the organization's strategy of *Enhanced Regionalization of Water and Wastewater Resources.* This strategic priority explicitly calls for the Authority to:

1. **Convene Stakeholders**: Build consensus and partner to elevate resource availability and address water and wastewater challenges across the region.
2. **Develop Comprehensive Solutions**: Lead the effort to explore and develop comprehensive regional water and wastewater solutions.
3. **Leverage Economies of Scale**: Evaluate the potential for expanding membership to maximize relative benefits and economic efficiency.

The Strategic Plan also addresses **Infrastructure and Service Delivery**, with strategies to expand wholesale water capacity and pursue opportunities to provide regional wastewater services, ensuring that the necessary capacity exists to support the region's significant industrial growth and anticipated residential needs.

The commitment to expanding regionalization is becoming more tangible. In June 2024, the City of Asheboro and PTRWA signed a Memorandum of Understanding (MOU) agreeing to evaluate the feasibility of the City of Asheboro's potential future membership. This collaboration is directly informed by the strategic goal of regional enhancement and a 2024 NCDEQ report that advocated for further regionalization efforts.

Actively exploring enhanced regionalization enables PTRWA to move beyond its existing two-county water management role, potentially expanding its membership and encompassing broader water and wastewater services. PTRWA and its subdivisions have demonstrated a strong commitment to a robust, sustainable, and economically viable future for the Piedmont Triad region by commissioning the creation of this Regionalization Study effort.

Regardless of the alternative chosen by PTRWA and its member jurisdictions, the Authority will need to modify its current membership to enable full representation, potentially altering the number of representatives or proportionate representation.

PTRWA, like other water and sewer authorities throughout North Carolina, is governed by an independent board appointed by the forming member jurisdictions (counties, municipalities, and other political subdivisions). The power of appointment and removal gives member governments influence. However, board members must act as fiduciaries of the Authority, taking an oath to prioritize and serve in the best interests of the utility system, or the Authority, itself, over the competing demands of individual member jurisdictions' priorities. The governing body organizes by electing officers and adopting bylaws; it requires a majority quorum for decisions; it is granted broad statutory powers to finance, construct, operate, and acquire water, wastewater, and stormwater systems; it sets independent rates and fees (sufficient to cover costs, debt service, and reserves); and it adopts necessary ordinances to regulate utility services.

As utilities become regionalized and expand to include new members, it is important that the composition of the utility governing body ensures equitable representation among participating jurisdictions, as the constituencies of each jurisdiction will expect that.

8.1.1 Current State of Governance

The economic success of the Piedmont Triad, fueled by significant new commercial and industrial investment, is creating enormous demand for regional infrastructure. While local utilities have managed successfully to date, the complexity and scale of future infrastructure needs and regulatory requirements will demand a collaborative approach.

As an interlocal governmental agency, PTRWA's established framework already enables collaborative planning and investment in shared water infrastructure. However, the Authority's existing scope primarily addresses water supply, with individual municipalities generally responsible for their own wastewater treatment infrastructure and planning. The core challenge is achieving effective capacity and managing escalating costs responsibly.

The scale of expansion required to sustain this growth and the significant investment needed to comply with increasingly stringent state and federal regulatory requirements present major financial hurdles. For smaller communities, shouldering these essential, expensive upgrades independently can threaten the affordability and long-term viability of their utility services.

Critically, the region currently lacks a singular, unified entity capable of comprehensive, long-term resource planning for water and wastewater and essential resources derived from the treatment process. In particular, biosolids management is a major component of managing resources from wastewater treatment, and various options must be evaluated to determine the right path forward. Similarly, there must be some thinking about other future needs or potential services like reclaimed water. Moreover, the long-term sustainability of utility services often requires a governance model that ensures financial stability and provides an independent platform for making complex, multi-jurisdictional decisions about rates, capacity, and resource allocation.

To sustain economic momentum and ensure the long-term viability of these essential services, a regional solution is necessary. Cooperative entities, namely the PTRWA, can be expanded to leverage economies of scale, efficiently pool resources, manage risk more effectively, and establish the integrated planning and governance framework needed to deliver resilient, affordable, and compliant utility services to all member communities.

Adding new jurisdictions to PTRWA is a major undertaking. It will require amendments to the Authority's foundational documents and the explicit consent and restructuring of the Authority's cost-sharing model by all existing members. Several legal and governance amendments would be required, including:

- **Amended Articles of Incorporation:** The PTRWA's Certificate of Incorporation would need to be amended to formally recognize any new member as an "organizing political subdivision." This requires formal resolutions from the proposed new member community and *all existing PTRWA members*, followed by a filing with the North Carolina Secretary of State.
- **Amended Bylaws:** The PTRWA Bylaws, specifically Article II, Section 1(a) on Membership, would need a revision to modify the total number of Authority members (currently 10) and specify the number of Directors the new member would appoint to the Board. Any other sections impacted by an increased membership size (e.g., quorum definitions if not already sufficiently broad) would also need to be reviewed. The Bylaws allow for amendments by resolution at a regular, annual, or special meeting, with prior written notice to its current Directors.
- **Amended Joint Governmental Agreement:** This is the most complex and crucial step. The JGA explicitly states that it "may be amended or terminated only by a writing signed by all parties." Therefore, unanimous written consent from Greensboro, High Point, Archdale, Randleman, Jamestown, and Randolph County, in addition to the new members' agreement, will be required. This amendment will incorporate all the agreed-upon financial contributions,

water allocations, and responsibilities for the new member, and require an update of the corresponding exhibits.

8.2 Key Governance Considerations

Depending on the specific alternative selected, and the potential new makeup of PTRWA membership, several key considerations will impact how the organization approaches any changes to its current governance approach.

Consideration 1: Why must PTRWA current governance structure change?

Given the anticipated growth and demand for shared resources, PTRWA's governance approach must change to meet future needs. It is likely that PTRWA's membership would need to expand to ensure that communities that seek to own water and/or wastewater allocation, and/or to participate in any potential future regional management such as biosolids would desire to be members of the Authority, thus resulting in the need to change the composition of its Board. There are various approaches to regional cooperation that include interlocal agreements, wholesale purchase/treatment capacity agreements, joint ownership, and consolidation agreements, along with full consolidation agreements.

Consideration 2: Should PTRWA's governance to water and wastewater be under one governing body or two separate bodies?

There is no specific requirement for the PTRWA governing body to be a single entity providing governance over both regionalized water and wastewater utility services. While it may become necessary to establish a separate wastewater specific governing body under the PTRWA umbrella, the best short-term approach is to keep both water and wastewater utility under one governing body. This option is discussed in more detail below under Governance Options.

Consideration 3: Should the proposed future PTRWA governing body be configured to address the potential that a weighted vote (based on population, number of metered accounts, or treatment facility usage/allocation) be established?

Currently, there are a number of regional governing bodies across the United States where the full voting power of the board is proportionately allocated and assigned among the member agencies based on a number of criteria. This is mainly done when voting on significant financial matters, often including approval and issuance of bonds. Weighted voting serves to ensure that communities with greater financial stake or usage have a proportionally higher say in decisions related to utility system financing. This should be a topic of discussion as the PTRWA Board begins to implement any specific changes to its membership going forward.

Consideration 4: Assuming PTRWA's approach to governance will become modified, can a proposed new approach be established that would enable the addition of new members in the future?

While it may be clear right now that certain communities may wish to join the Authority, and some communities may not, experience shows that conditions change over time. Assuming PTRWA may want to add new members in the future, it will be critical to establish a membership framework that outlines the criteria for future membership.

Based on these four considerations, the following three options would be workable approaches for potential modifications to PTRWA's governance approach. Each of these options has benefits and challenges associated with them.

8.3 Governance Options

8.3.1 Option 1: Limited Regional Water and Wastewater Collaboration

In this option, the regional authority would limit board membership to municipal utility operators in the Piedmont Triad, which would include existing PTRWA members, the City of Asheboro, and other interested municipalities, assuming they choose to participate. This model would focus on regionalizing water and wastewater wholesale treatment services for a defined core group. Municipal governments that do not directly manage utilities would have representation through the respective utilities that already serve them, and additional ILAs would be established to define these relationships and service provisions.

Benefits of this approach include:

- **Simpler Formation:** Involves a more limited number of initial parties, namely Asheboro and any other jurisdictions that would contribute to the Authority's regional service, potentially simplifying the negotiation and establishment of the expanded authority.
- **Targeted Advantages:** Allows a core group of key regional utility operators to achieve specific shared economies and efficiencies in water and wastewater management.
- **Preserves Local Autonomy for Non-Members:** Municipalities outside the core group retain full control over their individual utility assets and decision-making when not covered by new interlocal agreements.

Potential **challenges** with this governance model include:

- **Risk of Uncoordinated Planning:** Continued independent operations by other regional entities could lead to less coordinated infrastructure development and suboptimal resource allocation in certain areas not included in the core group.
- **Investment Imbalance**: Potential for disproportionate investment burdens, where larger utility operators may need to make more significant financial or infrastructure contributions compared to smaller member municipalities.

8.3.2 Option 2: Dual Regional Boards for Water and Wastewater

This option also suggests expanding regional collaboration to include the City of Asheboro, assuming the City elects to join the Authority, but through the establishment or recognition of two distinct PTRWA regional governing bodies: one for regional water supply (the existing PTRWA with an expanded membership) and another separate board for regional wastewater treatment that includes municipal jurisdictions that are interested in a regional solution for wastewater treatment.

Benefits of dual regional boards for water and wastewater include:

- **Specialized Focus:** Each board can maintain a specialized focus on the technical and regulatory aspects of either water supply or wastewater treatment.
- **Potentially Easier Transition:** May present a less disruptive integration pathway for new members, as they join specific utility functions rather than a fully integrated system.
- **Clearer Accountability:** Distinct lines of responsibility for each service area, which could simplify performance tracking.

Potential **challenges** of this approach include:

- **Fragmented Planning:** Risks siloed decision-making and potential lack of coordination between water supply and wastewater management, hindering comprehensive water cycle planning emphasized by the Regionalization Study.
- **Duplication of Resources:** Potential for redundant administrative overhead, staff, and support functions across two separate boards.
- **Missed Synergies:** Limits the ability to achieve full economies of scale and operational efficiencies that a single integrated authority could offer.
- **Potential for Conflicting Priorities:** Separate boards might develop differing objectives or compete for regional resources, potentially delaying critical infrastructure projects.

8.3.3 Option 3: Integrated Regional Authority for Water and Wastewater

This option proposes expanding PTRWA's membership to include the City of Asheboro, as well as other interested municipal utilities, assuming they elect to join the Authority. Additionally, Guilford County would be added in recognition that both counties should be represented on the PTRWA Board. This option would establish a single, consolidated regional authority with one governing Board responsible for both regional water treatment and regional wastewater treatment plants. All other municipalities within the broader PTRWA region would participate through individual interlocal agreements for service.

The **benefits** of an integrated regional authority for water and wastewater include:

- **Holistic Water Management:** Enables integrated planning and management of the complete water cycle, from source to discharge, aligning with Regionalization Study goals for resource optimization and long-term sustainability.
- **Expanded Water Reuse Opportunities:** An integrated regional authority is uniquely positioned to advance water reuse initiatives, including the beneficial use of reclaimed water for industrial, agricultural, and landscape purposes. By managing both water and wastewater under a single governance structure, the Authority can more effectively plan, invest in, and

operate water reuse infrastructure, supporting regional sustainability goals and reducing overall demand on potable water supplies.

- **Regional Biosolids Management:** As discussed previously, the need to address wastewater treatment biosolids will be a critical need for not only the communities within Guilford and Randolph Counties but could also address the needs of other surrounding municipal jurisdictions in Alamance County and beyond. Since biosolids are a resource from wastewater treatment, opportunities exist to manage biosolids and leverage PTRWA as a regional organization.
- **Operational Efficiencies:** Potential for significant economies of scale in capital projects, operations, and maintenance due to unified oversight, benefiting large-scale infrastructure needs highlighted by the US 421 Corridor Study.
- **Streamlined Decision-Making:** A single board simplifies coordination and accelerates responses to regional water and wastewater challenges.
- **Enhanced Funding Opportunities:** A larger, more comprehensive regional entity may be better positioned to secure state and federal grants and financing for major infrastructure investments.
- **Robust Regional Growth Support:** Provides a unified strategy for supporting economic development and population growth across the region.

Potential **challenges** of this approach include:

- **Governance Adjustments:** Requires thoughtful consideration and potential adjustments to the current PTRWA interlocal agreements regarding representation and voting structures for the expanded board.
- **Initial Transition Investment:** Requires an initial investment in administrative and technical resources to ensure a smooth transition and operational alignment.

8.4 Governance Recommendations

The consulting team recommends that PTRWA move forward with Option 3 and strive to establish an integrated regional authority for water and wastewater with one governing body. This approach would best balance the needs for efficiency and representation, while positioning the organization for long-term sustainability, and providing a pathway for future jurisdictions to join the Authority in the future. The inclusion of both Guilford and Randolph Counties ensures that the voices of small communities, both incorporated and unincorporated, within each county would be represented, whether those communities ultimately elect to join.

This approach not only supports integrated planning and operational efficiencies but also enables the Authority to pursue advanced water reuse strategies—leveraging treated wastewater as a resource for non-potable applications and establishing PTRWA as a regional provider, which further strengthens the region's resilience for providing high quality and efficient water and wastewater services.

The vision for this integrated approach is graphically depicted in Figure 8-1.

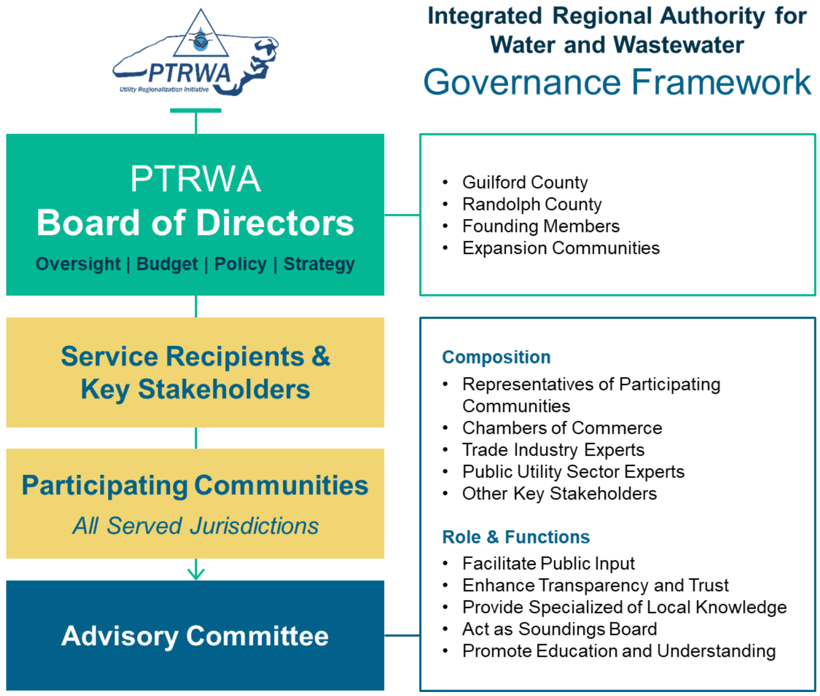


Figure 8-1: Governance Framework for Integrated Regional Authority for Water and Wastewater

Because an exact preferred scenario for the future members of PTRWA and the composition of its future Board of Directors is unknown at this time, the following is a proposed framework, or roadmap, that PTRWA can use to guide its possible change to the organization's governance approach. This framework assumes that PTRWA would elect to move forward with Option 3 and seek to advance Alternative 4 discussed in the Regionalization Study. If successful, this would result in the establishment of an integrated regional authority for water and wastewater.

To establish an integrated regional authority for water and wastewater that is both workable now and flexible to accommodate potential future members, the proposed governance framework includes the following provisions:

1. PTRWA's original member jurisdictions are recognized as founding members. As founding members, they will maintain their current board seats on the PTRWA Board of Directors, unless they voluntarily yield their seats, or sell their water allocation to another jurisdiction.
2. A new member classification will be created to allow for expansion communities. Expansion communities would be eligible to occupy a PTRWA Board of Director seat under the following criteria:
   a. Have retail water and/or wastewater utility, and/or
   b. Own an allocation at either an existing PTRWA owned water treatment facility or wastewater treatment facility
   c. Purchase existing allocation from current members

   d. Provide new water and/or wastewater supply currently owned by the proposed expansion community

3. To ensure that the PTRWA governance maintains a broad regional perspective, it is proposed that both Guilford County and Randolph County would each, at a minimum, have a single seat on the PTRWA Board of Directors. For each County to obtain and maintain their respective seats they must have an active ILA that requires county participation and financing (funding obligation) in support of utility regionalization. Specifically, Guilford County must partner with either Greensboro or High Point, and Randolph County must partner with Asheboro. Such support could include extensions into unincorporated areas of their respective counties, or other financial support.

4. PTRWA would establish a roster of participating communities, which would be made up of all communities that either directly or indirectly receive water and/or wastewater treatment services from PTRWA. This would include incorporated municipal jurisdictions as well as unincorporated jurisdictions who may currently be or may become served by either a founding member or expansion community.

5. The PTRWA Board would establish an official advisory committee comprised of representatives of participating communities and other key stakeholders, such as chamber of commerce representatives, trade industry representatives, representatives with subject matter expertise in the public utility sector, educational institutions, etc. The role of the advisory committee would broadly be to:

   - **Facilitate Public Input**: Provide a structured channel for diverse community perspectives on utility operations, policies, and future plans (e.g., long-range water/wastewater master plans and capital improvement projects).

   - **Enhance Transparency and Trust**: By involving citizens directly in discussions, these bodies promote openness in utility decision-making, which can build public confidence and legitimacy for the governing body's actions.

   - **Provide Specialized or Local Knowledge**: Members may bring unique insights, local historical context, or specialized professional expertise that complement the knowledge of the Authority’s staff and its Board of Directors.

   - **Act as a Sounding Board**: The advisory committee can also serve as an initial forum to test ideas, gauge public reaction to proposed changes (e.g., large capital projects, new service initiatives), and identify potential public concerns before formal adoption by the Board of Directors.

   - **Promote Education and Understanding**: Through their participation, members gain a deeper understanding of the complex challenges facing the Authority, and they can then serve as informed advocates or communicators within their respective communities.

8.5 Regional Governance Success Stories

The following success stories (case studies) represent utilities—primarily in the Carolinas—that have successfully regionalized under similar conditions currently facing the Piedmont Triad region. The primary goal associated with the research of these success stories is to understand and leverage the lessons learned by the jurisdictions involved in the formation of these regional utilities. In particular, the research focuses on a number of key aspects including the drivers for formation, legal structure of the regional utility, and governance of the regionalized utility organizations.

8.5.1 Water and Sewer Authority of Cabarrus County

The Water and Sewer Authority of Cabarrus County (WSACC) is an independent, user-fee funded public authority. WSACC was established in April 1992 through an agreement between the governing bodies of the Cities of Concord and Kannapolis, the Towns of Harrisburg and Mt. Pleasant, and Cabarrus County. The utility was created to operate and maintain a regional interceptor sewer system and the Rocky River Regional Wastewater Treatment Plant, as well as drinking water plants and water supply reservoirs and dams. Prior to the early 1990s, Cabarrus County and the four local municipalities operated utilities separately. WSACC has allowed members to join by "bringing something to the table," where jurisdictions provided assets—such as water supply reservoirs and dams, treatment plants, or trunk lines—as their "buy in" to the authority.

WSACC

WATER AND SEWER AUTHORITY OF CABARRUS COUNTY

- Founded 1992
- Wholesale water and wastewater
- Driven by population growth
- Governed by nine-member Board of Directors

The primary driving force behind regionalization was continued residential, commercial, and industrial growth. WSACC helps enable effective coordination to meet growing demand for treatment capacity. One of WSACC's mission objectives is to help organize jurisdictions to improve regional economic development. In October 2024, the utility celebrated the on-time and under-budget completion of a major expansion of its Rocky River Wastewater Treatment Plant, increasing capacity from 26.5 to 30 MGD. Strong regional collaboration between the utility's board, local officials, and contractors created conditions for the project's success. This expansion planning also involved Charlotte Water, a wholesale customer with an interlocal agreement (ILA) that provides wastewater treatment plant capacity to serve a portion of the Charlotte service area. While Charlotte is not a member of WSACC, it works in partnership through the ILA to build capacity as needed and provides funding for the capacity Charlotte impacts or requires. Expanded capacity enables the region to better absorb new industry, housing, and commercial projects while maintaining an efficient system.

WSACC operates under a nine-member Board of Directors, with two members each representing the more populous jurisdictions of Cabarrus County, Concord, and Kannapolis, one member each from Harrisburg and Mt. Pleasant, and one at-large seat appointed by Cabarrus County. The independent authority does not have any taxing authority; rather it is funded by Board-set user fees. WSACC uses a two-part fixed capacity fee and a variable per-gallon usage fee. WSACC's rates are charged to the member utilities, who ultimately collect charges from individual customers.

This particular regional solution demonstrates a regional hybrid that is flexible to meet the needs of that region most effectively.

8.5.2 Winston-Salem/Forsyth County Utilities

WSFCU serves approximately 380,000 residents across the City of Winston-Salem and Forsyth County. The City and County created their consolidated system in 1976, after an initial study on consolidation in 1965, driven by population growth projections. Solid waste services were consolidated in 1990.

In the 1960s and 1970s, City officials worried about losing local control and had concerns about the financial implications of absorbing the County's less mature infrastructure and associated debt. Consolidation moved forward through negotiations, and the agreement in 1976 was narrowly approved. The establishment of the utility as an enterprise fund proved to be a transformative decision. The focus on revenue generation and long-term planning helped to alleviate potential political interference and has since enabled both efficient service delivery and significant investment in infrastructure.

Winston-Salem / Forsyth County Utilities
Water • Wastewater • Solid Waste

WINSTON-SALEM/FORSYTH COUNTY UTILITIES

- Founded 1976
- Retail water and wastewater
- Driven by population growth
- Governed by 11-member Board of Commissioners

WSFCU has an 11-member board, with five members appointed by the Winston-Salem City Council, five by the Forsyth County Commissioners, and the chair jointly appointed by the Mayor and Chair of the County Commission. The Board sets policy and rates, while the City Council approves the utility's budget.

The utility is funded through water and wastewater fees, as well as landfill tipping fees. Centralized capital planning allows the utility to meet customer demands and regulatory requirements more efficiently. Unified capacity planning and investment have also helped to attract investment in business and industrial parks. One major project is the Innovation Quarter in Winston-Salem, which has over 1.9 million square feet of laboratory, office, and educational space and is home to over 3,700 workers and 8,000 workforce training participants. Additionally, in 2023, Forsyth County was awarded over $2.4 million from the State of North Carolina to improve water and sewer capacity at Tanglewood Business Park.

Though WSFCU was initially created nearly 50 years ago, several lessons can be learned. First, governance and finance rules must be developed early, so that asset ownership, rate-setting, and dispute resolution are clear and can help insulate professional management from political influence. The utility can be viewed as a deliberate economic development tool to help strategically align water and sewer capacity with site-readiness to attract new growth. Finally, the experience demonstrates that phasing integration is essential to ensure that smaller jurisdictions realize benefits over time while also prioritizing local representation and cost allocation.

8.5.3 Charlotte Water

> **CHARLOTTE WATER**
>
> - Founded 1972
> - Retail and wholesale water and wastewater
> - Driven by population growth and water supply planning
> - 1.2 million customers
> - Governed by Charlotte City Council

Charlotte Water is the largest public water and wastewater utility in the Carolinas, serving over 1.2 million customers in the Charlotte region, including the Towns of Matthews, Mint Hill, Pineville, Huntersville, Davidson, and Cornelius, as well as the Cities of Mount Holly and Belmont. In 1972, the City of Charlotte and Mecklenburg County consolidated water and wastewater services. In the mid-1980s, the utility signed agreements with six neighboring communities within Mecklenburg County to provide water and wastewater services.

Charlotte Water's key drivers have been rapid metropolitan growth and long-term water supply planning. By consolidating under one utility, Charlotte Water has been able to take advantage of economies of scale and be able to invest in infrastructure that supports growth in demand. Over the past several years, the utility has been building its new Stowe Regional Water Resource Recovery Facility (Stowe Facility), as its existing largest facility would likely be unable to meet demands of growth and regulatory requirements without extremely stringent permit limits. As a municipally owned utility serving multiple jurisdictions, Charlotte Water provides an example of the power of centralized, proactive planning and financing for regional infrastructure.

Charlotte Water's strategic, well-planned investments in both water and wastewater infrastructure have ensured the Charlotte region is prepared to support its continued, sustained growth. This balanced and comprehensive capacity is instrumental in attracting and supporting the new commercial and industrial investment that solidifies Charlotte's status as one of the most prosperous cities in the South. According to analysis by the utility, 7,100 jobs were created from significant operations and maintenance (O&M) and capital spending in FY2023, and over 260,000 jobs have been created in water-dependent industries in the surrounding region. The utility also estimates an economic impact of $15.2 million in growth for every $1 million spent.

Charlotte Water's sheer scale and fast population growth underscore how proactively sequencing capacity projects ahead of demand is critical to avoiding bottlenecks. Crucially, the utility's approach demonstrates how utilities can directly align infrastructure investments with targeted development corridors.

This approach is now extending beyond the borders of Mecklenburg County. The cities of Belmont and Mount Holly, both located in Gaston County, have been facing mounting challenges; both jurisdictions would have to upgrade their treatment plants and potentially impose significant rate increases to meet new regulatory requirements. As of September 2025, wastewater from the two cities now flows to Charlotte Water's new Stowe Facility through a new pump station. While Mount Holly will still provide water treatment services, the partnership with Charlotte Water will allow Mount Holly and Belmont to avoid costly upgrades and for customers to enjoy lower rates for wastewater.

The City of Charlotte's Council ultimately approves budgets, sets rates, and makes policy decisions. A seven-member Charlotte Water Advisory Committee informs the Council's decision making, with three members appointed by the Mecklenburg County Commission, three by the City of Charlotte's Council, and one by the Mayor of Charlotte. Charlotte Water shows how a large municipal utility can regionalize through interlocal agreements.

8.5.4 Raleigh Water

Raleigh Water serves over 630,000 residents across Raleigh, Garner, Wake Forest, Rolesville, Knightdale, Wendell, and Zebulon. Regionalization was primarily driven by rapid growth and water supply needs. Falls Lake was built as a water supply source in the early 1980s. In the 1990s, a Wake County task force was formed to explore consolidating regional utilities. The first official step toward regionalization occurred in 2001 when the Town of Garner merged its systems with the City of Raleigh. In the mid-2000s, five other municipalities joined via separate ILAs, allowing Raleigh to assume full operation, asset ownership, and customer service.

Like Charlotte Water, Raleigh Water is owned by a single municipality. Ultimate governance authority, including rate setting and bond issuance, lies with the City of Raleigh's City Council. Member municipalities rely on provisions within ILAs to ensure equitable representation in policies and operations that affect their jurisdictions.

Raleigh Water

RALEIGH WATER

- Founded 2011
- Retail water and wastewater
- Driven by population growth and water supply
- Seven municipalities and 630,000 people served
- Governed by Raleigh City Council

The ultimate result from the ILAs that enable Raleigh Water is a consolidated utility that can help ensure ample regional capacity. The utility is able to benefit from scaling, including lower borrowing costs and coordinated investments. In one example that is nearly cost prohibitive for most systems, Raleigh Water has been able to invest in its Bioenergy Recovery Project, which uses an innovative process called thermal hydrolysis to reduce biosolids volume and produces renewable fuel that helps fuel more than 70 city buses each day.

8.5.5 Two Rivers Utilities

Two Rivers Utilities is a regional water and sewer utility that serves approximately 100,000 people across eight municipalities around Gaston County. It was formed in 2011 when the City of Gastonia and the Town of Cramerton's wastewater systems were merged. The service population includes Gastonia, Cramerton, Bessemer City, McAdenville, High Shoals, Ranlo, Stanley, and Clover (South Carolina) along with portions of Lowell, Belmont, Dallas, and Kings Mountain.

TWO RIVERS UTILITIES

- Founded 2011
- Retail water and wastewater
- Driven by rising operating costs
- 12 municipalities served
- Governed by Gastonia City Council

For decades, the City of Gastonia had acted as a wholesale provider of water and wastewater services for smaller neighbors. In 2011, local municipalities merged their water and sewer systems to address rising costs, in part driven by the decline of the textiles industry. When the textile industry waned, the area's largest customers, residents were left responsible for maintaining the system. The merger has been mutually beneficial, with the City of Gastonia saving $12 million by using Cramerton's wastewater treatment plant instead of building a $12 million plant themselves as originally planned. Additionally, Cramerton residents saw a 20-30% decrease in their bills after the same water and sewer rates were applied systemwide.

Two Rivers Utilities falls under the purview of the City of Gastonia, with the City Council ultimately approving the budget, rates, and major capital projects. Partner jurisdictions have ILAs and wholesale contracts to protect their interests.

8.5.6 Central Iowa Water Works

Central Iowa Water Works (CIWW) is a recently formed regionalized utility that evolved from the regionalized utility Des Moines Water Works (DMWW). Its 12 founding entities include Cities of Ankeny, Clive, Grimes, Johnston, Norwalk, Polk City, Waukee, and DMWW, West Des Moines Water Works, Urbandale Water Utility, Warren Water District, and Xenia Rural Water District. CIWW provides drinking water treatment, water system planning, and wholesale delivery of water across the Des Moines metropolitan area. The formation of CIWW helped create shared costs for reserve capacity and expansion among members based on growth and usage; previously, DMWW had carried this burden alone.

CENTRAL IOWA WATER WORKS

- Founded 2024
- Wholesale water provider
- Driven by suburban population growth and equity demands
- 12 member entities
- Governed by 13-member Board of Trustees

The concept of regionalization had been discussed over the years, but moving the idea forward proved challenging. In 2017, the DMWW Board of Trustees re-focused on regionalization, and in 2020, representatives from DMWW, West Des Moines Water Works and the Urbandale Water Utility began meeting to discuss why past efforts to regionalize had stalled.

The creation of CIWW was driven primarily by suburban growth and concerns about equity across the region. Demand from surrounding communities accounted for approximately 60% of DMWW's water demand. These communities wanted a greater voice in governance and decision-making. At one point, there were plans for at least two new facilities that would have duplicated actual regional infrastructure needs at an increased cost. Local leaders agreed to put these plans on hold and agreed to an additional study on consolidation.

Previously, the main predecessor, DMWW, operated under a five-member Board of Trustees, who are appointed by the Mayor of Des Moines. CIWW's new model seeks to allow for greater representation across the region. Ultimately, an interlocal agreement created a 13-member Board of Trustees with one representative from each community and two from Des Moines.

The utility's rate structure allocates costs based on each community's usage, growth, and previous investments. Fixed operations costs are shared, while variable costs are tied to actual water delivered to each community. Capital expenses are shared, with faster-growing communities paying more for new capacity. The establishment of CIWW considered past investments, which are credited back to communities for future rate reductions.

Since CIWW was just established in 2024, ultimate outcomes have not yet been realized. However, CIWW analysis anticipates $425 million in regional benefits in an area that is expected to have growing demand. Amplified shared financial, technical, and managerial capacity are expected to enhance the ability to meet soaring suburban demand. The creation of CIWW demonstrates that regional consolidation requires trust, patience, and robust financial assessments to ensure equitable sharing among jurisdictions.

8.5.7 Des Moines Metropolitan Wastewater Reclamation Authority

DES MOINES METROPOLITAN WASTEWATER RECLAMATION AUTHORITY

- Founded 1979 with more formalization in 2004
- Wholesale wastewater treatment and conveyance
- Driven by infrastructure and capacity needs
- 550,000 people served across 18 jurisdictions
- Governed by 22-member Board of Representatives

The Des Moines Metropolitan Wastewater Reclamation Authority (DMMWRA) serves approximately 550,000 people with wastewater treatment and trunkline conveyance. The WRA is composed of 18 member jurisdictions. Following the passage of the 1972 Clean Water Act, jurisdictions in the Central Iowa Regional Association of Local Governments initiated a wastewater management study, leading to the entity's formation in 1979. Initially named the DMMWRA, these jurisdictions signed an Integrated Community Area (ICA) Agreement, which at the time provided sufficient organizational structure. In May of 1995, the ICA was renamed the Wastewater Reclamation Authority (WRA). In 2004, WRA was formalized as an authority and designated the City of Des Moines as its operating contractor.

Formal regionalization was driven by concerns around aging infrastructure and capacity needs; the region originally had twenty different systems, many of which had sewer infrastructure over 100 years old. As the Des Moines metro area grew in population, individual communities faced escalating costs and regulatory requirements that would have been challenging to meet alone; a coordinated, regional approach was seen as a pathway to increased efficiency and improved ability for financing and operating large-scale operations. WRA now treats an average of 70 MGD of wastewater.

WRA is currently governed by a 22-member Board of Representatives from each participating community, who are appointed by their respective governing bodies. Each community has one representative *plus* one additional representative for every 25,000 residents per the most recent US Census data. Its members include Des Moines (three representatives), West Des Moines (two representatives), Ankeny (two representatives), and one representative each from Altoona, Bondurant, Clive, Cumming, Grimes, Johnston, Norwalk, Pleasant Hill, Polk City, Waukee, Warren County, Polk County, Greenfield Plaza Sanitary Sewer District, and the Urbandale-Windsor Heights Sanitary Sewer District.

Successful regionalization has given the system greater organizational capacity for resource recovery efforts. Facility byproducts have been used in sustainable ways, including the application of biosolids on nearby farmland to increase soil health, and the injection of refined biogas into a natural gas pipeline. More importantly, the governance structure has allowed for shared budgeting and cost-sharing for regional projects that benefit all member communities. The pooling of financial strength and revenues of smaller member jurisdictions into a much larger entity has enabled stronger bond ratings and lower borrowing costs.

Table 8-1: Summary of Regional Governance Success Stories

	WSACC	WSFC Utilities	Charlotte Water	Raleigh Water	Two Rivers Utilities	DMMWRA	Central Iowa Water Works
Date Established	1992	1976	1972	2001	2011	2004	2024
Form	Authority	Municipal	Municipal	Municipal	Municipal	Authority	Authority
Services	Water and wastewater, wholesale	Water and wastewater, retail	Water and wastewater, retail and wholesale	Water and wastewater, retail	Water and wastewater, retail	Wastewater, wholesale	Water, wholesale
Governing Body	Board of Directors	Board of Appointed Commissioners	City Council	City Council	City Council	Board of Representatives	Board of Trustees
Governing Body Members	9	11	12	12	7	22	13

8.6 Governance Conclusions

As the water and wastewater needs of individual jurisdictions within the Piedmont Triad region have evolved rapidly over recent years, PTRWA has stepped forward, increasingly serving as a facilitator of regional cooperation discussions. While PTRWA's involvement in these discussions is a logical extension of its established role as a wholesale water provider to its six member communities, the scope of discussions increasingly extends beyond current membership and encompasses both water and wastewater services, highlighting a compelling opportunity to enhance the regional coordination, planning, and ultimate delivery of essential water and wastewater utility services.

Further, while the PTRWA Board of Directors has demonstrated strong support for exploring an expanded role of the Authority, the precise pathway forward in terms of implementing adjustments to the organization's membership and addressing the future governance of PTRWA will be collaboratively defined through thoughtful and specific discussions with current and potential future members and partners. Establishing a flexible framework that enables non-member communities to potentially engage with PTRWA immediately, or at some future point in time, creates a foundation and environment for sustained regional cooperation among the communities within both Guilford and Randolph counties. Moving forward with the proposed governance framework establishes PTRWA's vision for enhanced regionalization while delivering integrated water and wastewater services and establishing a long-term vision for expanded water reuse and regional biosolids management to secure the success for all communities within the region.

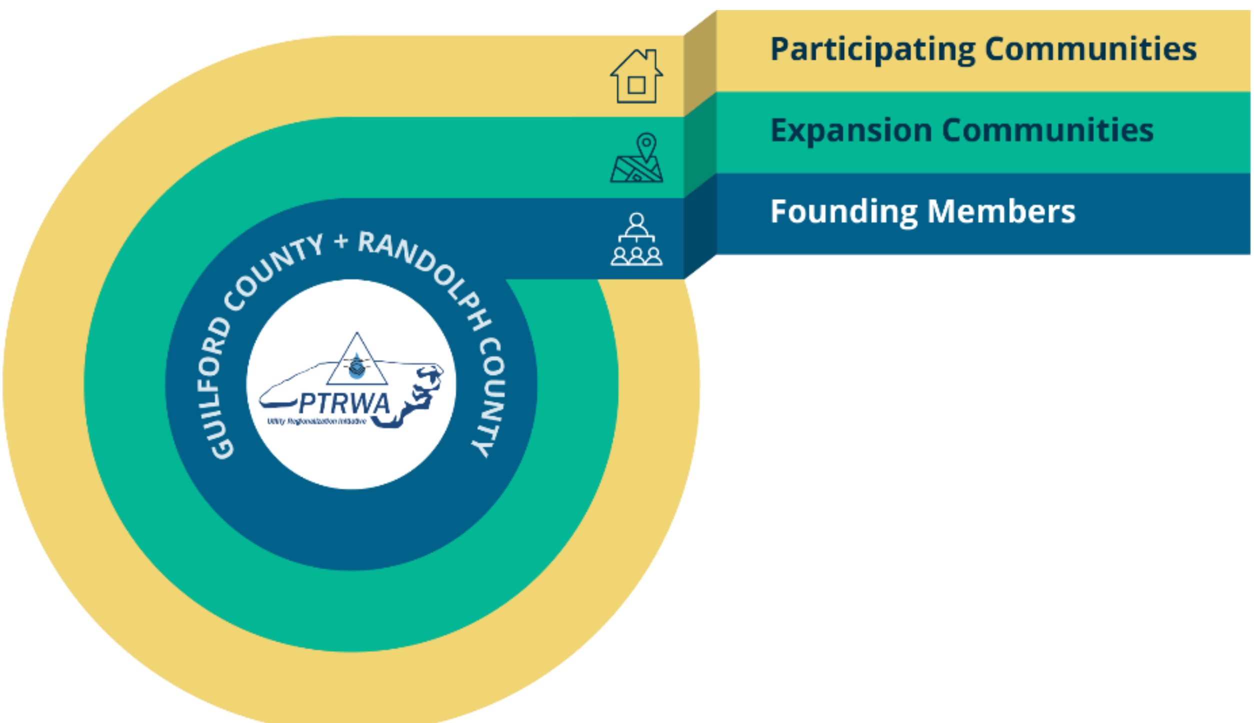


Figure 8-2: Governance Depiction

9. Conclusions and Recommendations

The Guilford and Randolph County Water and Wastewater Utility Regionalization Study was conducted to evaluate both near and long-term water and wastewater needs across the region and to determine whether a collaborative or independent utility structure would best position municipalities for sustainable growth, regulatory compliance, and economic competitiveness. The analysis demonstrates that **regionalization is not only beneficial but essential** for meeting future infrastructure demands, stabilizing costs, and supporting the region's long-term development trajectory.

9.1 Key Findings

9.1.1 Regional Growth Pressures and Service Demands

Over the past two decades, Guilford and Randolph Counties have experienced substantial economic transition, marked by declines in traditional manufacturing and a shift toward high-skill, infrastructure-dependent industries. These changes have placed increasing pressure on the region's water and wastewater systems, which must now support new development, expanding residential needs, and the recruitment of major employers. The Study confirms that a **significant investment in utility infrastructure will be required**, regardless of whether municipalities act independently or jointly.

9.1.2 Wastewater Capacity, Regulatory Pressures, and Emerging Contaminants

Greensboro and High Point wastewater facilities are already nearing critical capacity thresholds and face additional regulatory uncertainties tied to Jordan Lake nutrient rules and uncertain PFAS/PFOA treatment requirements. Without coordinated investment and load management, these constraints will increasingly limit economic development potential and industrial growth within municipal boundaries. High inflow and infiltration (I&I) rates—which are particularly severe in systems with deferred maintenance—further underscore systemic vulnerabilities that cannot be efficiently addressed through isolated local action.

9.1.3 Regional Economic and Housing Implications

Failure to implement a cohesive, regionalized utility framework would likely suppress economic development, restrict housing supply, and intensify outward migration to surrounding counties. In contrast, a unified approach fosters a more predictable and scalable service platform capable of supporting the region's economic development priorities, major infrastructure investments, and housing expansion goals. The Study identifies that **regionalization offers the greatest benefit for both current residents and future growth**, enabling more balanced, equitable, and resilient community development.

9.2 Evaluation of Alternatives

The Study evaluated several structural, operational, and governance models for utility service delivery. While all alternatives require considerable capital investment, the distributed benefits, lifecycle cost efficiencies, and enhanced regulatory resilience of a regional system far outweigh the limitations observed under decentralized approaches. Independent utility operation would perpetuate fragmented investments, non-uniform service levels, and localized financial burdens.

Among the alternatives considered, **Alternative 4—Full Regionalization—consistently performs best** across every major decision criterion, including cost-effectiveness, regulatory readiness, operational resilience, and long-term economic support.

9.3 Selection of Alternative 4

Based on the comprehensive technical, financial, and regulatory evaluation, the Study concludes that **Alternative 4 is the preferred and recommended solution** for the region.

This alternative offers:

- **Coordinated treatment capacity planning**, reducing duplicative capital investments and enabling strategic regional partnership.
- **Improved regulatory flexibility**, particularly for nutrient management, emerging contaminant treatment, and future federal or state rulemaking.
- **More efficient cost distribution**, ensuring major capital upgrades are shared equitably across a broader user base rather than concentrated in a single community. The imbalance of the number of rate payers between Greensboro and High Point versus the number of rate payers associated with the smaller utilities allows cost to be distributed amongst a larger customer base, decreasing the cost impacts to the region as a whole.
- **Enhanced system reliability and resilience**, with increased redundancy, unified asset management, newer state-of-the-art technology, and optimized conveyance and treatment infrastructure.
- **Stronger support for regional economic development**, ensuring infrastructure capacity does not constrain industrial recruitment, housing development, or job growth across the entire two-county region.

Collectively, these benefits demonstrate that Alternative 4 provides the clearest pathway for ensuring sustainable, equitable, and future-ready utility services throughout the region.

Each Alternative progressed to more inclusivity of the region, thus, should strategic partners included in Alternative 4 elect not to participate, the team would recommend to move forward with Alternative 3, working back to Alternative 2, then 1.

9.4 Recommendations

To advance the implementation of Alternative 4, the Study recommends:

1. Developing a formal regional governance and organizational structure, including legal frameworks, financial agreements, and decision making protocols among participating municipalities.

2. Creating a phased integration plan to transition asset ownership, operational roles and responsibilities, consolidate asset management practices, and prioritize capacity critical projects.

3. Advancing detailed financial modeling to develop equitable rate structures, cost sharing methodologies, and capital financing strategies appropriate for a regional utility.

4. Initiating unified capital planning, focusing on major facility upgrades, conveyance system improvements, I&I reduction efforts, and PFAS/PFOA treatment requirements.

5. Conducting coordinated stakeholder and public engagement, clearly communicating the long-term benefits of regionalization and the anticipated impacts on service levels, rates, and infrastructure investments.

Specific recommendations throughout the study:

1. The City of Asheboro should consider applying for an Interbasin Transfer Certificate to maximize their access to the 26 MG of safe yield in their raw water reservoirs. Initially, the IBT should formalize access to the 12 MGD capacity of their existing WTP with the intention to reapply for additional access as demand requires in the region. The city should consider partnering with PTRWA to share the available raw water supply to increase water security and flexibility in the region in future years.

2. Utilities in the region with reservoirs should update their safe yield analysis to confirm average day demand projections can be met in the region as projected.

3. All utilities should consider non-potable reuse opportunities to supplement capacity related concerns at the wastewater treatment facilities in the region. Water reuse is one strategy that can address both water supply demands and increased wastewater loadings. By reusing treated wastewater for industrial processes or irrigation, the water supply is augmented and pollutant loadings to the receiving waters are reduced.

4. Pursue regional solutions to address biosolids capacity limitations in the region to find a collective solution.

9.5 Next Steps and Implementation

9.5.1 Phase 1 — Formalization and Organizational Foundations (0–12 Months)

1. Establish Regionalization Steering Committee
   - Refine the existing Steering Committee to form a multi-jurisdictional working group representing all participating municipalities, utilities, and regional stakeholders.
   - Define committee charter, decision protocols, meeting cadence, and communication structure.

2. Define Governance Framework Options

- Evaluate operational models (e.g., regional authority, joint utility commission, consolidated service provider).
- Identify legal requirements, interlocal agreement (ILA) structures, and statutory considerations.
- Prepare draft governance documentation for municipal review.
- Conduct briefings with municipal leadership, county officials, and key community partners throughout
- Finalize ILAs where relationships, mutual interests, and strategic direction are clear.

3. Conduct Preliminary Financial Framework Analysis
    - Initiate, as appropriate, asset valuations to support potential asset ownership transfers, cost of service and regional rate analysis, cost sharing, and revenue modeling.
    - Identify potential state/federal funding availability, funding programs, grants, and loan mechanisms.
    - Perform high-level assessment of capital obligations by jurisdiction.

4. Initiate Targeted Stakeholder Engagement
    - Develop public information and messaging that sets expectations around benefits, timing, and cost considerations.

9.5.2 Phase 2 — Technical Integration and Capital Planning (12–24 Months)

5. Develop a Regional Asset Inventory and Condition Assessment
    - Consolidate GIS, maintenance, and planning data across all participating utilities.
    - Identify critical assets for immediate integration (treatment, conveyance, pump stations, trunk lines).
    - Establish a shared methodology for risk assessment and prioritization.

6. Refine Capacity and Treatment Strategy Under a Unified System
    - Identify facility expansions and process upgrades needed to meet future nutrient removal requirements and emerging contaminant standards.
    - Evaluate recommendations to consolidate or repurpose existing facilities to optimize the intermittent use of existing infrastructure to delay capital investment and infrastructure replacement.

7. Prepare a Phased Regional Capital Improvement Plan (CIP)
    - Establish near-term (0–5 yrs), mid-term (5–15 yrs), and long-term (15+ yrs) investment priorities for the regional authority and individual utility improvements.
    - Align CIP with funding cycles and regulatory deadlines.
    - Develop cost allocations consistent with governance and financial principles derived in Phase 1.

8. Launch Joint Inflow and Infiltration (I&I) Reduction Program
    - Standardize I&I monitoring and reporting across communities.
    - Target high-impact basins for early rehabilitation to reduce regional treatment burden.
    - Establish investment pathways for jurisdictions with backlogged maintenance needs.

9.5.3 Phase 3 — Financial, Legal, and Administrative Integration (24–48 Months)

9. Finalize Interlocal Agreements (ILAs)
    - Codify governance structure, voting rights, financial commitments, and asset transfer/ownership terms.
    - Develop policies for system expansion, annexation impacts, and long-term growth management.

10. Implement Regional Financial Model and Rate Structure
    - Adopt unified or harmonized rate/fee structures.
    - Establish reserve, depreciation, and capital recovery policies.
    - Formalize cost-sharing models for regional CIP implementation.

11. Consolidate Operational Policies and Procedures
    - Standardize SOPs for maintenance, emergency response, permitting, pretreatment, and regulatory reporting.
    - Develop shared workforce strategies including training, certifications, and cross-utility staffing mechanisms.

12. Initiate Early Integration Projects
    - Begin construction of priority conveyance improvements and treatment capacity expansions.
    - Pilot shared services programs (e.g., biosolids, SCADA, laboratory services, purchasing).

9.5.4 Phase 4 — Full System Integration and Long-Term Operations (48+ Months)

13. Transition to Regional Operational Control
    - Migrate dispatch, SCADA, monitoring, and reporting to the new regional entity.
    - Align regulatory permits under consolidated ownership or joint management frameworks.
    - Transfer assets according to ILAs and governance documents.

14. Execute Long-Term CIP and Resilience Programs
    - Advance treatment plant expansions, transmission system upgrades, and nutrient/emerging contaminant solutions.
    - Implement regional resilience programs addressing redundancy, climate vulnerability, and emergency preparedness.

15. Ongoing Public and Stakeholder Engagement
    - Continue transparent communication regarding rate impacts, project progress, service improvements, and regional benefits.
    - Maintain strong intergovernmental collaboration through regular reporting and coordinated planning.

9.5.5 Phase 5 — Continuous Improvement and Strategic Growth

16. Establish Performance Monitoring and Optimization Metrics
    - Track KPIs such as treatment efficiency, cost per gallon treated, I&I reduction, regulatory compliance, and service reliability.
    - Use data to refine CIP priorities and optimize regional operations.
17. Support Regional Economic and Housing Initiatives
    - Coordinate with local economic development organizations to proactively plan for industrial and commercial growth.
    - Integrate utility planning with regional housing affordability and land-use strategies.

Appendix A: 2025 Water and Wastewater Regionalization Financial Impact Analysis

Authored by: Raftelis

PTRWA Master Plan

2025 Water and Wastewater Regionalization Financial Impact Analysis

November 14, 2025

RAFTELIS

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1. Executive Summary

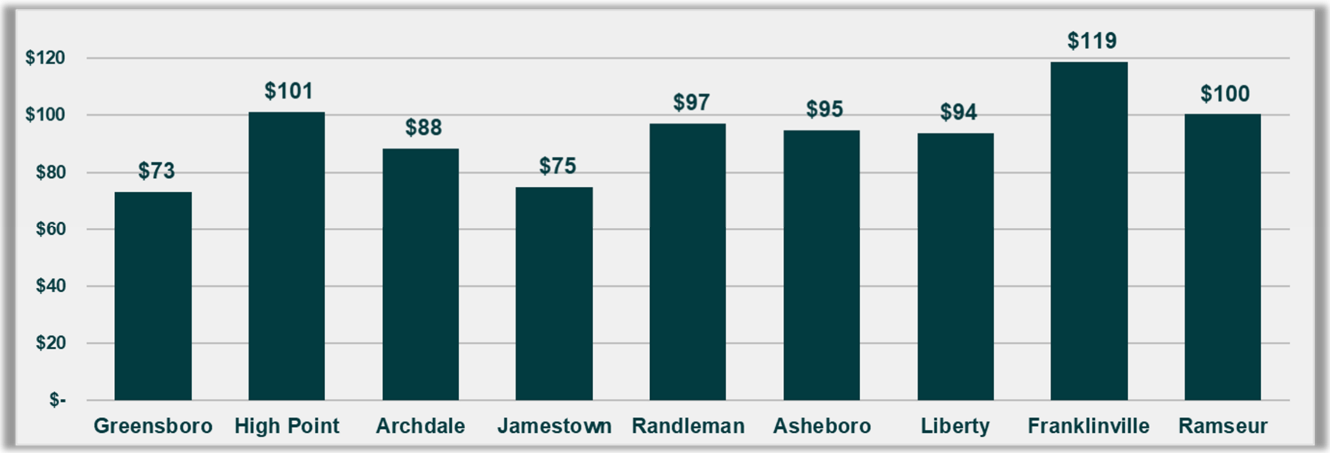
The North Carolina Department of Environmental Quality ("NCDEQ") and the North Carolina General Assembly have indicated interest in the practical advantages of regional cooperation of water and wastewater utilities within the State. In 2023 the North Carolina General Assembly commissioned a study via Session Law 2023-134, titled "Regional Water and Wastewater Infrastructure Concept Plan – US 421 Corridor". The Plan offered concepts where utility regionalization efforts could address the current and future infrastructure demands along the US Hwy 421 Corridor. The US 421 Corridor Plan involved a seven-county geographic area. The Piedmont Triad Regional Water Authority Master Plan intends to more specifically address the water and wastewater infrastructure demands of nine utilities within two counties referenced in the US 421 Corridor Plan, Guilford and Randolph County.

The area in and around these two counties have recently been central to significant, ongoing economic development initiatives sponsored by the State of North Carolina. In order to address the growing regional water and wastewater infrastructure demands the Piedmont Triad Regional Water Authority ("PTRWA") engaged a team of consultants, including Raftelis and led by Hazen and Sawyer, to conduct a financial impact analysis ("Study") of the nine utility systems in the two-county region and analyze the additional financial and rate impacts associated with four alternative regionalization plans that address water and wastewater demands through 2050. The scope of services for this Study included an examination of the capital investment required in each of the regionalization alternatives, the investments effect on future utility rates, and an evaluation of funding requirements for alternative feasibility. The purpose of the Study aligns with the recent policy initiatives endorsed by State Legislature, most notably Session Law 2025-77 H.B. 694, which directed the Environmental Finance Center at the UNC-Chapel Hill School of Government to study water and wastewater regionalization across the state to identify areas where the costs of these essential services could be lowered and their overall quality improved.

1.1. Key Findings

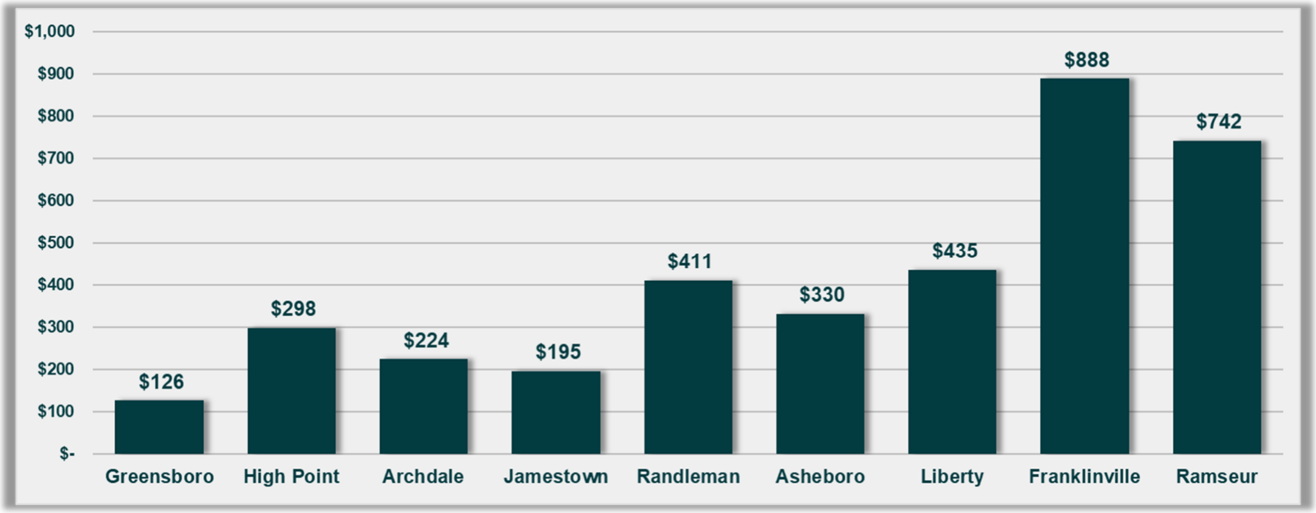
As a part of the larger Study, Raftelis was engaged to develop a methodology to evaluate the impact of capital investment associated with four regionalization alternative plans on water and wastewater rates for nine utilities in Guilford and Randolph County through 2050. The local government owned utilities in the Study include Archdale, Asheboro, Franklinville, Greensboro, High Point, Jamestown, Liberty, Ramseur, and Randleman. In order to evaluate the impact to water and wastewater rates Raftelis developed a unit cost analysis model which provides a detailed review of the escalating total annual costs for each utility system in relation to the growing customer demand for services. The unit cost in the Study analysis is expressed as the total projected annual system cost per thousand gallons (kgal) of water or wastewater demand. The annual percent change in the water or wastewater unit cost represents the necessary increase in revenues, and therefore user rates, in order to meet the total annual water or wastewater system cost. The unit cost analysis assumed that utilities existing Fiscal Year ("FY") 2026 user rates were sufficient to recover total annual system costs in FY2026. To equitably compare the impact of rate increases amongst utilities, Raftelis utilized a "typical" monthly residential bill for water and wastewater services of 5,000 gallons. The 5,000 monthly gallons benchmark is used by several industry organizations including the Environmental Protection Agency, American Waterworks Association, and North Carolina Environmental Finance Center for comparing affordability of services and financial capability of utilities. By standardizing usage at this level, Raftelis is able to compare costs across different rate structures and accurately assess the impacts of rate adjustments on a residential customer. Raftelis gathered available FY2026 rate schedules from each utility to calculate what a residential customer using water and sewer services would pay on their monthly utility bill for 5,000 gallons of consumption for those service. Figure 1 exhibits the existing FY2026 residential monthly bill for water and wastewater for each utility based on 5,000 gallons. For example, a residential customer in FY2026 who is using 5,000 gallons of water and wastewater service from the Town of Liberty would see a charge of $94 on their monthly water and wastewater bill. Utilities with higher existing rates experience a more significant 'dollar-of-impact' for every percentage increase in cost. For these high-cost providers, even modest inflationary adjustments result in larger absolute increases to the resident's bill, further straining household affordability compared to utilities starting from a lower rate base.

Figure 1. Combined Current FY26 Residential Monthly Bill Comparison (5 kgal)



Using the existing monthly bills (based on a 5,000 gal/month usage) as a baseline, Raftelis applied future costs associated with each utilities revenue requirements which include existing operating expenses, debt service, and funding of capital improvement projects. Figure 2 shows the projected water and wastewater combined 5,000 gallon monthly bills in FY2050 if the utilities do not participate in any of the regionalization alternative plans. This scenario is also referred to as the "Go-It-Alone" scenario and assumes all system revenue requirement costs are executed and funded with user rate charges. It should also be noted that the "Go-it-alone" scenario does not provide a full solution for wastewater demand where all nine (9) utilities would have adequate capacity through FY2050. Both Greensboro and High Point would become capacity limited on wastewater before FY2050 without one of the four alternatives being implemented. While water and wastewater rates should be expected to increase significantly over the next 25 years due to increases in operating and capital investment costs, several of the forecasted utility bills shown in Figure 2 are forecasted to need to increase over 6% on average annually through 2050 in a "Go-it-alone" scenario. Because a majority of the capital project costs are projected to be incurred over the next 10 years, several of the immediate forecasted rate increases are much higher than 6%.

Figure 2: Projected FY50 Residential Monthly Bills "Go-it-alone" (5 kgal)



In order to determine the impacts associated with each of the alternatives, Raftelis computed the estimated rate impacts of adding the capital and operational cost of each regional alternative plan to the "Go-It-Alone" scenario, removing any existing ("Go-it-alone") project costs which were eliminated due to a particular regionalization alternative. The capital expense associated with replacing existing treatment capacity at brand-new, regional facilities is projected to be significantly more expensive than simply executing incremental upgrades and improvements at the current, existing utility plants. Due to these comprehensive capital cost assumptions embedded within the alternative plans, the total financial impact on utility rates for each utility is generally projected to be the same or higher in the regional alternatives compared to the "Go-It-Alone" solution, unless substantial outside funding support is successfully secured. This means that utility bills will project the same or higher in each of the alternatives, because of added project cost, without outside funding support. Figure 3 shows the projected water and wastewater combined 5,000 gallon monthly bills in FY2050 if the utilities participate in a regionalization alternative plan solution.

Figure 3: Projected FY50 Residential Monthly Bills by Alternative (5 kgal)

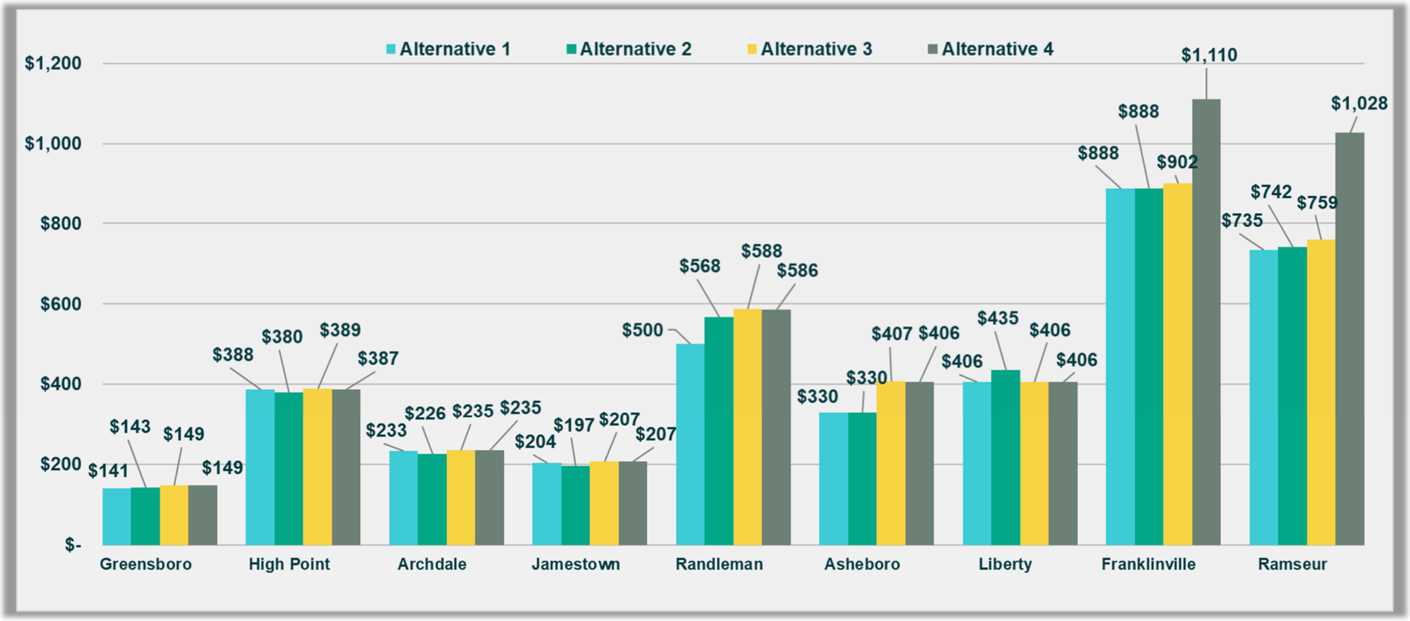


Figure 3 illustrates that without some level of outside funding support, proceeding with a regionalized alternative plan would have the same if not worse impact on water and wastewater user rates compared to the "Go-It-Alone" scenario, making monthly utility bills in FY2050 particularly unreasonable for the smaller communities in Randolph County.

1.2. Recommendations

Based on the unit cost analysis comparing the "typical" utility bill impacts for the four regionalization alternative master plans against the "Go-It-Alone" scenario, the following strategic financial recommendations are crucial for ensuring the successful implementation of the preferred alternative plan.

- **Financial Planning:** Each individual utility should conduct detailed financial planning and rate analysis using the project costs that develop from the PTRWA Regional Alternative Master Plan. **While this study utilizes primarily publicly available information to provide a regional overview, utilities should conduct their own internal analyses to supplement these findings. This localized financial evaluation will provide more detailed insights necessary for leadership to determine the extent to which they should participate in various regionalization alternatives."**

- **Acquire Outside Funding Support:** For any regional alternative plan to be feasible, as it pertains to the financial viability and reasonability of projected "typical" customer bills, a level of outside funding support is needed to subsidize the capital cost for the most vulnerable communities. It should be noted that outside funding support will also be required in the "Go-it-alone" scenario, otherwise vulnerable utilities will continue to defer necessary capital maintenance and improvements. While individual utilities in the "Go-It-Alone" scenario could potentially acquire grant funding, the North Carolina State Legislature has indicated a clear strategic preference for supporting regional solutions, as demonstrated by House Bill 694, which directs the UNC Environmental Finance Center to study regionalization with the intention of identifying pathways to lower the cost of utility services across the State. Therefore, for the purposes of this comparative analysis, it is conservatively assumed that the "Go-It-Alone" scenario would not receive outside funding support, while a regionalization Alternative would likely be positioned to receive and leverage a higher level of external financial assistance. Table 1 displays the identified level of outside funding support required for each utility in each alternative plan for projected water and wastewater charges to remain reasonable in FY2050.

Table 1: Identified Level of Funding Support

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Utility Provider				
Greensboro	$ -	$ -	$ -	$ -
High Point	234,270,000	314,150,943	314,986,400	314,549,499
Archdale	-	-	-	-
Jamestown	-	-	-	-
Randleman	83,666,140	134,345,272	124,499,340	124,461,102
Asheboro	-	-	472,642,932	473,006,766
Liberty	21,600,000	33,600,000	21,600,000	21,600,000
Franklinville	9,200,000	9,200,000	9,200,000	21,944,218
Ramseur	74,900,000	77,400,000	90,500,000	156,639,995
Total: Funding Support	**$ 423,636,140**	**$ 568,696,215**	**$ 1,033,428,672**	**$ 1,112,201,580**

Acquire Outside Funding Support (cont.): Every dollar of alternative plan regional project cost for Liberty, Franklinville, and Ramseur is identified to require outside funding. The outside funding support for the designated utilities will significantly reduce the burden of the large upfront capital investment that is required in all alternative plans. The impacts the funding support will have on the FY2050 “typical” water and wastewater residential customer bills is shown in Figure 4 and Figure 5. It is crucial to highlight that, with the outside funding support, Figure 5 illustrates the Guilford County utilities paying at or above the “Go-It-Alone” scenario for their alternative master plan capital projects and a majority of the Randolph County utilities paying at or below for theirs. It should be noted that Alternatives 1-4 are more expensive for Greensboro and High Point because they are acquiring more wastewater capacity than in the “Go-It-Alone” scenario. The “Go-It-Alone” scenario does not address the full future wastewater demands for the region.

Figure 4: Projected FY50 Monthly Bills by Alternative with Support (5 kgal)

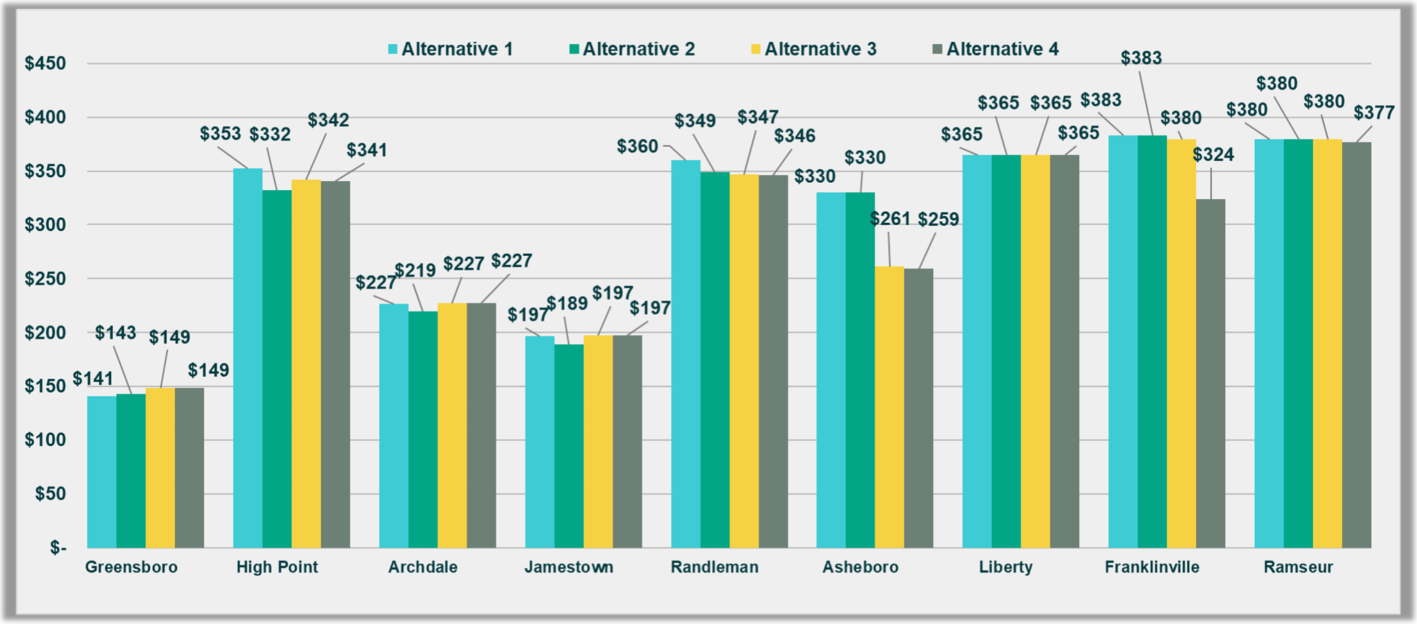
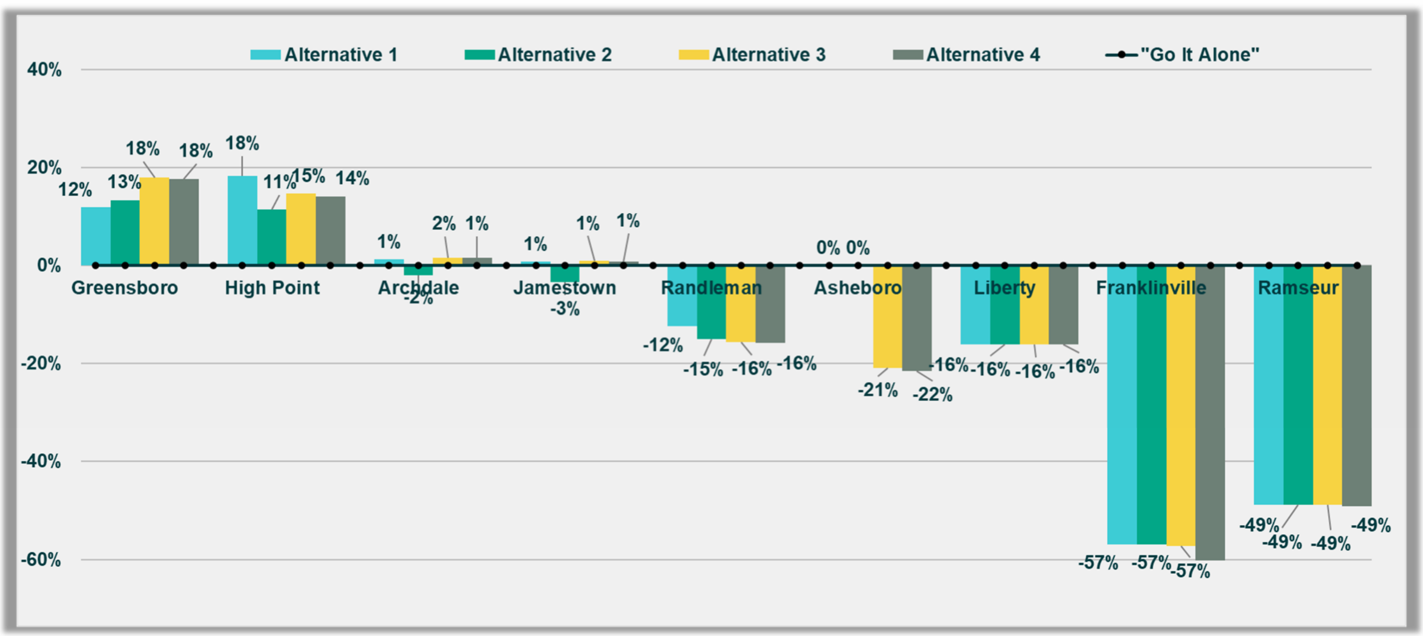


Figure 5: Alternative Plans with Support vs. "Go-It-Alone" FY50 Monthly Bills % Difference



*The "Go-It-Alone" scenario does not address the full wastewater demands for the region through 2050

- **Pursue Alternative Plan:** Each of the nine utilities will need to work with PTRWA and/or the planned utility provider to begin the engineering, financial, and governance processes for the implementation of the selected alternative plan. Communication of financial objectives and challenges will be key to the success of Guilford and Randolph County water and wastewater regionalization efforts.

- **Explore Additional Regionalization Solutions:** The PTRWA Master Plan alternatives present regional solutions in the framework of wholesale water and wastewater capacity allocations, as is currently the model for water treatment at PTRWA. Other formal partnerships such as interlocal agreements for purchasing treatment or contracting of infrastructure management can alleviate the high cost of maintaining and operating a full utility system, especially for the communities that lack the economies of scale to effectively do so. If a stakeholder’s primary regional objective is to achieve regional rate parity with peers, consolidation of the of utility services is the most practical regional solution.

2. Introduction

2.1. Study Background

The Piedmont Triad region is experiencing rapid economic development and population growth, particularly along key transportation and commercial arteries in Guilford and Randolph Counties. While this growth signifies a vibrant regional economy, it has simultaneously placed enormous and escalating demands on existing water and wastewater infrastructure. Crucially, the current organizational landscape within the two-county area is characterized by a mostly fragmented system of multiple, independent service providers. This fragmentation severely limits the ability of the region to engage in coordinated, long-term resource planning, financing, and capital investment necessary to sustainably support future development and maintain regulatory compliance. While local utilities have managed successfully to date, the complexity and scale of future infrastructure needs and regulatory requirements demand a collaborative approach.

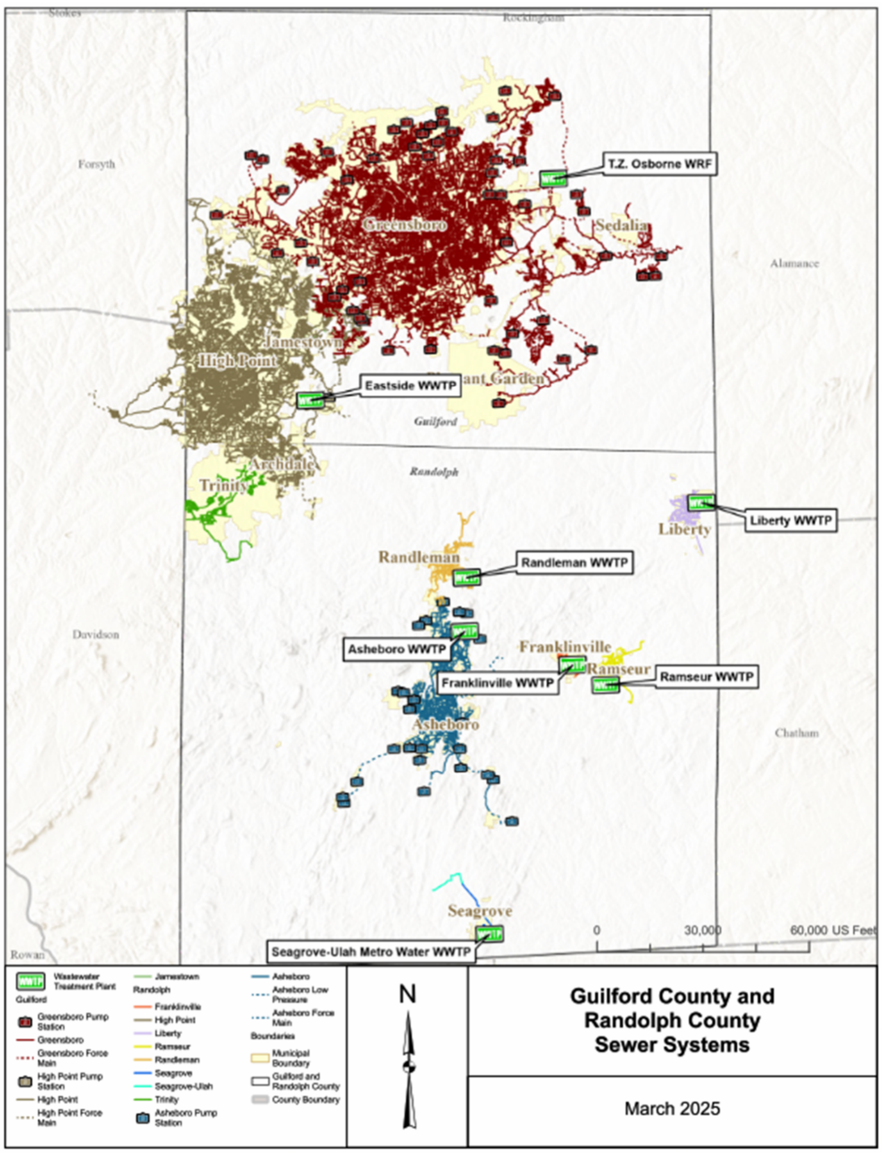
The impetus for this comprehensive regionalization effort originated from the North Carolina General Assembly's recognition of these systemic limitations. This legislative concern culminated in the previous foundational work titled “Regional Water and Wastewater Infrastructure Concept Plan - US 421 Corridor”. The Plan offered concepts where utility regionalization efforts could address the current and future infrastructure demands along the US Hwy 421 Corridor. The Piedmont Triad Regional Water Authority Master Plan intends to more specifically address the water and wastewater infrastructure demands of nine utilities within two counties referenced in the US Hwy 421 Corridor Plan, Guilford and Randolph County.

The Piedmont Triad Regional Water Authority (“PTRWA”) engaged a team of consultants, including Raftelis, led by Hazen and Sawyer to conduct a Financial Impact Analysis (“Study”) of the nine utility systems in Guilford and Randolph Counties and evaluate the additional financial and rate impacts associated with four regionalization alternatives that address water and wastewater treatment demands in the area through 2050. As an interlocal governmental agency, PTRWA currently focuses on regional water. Its established framework already enables collaborative planning and investment in shared water infrastructure. However, the existing scope of the PTRWA does not involve wastewater treatment, with individual municipalities generally responsible for their own wastewater treatment infrastructure and planning. The scale of expansion required to sustain growth in the corridor and the significant investment needed to comply with increasingly stringent state and federal regulatory requirements (concerning aging infrastructure and environmental standards) present major financial hurdles. For smaller communities in particular, shouldering these essential, expensive upgrades independently can threaten the affordability and long-term viability of their utility services. To sustain economic momentum and ensure the long-term viability of these essential services, a regional solution is necessary. By expanding cooperative entities like the PTRWA, we can leverage economies of scale, efficiently pool resources, manage risk more effectively, and establish the integrated planning and governance framework needed to deliver resilient, affordable, and compliant utility services to all member communities. The utility service providers evaluated in the Study along with their number of metered connections are shown below in Table 2. Figure 6 provides an overview of the two-county study area including the nine evaluated utility providers and any of their other local government system connections.

Table 2: Utility Service Providers Evaluated in the Study

Guilford County		Randolph County	
Utility Provider	# of Metered Connections [1]	Utility Provider	# of Metered Connections [1]
Greensboro	110,003	Asheboro	13,756
High point	51,853	Archdale	5,062
Jamestown	2,708	Randleman	2,576
		Liberty	1,490
		Ramseur	1,233
		Franklinville	568

Figure 6: Guilford and Randolph County Study Area



[1] The number of metered connections for each utility provider was referenced from the *2024 North Carolina Local Water Supply Plans*

The core challenge of the two-county region is achieving effective capacity and managing the immense upfront capital costs for a regional solution responsibly. This portion of the PTRWA Master Plan report serves as the overview to the Financial Impact Analysis ("Study") concerning the cost of the four proposed regionalization alternatives presented. The core objective of this Study is to provide an objective, data-driven assessment of the fiscal consequences associated with the successful implementation of the Regionalization Master Plan alternatives.

The Financial Impact Analysis detailed in this section of the report will provide an examination of:

- **Fiscal Feasibility:** Determining the overall economic viability of the regional entity, including necessary capital investment and projected revenue requirements.

- **Ratepayer Impact:** Analyzing the short-term and long-term effects of regionalization on existing customer rates and identifying potential advantages for achieving economies of scale.

- **Identify Need for Funding Support:** Evaluating the potential exposure to financial risks for both the regional entity and the individual service providers.

This analysis incorporates detailed financial modeling based on projected infrastructure needs identified in the Master Plan, which includes potential construction and expansions of treatment facilities, transmission systems, and related debt financing. The conclusions drawn from this Financial Impact Analysis are essential for informed decision-making by the PTRWA, the respective County and municipal governments, the North Carolina General Assembly, and the North Carolina Department of Environmental Quality ("NCDEQ"). They may serve as the financial foundation upon which negotiations regarding the execution and timing of the PTRWA Regionalization Master Plan will be made.

2.2. Summary of Existing Financial Challenges for Water and Wastewater Service Providers

The current fragmentation of water and sewer utility services across small, divided communities presents significant and interconnected financial challenges that threaten the long-term affordability and sustainability of these essential services. These challenges are particularly acute in systems that lack the economies of scale necessary to effectively manage modern infrastructure demands and regulatory compliance. Several of the most significant challenges facing the communities in Guilford and Randolph County are summarized as follows:

1. **Cycle of Deferred Maintenance and Financial Strain:** One of the most pervasive financial challenges facing small utilities is the deferral of necessary capital improvement and renewal and replacement projects. While initially affordable, this strategy guarantees exponentially higher repair costs, system failures, and emergency fixes in the long run, leading to spikes in operational spending.

    - **Lack of Economies of Scale** – Smaller service areas inherently face higher fixed costs per customer. They cannot spread the substantial costs of specialized equipment, highly skilled personnel (e.g., licensed engineers, certified operators), and complex planning across a large rate base. This inefficiency often leads to thin operating margins. The NCDEQ recognizes this in their Viable Utility Program assessment criteria, scoring a point against any utility systems serving less than 10,000 people, which is true of all but three utilities in this Study.

- **Pressure to Suppress rates:** Driven by a strong interest in mitigating ratepayer impacts, often in economically sensitive communities, utility boards and local governments frequently prioritize keeping current rates low. This political and public pressure directly conflicts with the need to generate sufficient revenue to cover full system costs, including future capital replacement.

2. **Constraints on Sustainable Growth and Resource Capacity:** Modern utility management must navigate the reality that water and wastewater resources are finite, and the ability to expand services is constrained by regulatory, environmental, and technical limitations.

    - **Stringent Regulatory Restrictions:** Environmental regulations (e.g., those governing nutrient discharge, watershed protection, and drinking water quality standards) often impose significant, non-negotiable costs on utilities. Small systems frequently lack the financial capacity and technical expertise to implement the advanced treatment technologies required to comply with these rules.

    - **Inability to Realize Capacity Needs:** A growing region requires greater wastewater treatment capacity and reliable water sourcing. However, a fragmented approach often means that individual utilities either cannot obtain the necessary permitting for plant expansions, or they are unable to finance the large-scale upgrades needed to meet regional demand. Furthermore, the capacity that *is* available may be severely limited by previous regulatory actions which creates an inability to obtain new permits. These restrictions transform a regulatory and technical capacity problem into a severe economic constraint, as new residential or commercial development cannot be serviced.

3. **Inefficient Financial Structure or Borrowing Limitations:** Small or Segmented utilities are financially disadvantaged when seeking capital for necessary improvements.

    - **Higher Cost of Capital:** Due to a smaller revenue base, limited financial reserves, and a less diverse ratepayer base, small utilities often present a greater financial risk to lenders. This translates into lower credit ratings and consequently higher interest rate to borrow funds compared to larger, regional systems.

    - **Inadequate Rate Structures:** Many small utilities fail to employ professional rate-setting practices that incorporate cost-of-service, capital replacement costs, and reserve funding. Reliance on ad-hoc or politically influenced rate adjustments prevents the establishment of stable, predictable revenue streams necessary for long-term financial planning and investment.

In summary, the decentralized structure of utility service in small communities creates a systemic trap: the desire to maintain short-term affordability through suppressed rates forces the deferral of essential capital maintenance. This deferral, combined with the difficulty of meeting complex regulatory demands and accessing affordable capital, severely undermines the long-term viability of the utility, ultimately leading to unsustainable service and higher costs for future generations of ratepayers. Regionalization initiatives like the ones devised in this PTRWA Master Plan seek to overcome these fundamental challenges by leveraging economies of scale, professionalizing financial management, and establishing a unified platform for strategic infrastructure investment and regulatory compliance.

3. Our Approach

The goals of the Financial Impact Analysis were to assess the project capital costs related to each alternative in the PTRWA Master Plan as they are allocated to utility provider, calculate and examine the impacts to rate payers through the 2050 planning year, and provide recommendations for funding requirements. In order to achieve these goals, Raftelis worked with the consultant team, led by Hazen and Sawyer, to coordinate stakeholder meetings with the utility providers in the Study. This would allow the consultant team to understand the specific goals of each governmental entity and give them a chance to share crucial data related to demand projections, capital improvement plans, and other general financial information. Raftelis used the information that was made available to develop a financial model that would measure the ratepayer impacts of, principally, the "Go-It-Alone" scenario to serve as a baseline of reference and subsequently the four regionalization alternatives. Any Master Plan alternative costs that were recognized to impact ratepayers unreasonably were identified and a level of funding support is recommended for those utility providers to subsidize their allocated project costs. The following sections of the Financial Impact Analysis will describe in detail the financial modeling processes and assumptions involved in the development of Raftelis' findings and ultimate recommendations.

The financial impact section of the PTRWA Master Plan report was prepared for PTRWA through Hazen and Sawyer by Raftelis and is based on publicly available information or information provided by the individual stakeholders in the Study. While it is believed that the information, data, and opinions contained herein will be reliable under the conditions and subject to the limitations set forth in this report, Raftelis does not guarantee the accuracy thereof. Raftelis has assumed that the information provided by others, both verbal and written, is complete and correct. The projections set forth in this report are intended as "forward-looking statements." In formulating these projections, Raftelis has made certain assumptions with respect to conditions, events, and circumstances that may occur in the future. While Raftelis believes the assumptions are reasonable, actual results may differ materially from those projected, as they are influenced by the conditions, events, and circumstances that occur. As such, Raftelis does not take responsibility for the accuracy of data or projections provided by or prepared on behalf of the Client, nor does Raftelis have any responsibility for updating this report for events occurring after the date of this report. Use of this report or any information contained therein by any party other than the Client shall constitute a waiver and release by such third party of the Client from and against all claims and liability, including but not limited to liability for special, incidental, indirect or consequential damages in connection with such use. Such use of this report by a third party shall constitute agreement by the third party user that its rights, if any, arising from this report shall be subject to the terms of this Report's Limitations, and in no event shall the third party's rights, if any, exceed those of the Client under its contract with Raftelis. The benefit of such releases, waivers, or limitations of liability shall extend to the related companies and subcontractors of any tier of Raftelis and the shareholders, directors, officers, partners, employees, and agents of all released or indemnified parties.

3.1. Methodology

The core of this Financial Impact Analysis utilizes the framework of detailed unit cost analysis designed to project the total annual system cost of providing water and wastewater services. Total annual system costs are also referred to as the utility providers' revenue requirements. The revenue requirements for the nine distinct utility providers within Guilford and Randolph Counties were projected through FY2050. This methodology establishes a transparent, standardized metric against which the financial impacts of the "Go-It -Alone" scenario versus the regionalization alternatives can be measured. An outline of the steps involved in the unit cost analysis is provided below.

1. **Defining and Allocating Utility Revenue Requirements:** The first step in the unit cost analysis involved determining each utility's revenue requirements. This comprehensive figure includes all necessary expenditures to operate, maintain, finance, and expand the utility system sustainably for a given fiscal year. Key components include:

   - **Operating and Maintenance (O&M) Expenses:** Personnel, chemicals, power, materials, administrative overhead, any purchased treatment, etc.
   - **Debt Service:** Principal and interest payments on existing and future debt used to finance capital projects.
   - **Capital Improvement Program (CIP) Funding:** Cash or "Pay-as-you-go" funding and amortization of capital costs.
   - **Transfer Payments:** Inter-fund or inter-jurisdictional fees where applicable.

   All utility providers in the study manage both water and wastewater systems. In order to calculate separate water and wastewater costs the revenue requirements were meticulously allocated to either the water or wastewater system based on utility reporting. When costs were not directly assigned to a system by utility, allocation assumptions were made.

2. **Calculating the Unit Cost per Thousand Gallons:** The annual revenue requirement for each of the nine utility providers (for both water and wastewater individually) was then divided by the projected total annual system water or wastewater demand, measure in thousands of gallons (kgal). Projected annual system demands for water and wastewater were provided by Hazen and Sawyer. This calculation was performed annually for each utility in each scenario and alternative from the baseline Fiscal year, FY2026, through FY2050.

3. **Incorporating Debt Service Coverage Ratio (DSCR):** To ensure the financial projections reflected the standards of a sustainable and creditworthy utility, a critical adjustment was made to the revenue requirements, when applicable. Utility enterprises typically maintain a debt service coverage ratio (DSCR) to demonstrate the financial capacity to meet debt obligations and provide a buffer for unexpected events. The unit cost analysis incorporated a requirement that the unit cost must generate sufficient revenue not only to cover the baseline revenue requirement but also to achieve a minimum of 1.5x DSCR. This means that the calculated unit cost in any given year was engineered to ensure that net operating revenues (revenues less O&M) were at least 1.5 times the annual debt service requirement. This required DSCR was built directly into the revenue requirement calculation before the final unit cost was determined.

4. **Determining Incremental Rate Adjustments:** The unit cost analysis established a baseline assumption that each utility's existing FY2026 water and wastewater rates were sufficient to fully recover their respective FY2026 budgeted system expenses (revenue requirements). For every subsequent year (FY2027 through FY2050), the change in unit cost of service served as the required increment for rate adjustment projections. The annual adjustment in the unit cost was translated into the required adjustment to the "typical" residential bill of 5,000 gallons individually for water and

wastewater. For example, if the unit cost of water service in FY2030 increased by 10% from FY2029, it was assumed that the "typical" residential bill would need to increase by 10% in order to recover the additional system cost. This unit cost adjustments represent a "just-in-time" rate increase to recover annual cost. In practice, when conducting detailed financial planning a utility enterprise will typically adopt several smaller rate increases annually leading up to a large system cost year, instead of waiting to have one large increase. This mitigates annual customer impacts or what is commonly referred to as "rate-shock".

5. **Applying the Floor Constraint for Rate Stability:** If the projected unit cost decreased from the previous year, the "typical" residential bill of 5,000 gallons of water and wastewater consumption was held constant (i.e. the utility rates were not decreased). This conservatism recognizes the operational reality that utilities rarely, if ever, reduce water and wastewater rates, even in years with lower projected costs. Instead, excess revenue generated in such years would typically be retained and strategically allocated to enhance the utility's reserve funds and offset the need for future rate increases.

3.2. General Forecast Assumptions

The unit cost analysis model includes several baseline assumptions applicable to the "Go-It-Alone" scenario and all four PTRWA Master Plan regional alternatives modeled as a part of this Study.

3.2.1. Operating and Maintenance Expenses

O&M expenses represent normal, recurring expenses necessary to sustainably operate and maintain the water and wastewater utility systems during the annual accounting cycle. Raftelis used actual historical and FY2026 budgeted operating expenses to serve as the basis for the projection of utility operating expenses. Raftelis used publicly available operating expense information or data provided by the individual stakeholders in the Study. In order to calculate separate water and wastewater costs the revenue requirements were meticulously allocated to either the water or wastewater system based on utility reporting. When costs were not directly assigned to a system by utility, allocation assumptions were made. Operating expenses for all utility providers were escalated from the FY 2026 budget by 4% per year to account for growing utility costs and inflation, which is consistent with longer-term historical trends. If an individual utility was available to provide Raftelis with their own financial planning O&M escalations, those were used instead. It is worth noting that while current inflationary pressures are easing slightly, they continue to run higher than what has been experienced in recent history.

It should be noted that each PTRWA Master Plan alternative involves significant changes to existing utility system operations and the cost impact of those changes, to the best of our ability, have been reflected in the projected operating expenses for each water and wastewater utility provider. For example, the operating expenses associated with the ongoing operation of a brand-new wastewater treatment plant are not currently reflected in utilities' operating budgets, so projected costs have been allocated to the potential participating members. More detailed operational cost adjustments are summarized in the individual utility sections.

3.2.2. Existing Debt

Existing debt service refers to prior debt issuances and the corresponding annual debt service payments, both principal and interest, that the utility funds are obligated to pay. Raftelis utilized data provided by PTRWA and the other individual stakeholders. If complete existing debt service schedules were not provided by individual stakeholders Raftelis utilized publicly available debt schedule information from the State and Local Government Finance division of the North Carolina State Treasurers office. Existing debt was appropriately allocated to the water versus wastewater systems as reported.

3.2.3. Capital Improvement Plans and Financing

A significant part of any utility's revenue requirements is its capital improvement plan. Raftelis utilized capital improvement plans ("CIP") provided by individual stakeholders. Several stakeholders did not provide or do not conduct any sort of capital planning. In this case Raftelis estimated projected annual capital expenditures based on either historical budgeted capital outlay, if available, or the depreciation value found in stakeholders most recent Annual Comprehensive Financial Report ("ACFR"). While depreciation itself is a non-cash accounting entry, its calculated value provides a critical measure of the funds that should be set aside annually to ensure infrastructure sustainability. Capital expenditures that were projected from either historical budgeted outlays or depreciation were escalated at 4% annually.

The capital improvement plans provided were forecasted out between 5 to 10 years, which is typical of most utilities who perform capital planning. However, the forecast for the Master Plan extends to 2050, well outside the typical individual utility capital planning term. In order to recognize missing capital cost in the 20-year planning gap in some cases, Raftelis utilized depreciation values from the most recent municipalities' ACFR to represent minimum water and sewer system reinvestment in the outer planning years. This depreciation amount was escalated at 4% annually from the fiscal year of reporting but only utilized in the planning years outside of the utility providers current CIP.

The financing of capital improvement plans generally assume projects will be funded with a blend of debt and equity. Equity financed projects are assumed to be funded with user rate revenues also called "pay-as-you-go" ("PAYGO"). Debt financing includes future debt issuances through financing agreements issued by a specified lender or through revenue bond issuances. For the stakeholders who provided CIP's, their reported funding sources and assumptions were used for the calculation of revenue requirements. For stakeholders who did not provide a comprehensive capital plan funding sources were assumed. Lower cost projects were generally assigned PAYGO funding and more significant capital investments are anticipated to require debt financing. Any projects assigned debt financing are assumed to have 30-year agreement terms at 4.00% interest rates with at 1.00% issuance cost. Debt issuances are forecasted to have one half payment in the fiscal year of issuance and full payments annually thereafter.

It should be noted that each PTRWA Master Plan alternative involves significant changes to existing utility capital improvement plans. The capital cost differential between the existing fragmented "Go-It-Alone" scenario and the proposed regional alternatives serves as the single most critical driver in the long-term unit cost trajectory. Raftelis has collaborated with Hazen and Sawyer and Wooten to reflect, to the best of our ability, the changes to existing capital improvement plans should a proposed alternative be pursued. In the case that a capital project exists in both the provided utility CIP and the PTRWA Master Plan alternative, the cost developed in the alternative was used. In order for equitable comparison the costs developed in the alternative plans would also be used in the "Go-It-Alone" scenario. More detailed capital project cost adjustments are summarized in the individual utility sections.

3.2.4. Demand Projections

Accurate demand projections of future water and wastewater demand are crucial to the analysis because they directly determine both the timing and magnitude of required capital investments related to system expansion. In the unit cost analysis, the escalation of demand also serves to lower the annual change in unit cost, as the total revenue requirements are spread out over more consumption. The demand projections through 2050 were provided by Hazen and Sawyer for each utility provider and are summarized in million gallons per day for water and wastewater in Table 3 and Table 4. The projected demands do not change by scenario or alternative.

Table 3: Projected Regional Water Demand (MGD)

	2026 *MGD*	2030 *MGD*	2035 *MGD*	2040 *MGD*	2045 *MGD*	2050 *MGD*
Utility Provider						
Greensboro	39.46	44.38	47.49	50.85	53.11	55.37
High Point	13.83	14.34	15.34	16.34	17.79	19.24
Archdale	1.10	1.30	1.48	1.66	1.97	2.28
Jamestown	0.70	0.93	1.07	1.22	1.36	1.50
Randleman	0.84	0.88	1.04	1.21	1.38	1.55
Asheboro	5.48	5.60	6.09	6.58	7.06	7.55
Liberty	0.34	0.39	0.46	0.52	0.59	0.66
Franklinville	0.11	0.11	0.12	0.12	0.13	0.13
Ramseur	0.55	0.61	0.68	0.74	0.81	0.87
Total: Regional Demand	**62.40**	**68.53**	**73.75**	**79.23**	**84.18**	**89.14**
% Change		*10%*	*8%*	*7%*	*6%*	*6%*

Table 4: Projected Regional Wastewater Demand (MGD)

	2026 *MGD*	2030 *MGD*	2035 *MGD*	2040 *MGD*	2045 *MGD*	2050 *MGD*
Utility Provider						
Greensboro	36.56	39.69	42.37	45.05	47.76	50.47
High Point	14.80	16.16	17.35	18.54	19.99	21.43
Archdale	1.18	1.40	1.59	1.77	2.09	2.41
Jamestown	0.81	0.99	1.14	1.28	1.42	1.56
Randleman	0.84	0.88	1.04	1.21	1.38	1.55
Asheboro	4.30	5.05	5.46	5.94	6.39	6.84
Liberty	0.36	0.42	0.52	0.61	0.76	0.90
Franklinville	0.06	0.07	0.07	0.07	0.08	0.08
Ramseur	0.24	0.30	0.41	0.58	0.59	0.59
Total: Regional Dem	**59.13**	**64.96**	**69.94**	**75.05**	**80.44**	**85.83**
% Change		*10%*	*8%*	*7%*	*7%*	*7%*

4. Regionalization Alternatives - Capital Cost Summaries

For water and wastewater utilities, capital expenditures—the costs associated with building, expanding, and rehabilitating long-lived infrastructure—represent the largest, most volatile, and most influential component of the total revenue requirements over a multi-decade planning horizon. This section presents the detailed capital cost estimates for the various regionalization alternatives developed by Hazen and Sawyer as part of the comprehensive PTRWA Master Plan. The core purpose of these alternatives is to define actionable pathways for addressing the projected water and wastewater service demands of Guilford and Randolph Counties through the year 2050. These cost summaries, which show the key differences between alternatives, are the primary variables driving the disparity in projected ratepayer impacts and subsequently the need for outside funding support. Each alternative represents a distinct strategic approach to wastewater infrastructure consolidation, expansion, and service delivery, designed to move the region beyond the fragmented structure of the "Go-It-Alone" scenario also summarized below. The capital costs presented for both the "Go-It-Alone" scenario and the regional alternatives comprehensively include all necessary investments for the sustainable management and servicing of biosolids generated at the respective wastewater treatment facilities. Due to PTRWA's existing presence in regional water service the regional water capital projects will remain unchanged between the "Go-It-Alone" Scenario and the four alternatives.

4.1. "Go-It-Alone" Scenario

The "Go-It-Alone" scenario serves as the baseline for the financial impact analysis, which all the alternatives are compared to. This scenario models the projected capital expenditure required if the nine identified utilities continue to operate mostly independently, without the unified resource planning, financing mechanisms, or consolidated infrastructure envisioned by the regional alternatives. Crucially, the "Go-It-Alone" scenario explicitly excludes the construction of a new regional wastewater treatment facility or major regional interconnectivity projects. Under the "Go-It-Alone" scenario each utility provider is solely responsible for meeting its own localized growth demands and regulatory requirements through 2050. Five utilities have been specifically identified as requiring treatment plant expansions within the 25-year planning period to address capacity shortfalls: Greensboro, High Point, Randleman, Asheboro, and Ramseur. A defining feature and major limitation under the "Go-It-Alone" scenario is the inability of the region's largest providers, Greensboro and High Point, to secure sufficient capacity during the planning period. The expansion capabilities of their systems are constrained by existing National Pollutant Discharge Elimination System ("NPDES") permits. It should also be noted that existing outside funding support provided by Randolph County has been assumed to be fully allocated to identified utility providers for projects in this scenario. Table 5 and Table 6 summarize the capital projects associated with the "Go-It-Alone" scenario.

Table 5: Water Project Cost Summary

ID	Water Capital Projects	Total Project Cost	Randolph County Grant Funding (1)	1st Fiscal Year of Debt Payments
W1.1	PTRWA Expansion to 26.7 mgd	$ 94,100,000		FY 2028
W1.2	PTRWA Advanced Treatment Upgrade 26.7 mgd	146,900,000		FY 2031
W1.3	PTRWA Residuals Facility Expansion to 26.7 mgd	42,200,000		FY 2034
W1.4	PTRWA Expansion to 36 mgd	181,400,000		FY 2034
W1.5	PTRWA Advanced Treatment Upgrade to 36 mgd	51,200,000		FY 2042
W1.6	PTRWA Residuals Facility Expansion to 36 mgd	32,700,000		FY 2042
W1.7	PTRWA Expansion to 48 mgd	234,000,000		FY 2031
W1.8	PTRWA Advanced Treatment Upgrade to 48 mgd	66,000,000		FY 2034
W1.9	PTRWA Residuals Facility Expansion to 48 mgd	42,200,000		FY 2042
W2	Water service from PTRWA to Asheboro	10,400,000		FY 2026
W3	Asheboro WTP Advanced Treatment Upgrade	37,400,000		FY 2028
W4	High Point Ward WTP Advanced Treatment Upgrade	95,900,000		FY 2028
W5.1	Mitchell Advanced Treatment Upgrades	120,000,000		FY 2026
W5.2	Townsend Advanced Treatment Upgrades	150,000,000		FY 2027
W6.1	Water service from Ramseur to Liberty (Hwy 421 @ Hwy 49)	14,200,000	3,800,000	FY 2027
W6.2	Ramsuer to Liberty Booster Pump Station	1,100,000		FY 2027
W7.1	Liberty Water Line from Greensboro - Toyota facility	9,500,000	9,500,000	FY 2028
W7.2	Greensboro to Liberty Booster Pump Station	1,500,000	1,500,000	FY 2028
W8	Water service from Greensboro to Franklinville (Hwy 62 down Hwy 22)	9,200,000		FY 2032
W9	Asheboro to Chatham County Water Line Additional Project Funding	12,000,000	12,000,000	FY 2026
W10.1	Ramseur WTP Rehabilitation of existing facility	23,400,000		FY 2028
W10.2	Ramseur WTP Advanced Treatment Upgrade at 1.5mgd	6,000,000		FY 2028
W10.3	Ramseur WTP Expansion to 3mgd	29,300,000		FY 2031
W10.4	Ramseur WTP Advanced Treatment Upgrade to 3 mgd	6,000,000		FY 2031
W11	Water service from Greensboro to North of the Lakes	22,800,000		FY 2026
W12.1	Greensboro HWY 62 Pump Station Expansion	1,500,000		FY 2029
W12.2	Parallel Waterline from HWY 62 to Sutton Rd - Hwy 73 Greensboro	35,200,000		FY 2029
W12.3	Parallel Waterline from Sutton Rd to S Holden Rd Greensboro	14,300,000		FY 2029
Total: Water Capital Project Costs		**$ 1,490,400,000**	**$ 26,800,000**	

(1) Known grant funidng includes Randolph County ARPA funding and Randolph County State Budget Infrastructure Grant ($85)

(2) Separate Grant funding assumed to fund this project

Table 6: “Go-It-Alone” Wastewater Project Cost Summary

ID	"Go-It-Alone" Wastewater Capital Projects	Total Project Cost	Randolph County Grant Funding	1st Fiscal Year of Debt Payments
WW1	Seagrove 0.9 mgd Package WWTP	$ 3,000,000	$ 3,000,000	FY 2026
WW2.1	Liberty Transfer Lift Station to Greensboro	12,600,000		FY 2037
WW2.2	Liberty Sewer Force Main to Greensboro	9,500,000		FY 2037
WW3	Greensboro TZO WRF Expansion to 60 mgd	90,000,000		FY 2034
WW6.1	High Point Eastside WWTP Upgrade of Existing 26 mgd	585,000,000		FY 2032
WW6.2	High Point Eastside WWTP Expansion to 32 mgd	270,000,000		FY 2031
WW9	Randleman WWTP Upgrade of Existing 1.745 mgd	73,300,000	14,500,000	FY 2031
WW14.1	Ramseur WWTP Upgrade of Existing 0.46 mgd	19,300,000	6,600,000	FY 2027
WW14.2	Ramseur WWTP Expansion to 1 mgd	28,400,000	28,400,000	FY 2027
WW15	Franklinville WWTP Upgrade of Existing 0.1 mgd	4,200,000	4,200,000	FY 2031
WW16.1	Asheboro WWTP Upgrade of Existing 9 mgd	324,000,000		FY 2031
WW16.2	Asheboro WWTP Expansion to 12 mgd	135,000,000		FY 2033
Total: Wastewater Capital Project Costs		**$ 1,554,300,000**	**$ 56,700,000**	

4.2. Regionalization Alternative 1

The Master Plan Alternative 1 provides a significant step toward regional cooperation by proposing the construction of a major new regional wastewater treatment facility located near Randleman. Randleman's existing wastewater treatment capacity would be entirely retired and replaced by their expanded allocated share in the new regional facility. This immediately removes a small, ageing facility from the region and consolidates its service. Greensboro and High Point utilities would be allocated capacity at the new regional plant, providing a crucial and sustainable avenue for growth that is unavailable under the "Go-It-Alone" Scenario due to their current NPDES permit restrictions. Liberty, Jamestown, and Archdale's future demands are incorporated in either Greensboro or High Points allocated capacity based on existing agreements. While utilizing the new regional plant for some growth, Greensboro would also be required to expand its existing TZO wastewater plant up to its maximum legal NPDES permit limits. In this alternative Asheboro, Ramseur, and Franklinville would not participate in the regional wastewater plant and would continue to operate and expand their localized systems very similarly to the "Go-It-Alone" scenario. It should also be noted that existing outside funding support provided by Randolph County has been assumed to be fully allocated to identified utility providers for projects in this scenario. Table 7 summarizes the wastewater capital projects associated with Alternative 1. The regional water capital projects remain unchanged from the "Go-It-Alone" scenario.

Table 7: Alternative 1 Wastewater Project Cost Summary

ID	Alternative 1 Wastewater Capital Projects	Total Project Cost	Randolph County Grant Funding	1st Fiscal Year of Debt Payments
WW1	Seagrove 0.9 mgd Package WWTP	$ 3,000,000	$ 3,000,000	FY 2026
WW2.1	Liberty Transfer Lift Station to Greensboro	12,600,000	2,500,000	FY 2037
WW2.2	Liberty Sewer Force Main to Greensboro	9,500,000	9,500,000	FY 2037
WW3	Greensboro TZO WRF Expansion to 60 mgd	90,000,000		FY 2034
WW6.1	High Point Eastside WWTP Upgrade of Existing 26 mgd	585,000,000		FY 2032
WW4	Greensboro Regional Lift Station/Force Main	102,900,000		FY 2031
WW5	Greensboro Regional Gravity Main	55,700,000		FY 2031
WW7	High Point Regional Lift Station/Force Main	196,400,000		FY 2031
WW8	Regional Gravity Outfall GSO/HP	140,700,000		FY 2031
WW10.1	Deep River Regional Lift Station (GSO, HP)	93,200,000		FY 2031
WW10.2	New Deep River WRF 9.5 mgd	427,500,000		FY 2031
WW10.3	Deep River WRF Expansion to 25 mgd	418,500,000		FY 2039
WW14.1	Ramseur WWTP Upgrade of Existing 0.46 mgd	19,300,000	9,100,000	FY 2027
WW14.2	Ramseur WWTP Expansion to 1 mgd	28,400,000	28,400,000	FY 2027
WW15	Franklinville WWTP Upgrade of Existing 0.1 mgd	4,200,000	4,200,000	FY 2031
WW16.1	Asheboro WWTP Upgrade of Existing 9 mgd	324,000,000		FY 2031
WW16.2	Asheboro WWTP Expansion to 12 mgd	135,000,000		FY 2033
Total: Wastewater Capital Project Costs		**$ 2,645,900,000**	**$ 56,700,000**	

4.3. Regionalization Alternative 2

The Master Plan Alternative 2 provides a significant step toward regional cooperation by proposing the construction of a major new regional wastewater treatment facility located near Randleman. Randleman's existing wastewater treatment capacity would be entirely retired and replaced by their expanded allocated share in the new regional facility. This immediately removes a small, ageing facility from the region and consolidates its service. Greensboro and High Point utilities would be allocated capacity at the new regional plant, providing a crucial and sustainable avenue for growth that is unavailable under the "Go-It-Alone" Scenario due to their current NPDES permit restrictions. Liberty, Jamestown, and Archdale's future demands are incorporated in either Greensboro or High Points allocated capacity based on existing agreements. While utilizing the new regional plant for some growth, Greensboro and High Point would also be required to expand the existing TZO and Eastside wastewater treatment plants to their maximum legal NPDES permit limits. In this alternative Asheboro, Ramseur, and Franklinville would not participate in the regional wastewater plant and would continue to operate and expand their localized systems very similarly to the "Go-It-Alone" scenario. The main difference between Alternative 1 and Alternative 2 is that the expansion at both TZO and Eastside, early in the forecast, postpone the immediate need for the additional capacity at the regional wastewater facility. It should also be noted that existing outside funding support provided by Randolph County has been assumed to be fully allocated to identified utility providers for projects in this scenario. Table 8 summarizes the wastewater capital projects associated with Alternative 2. The regional water capital projects remain unchanged from the "Go-It-Alone" scenario.

Table 8: Alternative 2 Wastewater Project Cost Summary

ID	Alternative 2 Wastewater Capital Projects	Total Project Cost	Randolph County Grant Funding	1st Fiscal Year of Debt Payments
WW1	Seagrove 0.9 mgd Package WWTP	$ 3,000,000	$ 3,000,000	FY 2026
WW2.1	Liberty Transfer Lift Station to Greensboro	12,600,000		FY 2037
WW2.2	Liberty Sewer Force Main to Greensboro	9,500,000		FY 2037
WW3	Greensboro TZO WRF Expansion to 60 mgd	90,000,000		FY 2034
WW6.1	High Point Eastside WWTP Upgrade of Existing 26 mgd	585,000,000		FY 2032
WW6.2	High Point Eastside WWTP Expansion to 32 mgd	270,000,000		FY 2032
WW9	Randleman WWTP Minimal Upgrade of Existing 1.745 mgd	39,300,000	14,500,000	FY 2031
WW4	Greensboro Regional Lift Station/Force Main	102,800,000		FY 2038
WW5	Greensboro Regional Gravity Main	55,700,000		FY 2038
WW7	High Point Regional Lift Station/Force Main	138,500,000		FY 2038
WW8	Regional Gravity Outfall GSO/HP	125,500,000		FY 2038
WW10.1	Deep River Regional Lift Station (GSO, HP)	64,800,000		FY 2038
WW10.2	New Deep River WRF 18.5 mgd	832,500,000		FY 2038
WW14.1	Ramseur WWTP Upgrade of Existing 0.46 mgd	19,300,000	6,600,000	FY 2027
WW14.2	Ramseur WWTP Expansion to 1 mgd	28,400,000	28,400,000	FY 2027
WW15	Franklinville WWTP Upgrade of Existing 0.1 mgd	4,200,000	4,200,000	FY 2031
WW16.1	Asheboro WWTP Upgrade of Existing 9 mgd	324,000,000		FY 2031
WW16.2	Asheboro WWTP Expansion to 12 mgd	135,000,000		FY 2033
Total: Wastewater Capital Project Costs		**$ 2,840,100,000**	**$ 56,700,000**	

4.4. Regionalization Alternative 3

The Master Plan Alternative 3 incorporates increased regional cooperation, compared to the previous alternatives, by proposing the construction of a major new regional wastewater treatment facility located near Asheboro. Asheboro and Randleman's existing wastewater treatment capacity would be entirely retired and replaced by their expanded allocated share in the new regional facility. This immediately removes two ageing facilities from the region and consolidates its services. Greensboro and High Point utilities would be allocated capacity at the new regional plant, providing a crucial and sustainable avenue for growth that is unavailable under the "Go-It-Alone" Scenario due to their current NPDES permit restrictions. Liberty, Jamestown, and Archdale's future demands are incorporated in either Greensboro or High Points allocated capacity based on existing agreements. All of Greensboro's, High Point's, Asheboro's, and Randleman's projected wastewater demand needs through 2050 would be addressed by the capacity available at the new regional facility. In this alternative Ramseur and Franklinville would not participate in the regional wastewater plant, however

Franklinville's existing wastewater treatment would be retired, and they would send their wastewater flows to an expanded Ramseur treatment facility. It should also be noted that existing outside funding support provided by Randolph County has been assumed to be fully allocated to identified utility providers for projects in this scenario. Table 9 summarizes the wastewater capital projects associated with Alternative 3. The regional water capital projects remain unchanged from the "Go-It-Alone" scenario.

Table 9: Alternative 3 Wastewater Project Cost Summary

ID	Alternative 3 Wastewater Capital Projects	Total Project Cost	Randolph County Grant Funding	1st Fiscal Year of Debt Payments
WW1	Seagrove 0.9 mgd Package WWTP	$ 3,000,000	$ 3,000,000	FY 2026
WW2.1	Liberty Transfer Lift Station to Greensboro	12,600,000	2,500,000	FY 2037
WW2.2	Liberty Sewer Force Main to Greensboro	9,500,000	9,500,000	FY 2037
WW6.1	High Point Eastside WWTP Upgrade of Existing 26 mgd	585,000,000		FY 2032
WW4	Greensboro Regional Lift Station/Force Main	123,300,000		FY 2030
WW5	Greensboro Regional Gravity Main	55,700,000		FY 2030
WW7	High Point Regional Lift Station/Force Main	197,400,000		FY 2030
WW8	Regional Gravity Outfall GSO/HP	133,000,000		FY 2030
WW11	Randleman Regional Gravity Main	2,000,000		FY 2030
WW12	Regional Gravity Outfall Randleman Tie-In	44,200,000		FY 2030
WW13.1	Deep River Regional Lift Station (GSO, HP, Rand)	122,400,000		FY 2031
WW13.3	New Deep River WRF 30 mgd	1,357,700,000		FY 2031
WW13.4	Deep River WRF Expansion to 43 mgd	342,100,000		FY 2040
WW14.1	Ramseur WWTP Upgrade of Existing 0.46 mgd	19,300,000		FY 2032
WW14.2	Ramseur WWTP Expansion to 1.25 mgd	41,500,000	35,000,000	FY 2032
WW19.1	Franklinville Transfer Lift Station to Ramseur	2,700,000	2,700,000	FY 2033
WW19.2	Frankinville Sewer Force Main to Ramseur	4,000,000	4,000,000	FY 2033
Total: Wastewater Capital Project Costs		**$ 3,055,400,000**	**$ 56,700,000**	

4.5. Regionalization Alternative 4

The Master Plan Alternative 4 incorporates the most regional cooperation, compared to the previous alternatives, by proposing the construction of a major new regional wastewater treatment facility located near Asheboro. Asheboro's, Randleman's, Ramseur's, and Franklinville's existing wastewater treatment capacity would be entirely retired and replaced by their expanded allocated share in the new regional facility. This immediately removes four aging facilities from the region and consolidates their services. Greensboro and High Point utilities would be allocated capacity at the new regional plant, providing a crucial and sustainable avenue for growth that is unavailable under the "Go-It-Alone" Scenario due to their current NPDES permit restrictions. Liberty, Jamestown, and Archdale's future demands are incorporated in either Greensboro or High Points allocated capacity based on existing agreements. All nine of the utility providers in the Study would have their projected wastewater demand needs addressed by the capacity available at the new regional facility. It should also be noted that existing outside funding support provided by Randolph County has been assumed to be fully allocated to identified utility providers for projects in this scenario. Table 10 summarizes the wastewater capital projects associated with Alternative 4. The regional water capital projects remain unchanged from the "Go-It-Alone" scenario.

Table 10: Alternative 4 Wastewater Project Cost Summary

ID	Alternative 4 Wastewater Capital Projects	Total Project Cost	Randolph County Grant Funding	1st Fiscal Year of Debt Payments
WW1	Seagrove 0.9 mgd Package WWTP	$ 3,000,000	$ 3,000,000	FY 2026
WW2.1	Liberty Transfer Lift Station to Greensboro	12,600,000	2,500,000	FY 2037
WW2.2	Liberty Sewer Force Main to Greensboro	9,500,000	9,500,000	FY 2037
WW6.1	High Point Eastside WWTP Upgrade of Existing 26 mgd	585,000,000		FY 2032
WW4	Greensboro Regional Lift Station/Force Main	123,300,000		FY 2030
WW5	Greensboro Regional Gravity Main	55,700,000		FY 2030
WW7	High Point Regional Lift Station/Force Main	197,400,000		FY 2030
WW8	Regional Gravity Outfall GSO/HP	133,000,000		FY 2030
WW11	Randleman Regional Gravity Main	2,000,000		FY 2030
WW12	Regional Gravity Outfall Randleman Tie-In	44,200,000		FY 2030
WW17.1	Ramseur Regional Lift Station	17,000,000	17,007,900	FY 2032
WW17.2	Ramseur Regional Force Main	60,300,000	19,018,900	FY 2032
WW18.1	Franklinville Regional Lift Station/Force Main	5,700,000	5,673,200	FY 2033
WW13.1	Deep River Regional Lift Station (GSO, HP, Rand)	122,400,000		FY 2031
WW13.3	New Deep River WRF 31 mgd	1,413,900,000		FY 2031
WW13.4	Deep River WRF Expansion to 44 mgd	342,600,000		FY 2040
Total: Wastewater Capital Project Costs		**$ 3,127,600,000**	**$ 56,700,000**	

4.6. Alternative Comparison

Table 11 illustrates the key differences regarding capacity gained and total regional cost between the “Go-It-Alone” scenario and the PTRWA Master Plan Alternatives. The comparison summary displays the major limitation under the “Go-It-Alone” scenario, which is the inability of the region’s largest providers, Greensboro and High Point, to secure sufficient capacity during the planning period. Based on the wastewater demand projections utility providers will be required to revisit regional wastewater treatment supply solutions well before 2042 when the wastewater capacity threshold is estimated to be reached for at least one of the utility providers. All the PTRWA Master Plan alternatives address the regions water and wastewater projected demands, as well as biosolid disposal, through 2050, with the key differences shown in the cost to involve more utility providers at the new regional facility.

Table 11: Regional Alternative Comparison Summary

Alternatives	Added Wastewater Capacity	Regional Sewer Related Capital Cost Through 2050	90% of Capacity Reached with Planned Expansions	Regional Water Related Capital Cost Through 2050
"Go it Alone": • No Regional Facility • Individual Utility Expansions	**13.5 MGD** 4 MGD – Greensboro; 0.54 MGD - Ramseur 6 MGD - High Point; 3 MGD – Asheboro 0.9 MGD - Seagrove	**$ 1.6 B**	**2042**	**$ 1.5 B**
Alternative 1: • Regional Facility includes *Greensboro (Expansion @ TZO)* *High Point Randleman*	**31.7 MGD** 25 MGD – Regional; 0.54 MGD - Ramseur 4 MGD - Greensboro; 3 MGD – Asheboro 0.9 MGD - Seagrove (Replaces 1.75mgd @ Randleman)	**$ 2.6 B**	**2050 +**	**$ 1.5 B**
Alternative 2: • Regional Facility includes *Greensboro (Expansion @ TZO)* *High Point (Expansion @ Eastside)* *Randleman*	**31.2 MGD** 18.5 MGD – Regional; 0.54 MGD - Ramseur 4 MGD – Greensboro; 3 MGD – Asheboro 6 MGD – High Point; 0.9 MGD - Seagrove (Replaces 1.75mgd @ Randleman)	**$ 2.8 B**	**2050 +**	**$ 1.5 B**
Alternative 3: • Regional Facility includes *Greensboro Randleman* *High Point Asheboro*	**33.7 MGD** 42.8 MGD – Regional; 0.79 MGD – Ramseur 0.9 MGD - Seagrove (Replaces 9mgd @ Asheboro) (Replaces 0.1mgd @ Franklinville) (Replaces 1.75mgd @ Randleman)	**$ 3.1 B**	**2050 +**	**$ 1.5 B**
Alternative 4: • Regional Facility includes *Greensboro Randleman* *High Point Asheboro* *Ramseur Franklinville*	**33.7 MGD** 44.1 MGD – Regional; 0.9 MGD - Seagrove (Replaces 9mgd @ Asheboro) (Replaces 0.46mgd @ Ramseur) (Replaces 0.1mgd @ Franklinville) (Replaces 1.75mgd @ Randleman)	**$ 3.1 B**	**2050 +**	**$ 1.5 B**

5. Utility Financial Impacts

The core of the Financial Impact Analysis is dedicated to detailed financial modeling of water and wastewater unit cost, and the resulting long-term ratepayer impacts of each individual service provider. The unit cost analysis was performed for water and wastewater for each individual utility provider under the "Go-It-Alone" scenario and each of the Master Plan alternatives. This section presents the total annual system costs (Revenue Requirements), projected water and wastewater demands (in thousands of gallons) and resulting unit cost calculations for all nine utility providers: Archdale, Asheboro, Franklinville, Greensboro, High Point, Jamestown, Liberty, Ramseur, and Randleman. For each provider and for every year through FY2050, the analysis identifies the change in annual unit cost to project the necessary increases to the "typical" 5,000-gallon residential bill to recover those costs. The resulting ratepayer impacts through FY2050 establishes a financial baseline, demonstrating the individual costs each utility faces in achieving sustainable service delivery, that each utility provider can use to inform decision making around long-term capacity and financial planning.

5.1. City of Archdale

5.1.1. Background

The City of Archdale purchases their water from PTRWA and will be part of future planned expansions. PTRWA will be able to meet their water needs for the foreseeable future. The City of Archdale owns 2.5 MGD capacity in the Eastside WWTP at High Point, which will meet their needs for the foreseeable future. In addition, the Cities of Archdale and Trinity have studied the alternative to build a WWTP discharging to the Yadkin River basin to meet their future needs. It is unclear at the time of this study when, if ever, this alternative will be pursued. Therefore, we have not included it in the alternatives.

5.1.2. Revenue Requirements

The first major task in establishing a unit cost analysis is developing an understanding of the revenue requirements of a utility during the forecast period. Revenue requirements refer to the utility's annual costs that must be recovered through user rates, fees, and charges. Revenue requirements are comprised of cash-based expenses including O&M expenses, cash-funded capital projects, debt service principal and interest payments, annual contributions to reserves, and any operating transfers to other utility or general funds.

1. Operating Expenses: O&M expenses represent normal, recurring expenses necessary to sustainably operate and maintain the system during the utility providers annual accounting cycle. Archdale's FY2026 operating budget served as the basis for the projection of utility operating costs. Operating expenses were escalated from the FY 2026 budget by 4% per year to account for growing utility costs and inflation, which is consistent with longer-term historical trends. Operating expenses were offset by miscellaneous revenues found in the budget. Archdale purchases sewer treatment from the City of High Point. To recognize Archdale is subsequently impacted by High Points increase in cost, Archdale's purchased sewer cost is projected to increase at the rate of High Point's annual unit cost change. There are no specific changes in operating costs by between the "Go-It-Alone" scenario or any alternative.

2. **Existing Debt:** Existing debt service refers to prior debt issuances and the corresponding annual debt service payments, both principal and interest, that the utility provider is obligated to pay. Archdale currently has four outstanding direct borrowings according to their most recent audited financial statements.

3. **Existing Capital Improvement Plan and Financing:** For water and wastewater utilities, capital expenditures - the costs associated with building, expanding, and rehabilitating long-lived infrastructure - represent the largest, most volatile, and most influential component of the total annual revenue requirement during any planning period. A capital improvement plan was not provided for Archdale. In this case, Raftelis estimated projected annual capital expenditure based on the depreciation value found in the most recent audited financial statement, and escalated that value at 4% annually. Based on the projections using depreciation split between water and wastewater, Archdale plans to spend approximately $24.8 million (M) in total between FY 2026 and FY 2050 for water capital projects and $34.4 M for wastewater. Raftelis assumes these capital projects will be financed with equity. The costs associated with the existing capital improvement plan are included in both the "Go-It-Alone" scenario and Master Plan Alternative. Table 12 shows the planned capital spending and anticipated funding sources for water and wastewater.

Table 12: Archdale Existing Capital Improvement Expenditures

		2026-2050
CIP Costs		
Water		
Cash Funded	$	24,754,140
Debt Financed		
Grant Funded		
Subtotal: Water CIP Costs	$	24,754,140
Wastewater		
Cash Funded	$	34,446,616
Debt Financed		
Grant Funded		
Subtotal: Wastewater CIP Costs	$	34,446,616
Total: Existing Capital Project Costs	**$**	**59,200,757**

4. **"Go-It-Alone" Capital Projects:** The "Go-It-Alone" scenario details the projected capital expenditures required, in addition to the existing CIP, if the nine identified utilities continue to operate mostly independently, without the unified resource planning, financing mechanisms, or consolidated infrastructure envisioned by the regional alternatives. Capital project costs in this scenario are allocated based on capacity and assumed to be debt financed. Archdale's total allocated "Go-It-Alone" scenario cost is $125.6 million. Table 13 exhibits the water and wastewater project costs allocated to Archdale in the "Go-It-Alone" Scenario.

Table 13: Archdale "Go-It-Alone" Capital Project Summary

Capital Project	Total Cost	Allocation %	Allocated Cost	1st Fiscal Year of Debt Payments
Water				
PTRWA Expansion to 26.7 MGD	$ 94,075,000	7.4%	$ 6,985,069	FY 2026
PTRWA Advanced Treatment Upgrade 26.7 mgd	146,900,000	9.2%	13,514,800	FY 2027
PTRWA Expansion to 36 MGD	181,400,000	17.0%	30,838,000	FY 2030
PTRWA Advanced Treatment Upgrade to 36 MGD	51,200,000	17.0%	8,704,000	FY 2030
PTRWA Residuals Facility Expansion to 26.7 mgd	42,220,000	9.2%	3,884,240	FY 2028
PTRWA Residuals Facility Expansion to 36 mgd	32,700,000	17.0%	5,559,000	FY 2031
Wastewater				
Upgrade High Point's Eastside WWTP	585,000,000	9.6%	56,160,000	FY 2031
Total: Capital Project Cost	**$ 1,133,495,000**		**$ 125,645,109**	

5. **Alternative Capital Projects:** The four PTRWA Master Plan alternatives define regional pathways for addressing the projected water and wastewater service demands of Guilford and Randolph Counties through the year 2050. The capital project costs included in each Alternative are allocated based on capacity, in addition to the existing CIP, and assumed to be debt financed. Table 14 exhibits the wastewater project costs allocated to Archdale in each of the four Master Plan Alternatives. The water project costs remain the same in the "Go-It-Alone" scenario and all alternatives.

Table 14: Archdale Alternative Wastewater Capital Project Summary

Wastewater Capital Project	Total Cost	Allocation %	Allocated Cost	1st Fiscal Year of Debt Payments
Alternative 1				
Upgrade High Point's Eastside WWTP	$ 585,000,000	9.6%	$ 56,160,000	FY 2031
Subtotal: Alternative 1	$ 585,000,000		$ 56,160,000	
Alternative 2				
Upgrade High Point's Eastside WWTP	585,000,000	9.6%	56,160,000	FY 2031
Subtotal: Alternative 2	$ 585,000,000		$ 56,160,000	
Alternative 3				
Upgrade High Point's Eastside WWTP	585,000,000	9.6%	56,160,000	FY 2031
Subtotal: Alternative 3	$ 585,000,000		$ 56,160,000	
Alternative 4				
Upgrade High Point's Eastside WWTP	585,000,000	9.6%	56,160,000	FY 2031
Subtotal: Alternative 4	$ 585,000,000		$ 56,160,000	

5.1.3. Demand Projections

The demand projection volumes act as the divisor in the unit cost calculation to transform the annual revenue requirement into a standardized cost metric that allows for meaningful comparison between scenarios and service providers. The water and wastewater demand projections through 2050 were provided by Hazen and Sawyer for each utility provider and are summarized for Archdale in annual thousand gallons for water and wastewater in Table 15. The projected demands do not change by scenario or alternative.

Table 15: Archdale Water and Wastewater Demand Projections

	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
Demand Projections (kgal)						
Water	399,858	474,500	540,200	605,900	719,050	832,200
% Change		*19%*	*14%*	*12%*	*19%*	*16%*
Wastewater	430,700	511,000	578,525	646,050	762,850	879,650
% Change		*19%*	*13%*	*12%*	*18%*	*15%*

5.1.4. Unit Cost Forecast and Bill Impacts

Table 16 presents the results of Archdale's unit cost analysis through 2050 for the "Go-It-Alone" scenario and each of the Master Plan alternatives. The unit cost analysis takes Archdale's annual water and wastewater costs detailed in the revenue requirement section, including added debt financed scenario/alternative capital cost, divided by the water or wastewater projected demand. The annual unit cost difference, including the minimum adjustments for debt service coverage and rate stability constraints detailed in the Methodology section, is applied to the "typical" 5,000 gallon water and wastewater residential bill. The resulting combined "typical" monthly residential bills through 2050 are presented in Table 17.

Table 16: Archdale Unit Cost Forecast

Unit Cost per Kgal	2026 Projected	2030 Projected	2035 Projected	2040 Projected	2045 Projected	2050 Projected
"Go-It-Alone"						
Water Unit Cost	$ 6.73	$ 11.51	$ 16.24	$ 16.24	$ 16.24	$ 16.24
% change		*71%*	*41%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.34	$ 7.88	$ 19.52	$ 19.52	$ 19.52	$ 19.52
% change		*7%*	*148%*	*0%*	*0%*	*0%*
Alternative 1						
Water Unit Cost	$ 6.73	$ 11.51	$ 16.22	$ 16.22	$ 16.22	$ 16.22
% change		*71%*	*41%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.34	$ 7.88	$ 19.81	$ 19.81	$ 19.81	$ 19.81
% change		*7%*	*151%*	*0%*	*0%*	*0%*
Alternative 2						
Water Unit Cost	$ 6.73	$ 11.51	$ 16.32	$ 16.32	$ 16.32	$ 16.32
% change		*71%*	*42%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.34	$ 7.88	$ 18.23	$ 18.23	$ 18.23	$ 18.23
% change		*7%*	*131%*	*0%*	*0%*	*0%*
Alternative 3						
Water Unit Cost	$ 6.73	$ 11.51	$ 16.22	$ 16.22	$ 16.22	$ 16.22
% change		*71%*	*41%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.34	$ 7.88	$ 19.82	$ 19.82	$ 19.82	$ 19.82
% change		*7%*	*151%*	*0%*	*0%*	*0%*
Alternative 4						
Water Unit Cost	$ 6.73	$ 11.51	$ 16.22	$ 16.22	$ 16.22	$ 16.22
% change		*71%*	*41%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.34	$ 7.88	$ 19.81	$ 19.81	$ 19.81	$ 19.81
% change		*7%*	*151%*	*0%*	*0%*	*0%*

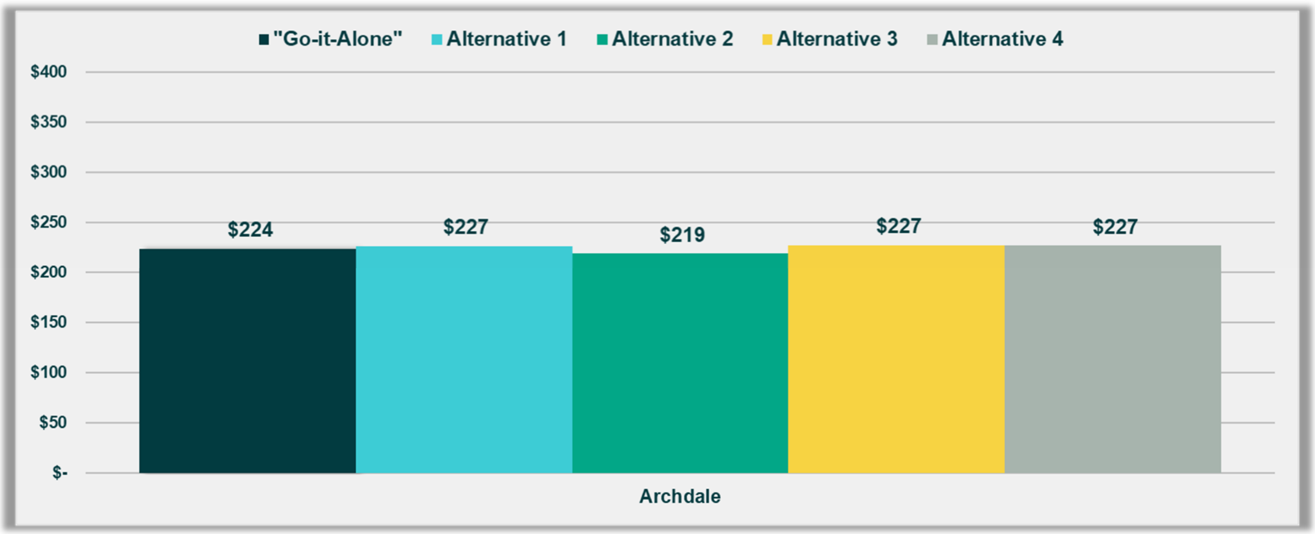
Table 17: Archdale Projected 5,000 Gallon Combined Monthly Bill

Combined Monthly Bill	2026 Projected	2030 Projected	2035 Projected	2040 Projected	2045 Projected	2050 Projected
"Go-It-Alone"	**$ 88**	**$ 119**	**$ 226**	**$ 226**	**$ 226**	**$ 226**
% change		*34%*	*90%*	*0%*	*0%*	*0%*
Alternative 1	**$ 88**	**$ 119**	**$ 228**	**$ 228**	**$ 228**	**$ 228**
% change		*34%*	*92%*	*0%*	*0%*	*0%*
Alternative 2	**$ 88**	**$ 119**	**$ 217**	**$ 217**	**$ 217**	**$ 217**
% change		*34%*	*83%*	*0%*	*0%*	*0%*
Alternative 3	**$ 88**	**$ 119**	**$ 228**	**$ 228**	**$ 228**	**$ 228**
% change		*34%*	*92%*	*0%*	*0%*	*0%*
Alternative 4	**$ 88**	**$ 119**	**$ 228**	**$ 228**	**$ 228**	**$ 228**
% change		*34%*	*92%*	*0%*	*0%*	*0%*

5.1.5. Identified Support Requirements

Outside funding support, often sourced from state and federal grants or negotiated in partnerships, is recommended within the financial analysis to offset capital costs that would otherwise impose an unreasonable burden on local ratepayers. Given the State Legislature's expressed preference for regional solutions, this analysis conservatively assumes the "Go-It-Alone" scenario receives no external funding while regional alternatives are positioned to secure and leverage substantial outside financial support. By reducing the net project financing required from the utility, this support effectively lowers the total Revenue Requirement and stabilizes the unit cost of service, ensuring that essential infrastructure upgrades can proceed without forcing unsustainable or massive rate increases upon the community. Archdale was not identified to require outside funding support. Figure 7 compares the "typical" 5,000-gallon FY2050 monthly combined residential utility bill for the "Go-It-Alone" scenario to each of the Master Plan Alternatives with the identified level of funding support applied.

Figure 7: Archdale Projected FY50 Monthly Bill Comparison with Support



5.2. City of Asheboro

5.2.1. Background

The City of Asheboro operates a 12 MGD water treatment facility with a raw water intake in the Uwharrie River subbasin in the Yadkin River basin with a safe yield of 26.5 MGD. However, the City has a grandfathered interbasin transfer up to 9.36 MGD and would not be able to expand without applying for an IBT Certification. The City of Asheboro's WTP facility is in need of repair and is expected to be a regional solution to meet the 2050 demands in the two-county Study area. The City of Asheboro operates a 9 MGD wastewater treatment facility discharging to the Deep River sub-basin. The facility is experiencing some intermittent discharge of 1,4-Dioxane. The City reports working with their industries to handle its concerns with source reduction and pretreatment. The "Go-It-Alone" scenario and Alternatives 1 and 2 assume this the

WWTP will require significant upgrades in the near future to address discharging regulations. These concerns are addressed at the regional WWTP facility in Alternatives 3 and 4.

5.2.2. Revenue Requirements

The first major task in establishing a unit cost analysis is developing an understanding of the revenue requirements of a utility during the forecast period. Revenue requirements refer to the utility's annual costs that must be recovered through user rates, fees, and charges. Revenue requirements are comprised of cash-based expenses including O&M expenses, cash-funded capital projects, debt service principal and interest payments, annual contributions to reserves, and any operating transfers to other utility or general funds.

1. **Operating Expenses:** O&M expenses represent normal, recurring expenses necessary to sustainably operate and maintain the system during the utility providers annual accounting cycle. Asheboro's FY2026 operating budget served as the basis for the projection of utility operating costs. Operating expenses were escalated from the FY 2026 budget by 4% per year to account for growing utility costs and inflation, which is consistent with longer-term historical trends. Operating expenses were offset by miscellaneous revenues found in the budget. The significant changes to operating expenses between the alternatives are listed below.

    - In Alternatives 3 and 4 Asheboro's existing wastewater treatment plant is retired. All budgeted operating expenses related to their existing WWTP are removed from the revenue requirements, starting in the year the new regional facility construction is completed.
    - Starting the year that the new regional facility construction is completed, Asheboro will start making purchases for sewer treatment at the facility. These purchases are based on a capacity pro rata share of the projected facility operating expenses, informed by Hazen and Sawyer.

2. **Existing Debt:** Existing debt service refers to prior debt issuances and the corresponding annual debt service payments, both principal and interest, that the utility provider is obligated to pay. Asheboro currently has five outstanding State Revolving Fund ("SRF") loans according to the Local Government Commission's debt reports.

3. **Existing Capital Improvement Plan and Financing:** For water and wastewater utilities, capital expenditures - the costs associated with building, expanding, and rehabilitating long-lived infrastructure - represent the largest, most volatile, and most influential component of the total annual revenue requirement during any planning period. A 15 year capital improvement plan through FY2039 was provided for Asheboro. To estimate capital cost for the planning period beyond the CIP, depreciation escalated at 4% annually was used. Based on the CIP and capital projections split between water and wastewater, Asheboro plans to spend approximately $69.3 million (M) in total between FY 2026 and FY 2050 for water capital projects and $110.2 M for wastewater. Raftelis assumes these capital projects will be financed with a blend of equity and debt. The costs associated with the existing capital improvement plan are included in both the "Go-It-Alone" scenario and Master Plan Alternatives. Any identified redundant capital project related cost was removed or replaced depending on Alternative. Table 18 shows the planned capital spending and anticipated funding sources for water and wastewater.

Table 18: Asheboro Existing Capital Improvement Expenditures

		2026 - 2050
CIP Costs		
Water		
Cash Funded	$	42,446,415
Debt Financed		22,200,000
Grant Funded		4,670,500
Subtotal: Water CIP Costs	$	69,316,915
Wastewater		
Cash Funded	$	50,631,800
Debt Financed		59,608,900
Grant Funded		-
Subtotal: Wastewater CIP Costs	$	110,240,700
Total: Existing Capital Project Costs	**$**	**179,557,615**

4. **"Go-It-Alone" Capital Projects:** The "Go-It-Alone" scenario details the projected capital expenditures required, in addition to the existing CIP, if the nine identified utilities continue to operate mostly independently, without the unified resource planning, financing mechanisms, or consolidated infrastructure envisioned by the regional alternatives. Capital project costs in this scenario are allocated based on capacity and assumed to be debt financed. Asheboro's total allocated "Go-It-Alone" scenario cost is $596.8 M. Randolph County currently owns water capacity at PTRWA but has communicated interest in selling its capacity. In the "Go-It-Alone" scenario and all Alternatives, Asheboro is assumed to purchase this capacity. Table 19 exhibits the water and wastewater project costs allocated to Asheboro in the "Go-It-Alone" Scenario.

Table 19: Asheboro "Go-It-Alone" Capital Project Summary

Capital Project	Total Cost	Allocation %	Allocated Cost	1st Fiscal Year of Debt Payments
Water				
PTRWA Expansion to 48 mgd	$ 234,000,000	29.5%	$ 69,030,000	FY 2042
PTRWA Advanced Treatment Upgrade to 48 MGD	66,000,000	29.5%	19,470,000	FY 2042
PTRWA Residuals Facility Expansion to 48 mgd	42,200,000	29.5%	12,449,000	FY 2042
Asheboro WTP Advanced Treatment Upgrade	36,900,000	100.0%	36,900,000	FY 2028
Section 1 Water service from Asheboro to Chatham County	12,000,000	Grant Funding	-	FY 2026
Wastewater				
Asheboro WWTP Existing 9mgd Upgrade	324,000,000	100%	324,000,000	FY 2031
Asheboro WWTP Expansion to 12 mgd	135,000,000	100%	135,000,000	FY 2033
Total: Capital Project Cost	**$ 850,100,000**		**$ 596,849,000**	

5. **Alternative Capital Projects:** The four PTRWA Master Plan alternatives define regional pathways for addressing the projected water and wastewater service demands of Guilford and Randolph Counties through the year 2050. The capital project costs included in each Alternative are allocated

based on capacity, in addition to the existing CIP, and assumed to be debt financed. Table 20Table 14 exhibits the wastewater project costs allocated to Asheboro in each of the four Master Plan Alternatives. The water project costs remain the same in the "Go-It-Alone" scenario and all alternatives.

Table 20: Asheboro Alternative Wastewater Capital Project Summary

Wastewater Capital Project	Total Cost	Allocation %	Allocated Cost	1st Fiscal Year of Debt Payments
Alternative 1				
Asheboro WWTP Existing 9mgd Upgrade	$ 324,000,000	100.0%	$ 324,000,000	FY 2031
Asheboro WWTP Expansion to 12 mgd	135,000,000	100.0%	135,000,000	FY 2033
Subtotal: Alternative 1	$ 459,000,000		$ 459,000,000	
Alternative 2				
Asheboro WWTP Existing 9mgd Upgrade	324,000,000	100.0%	324,000,000	FY 2031
Asheboro WWTP Expansion to 12 mgd	135,000,000	100.0%	135,000,000	FY 2033
Subtotal: Alternative 2	$ 459,000,000		$ 459,000,000	
Alternative 3				
New Regional WWTP Facility (Phase 1 - 30.2MGD)	1,357,700,000	46.3%	628,615,100	FY 2031
Subtotal: Alternative 3	$ 1,357,700,000		$ 628,615,100	
Alternative 4				
New Regional WWTP Facility (Phase 1 - 31.4MGD)	1,413,900,000	44.5%	629,098,999	FY 2031
Subtotal: Alternative 4	$ 1,413,900,000		$ 629,098,999	

5.2.3. Demand Projections

The demand projection volumes act as the divisor in the unit cost calculation to transform the annual revenue requirement into a standardized cost metric that allows for meaningful comparison between scenarios and service providers. The water and wastewater demand projections through 2050 were provided by Hazen and Sawyer for each utility provider and are summarized for Asheboro in annual thousand gallons for water and wastewater in Table 21. The projected demands do not change by scenario or alternative.

Table 21: Asheboro Water and Wastewater Demand Projections

	2026 *Projected*	**2030** *Projected*	**2035** *Projected*	**2040** *Projected*	**2045** *Projected*	**2050** *Projected*
Demand Projections (kgal)						
Water	1,999,470	2,042,175	2,221,025	2,399,875	2,576,900	2,753,925
% Change		*2%*	*9%*	*8%*	*7%*	*7%*
Wastewater	1,567,675	1,843,250	1,993,852	2,168,100	2,332,350	2,496,600
% Change		*18%*	*8%*	*9%*	*8%*	*7%*

5.2.4. Alternative and Unit Cost Forecast

Table 22 presents the results of Asheboro's unit cost analysis through 2050 for the "Go-It-Alone" scenario and each of the Master Plan alternatives. The unit cost analysis takes Asheboro's annual water and wastewater costs detailed in the revenue requirement section, including added debt financed scenario/alternative capital cost, divided by the water or wastewater projected demand. The annual unit cost difference, including the minimum adjustments for debt service coverage and rate stability constraints detailed in the Methodology section, is applied to the "typical" 5,000 gallon water and wastewater residential bill. The resulting combined "typical" monthly residential bills through 2050 are presented in Table 23.

Table 22: Asheboro Unit Cost Forecast

Unit Cost per Kgal	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"						
Water Unit Cost	$ 5.98	$ 9.60	$ 12.42	$ 13.62	$ 17.91	$ 19.03
% change		*60%*	*29%*	*10%*	*32%*	*6%*
Wastewater Unit Cost	$ 7.94	$ 9.95	$ 29.33	$ 29.33	$ 29.33	$ 29.33
% change		*25%*	*195%*	*0%*	*0%*	*0%*
Alternative 1						
Water Unit Cost	$ 5.98	$ 9.60	$ 12.42	$ 13.62	$ 17.91	$ 19.03
% change		*60%*	*29%*	*10%*	*32%*	*6%*
Wastewater Unit Cost	$ 7.94	$ 9.95	$ 29.33	$ 29.33	$ 29.33	$ 29.33
% change		*25%*	*195%*	*0%*	*0%*	*0%*
Alternative 2						
Water Unit Cost	$ 5.98	$ 9.60	$ 12.42	$ 13.62	$ 17.91	$ 19.03
% change		*60%*	*29%*	*10%*	*32%*	*6%*
Wastewater Unit Cost	$ 7.94	$ 9.95	$ 29.33	$ 29.33	$ 29.33	$ 29.33
% change		*25%*	*195%*	*0%*	*0%*	*0%*
Alternative 3						
Water Unit Cost	$ 5.98	$ 9.59	$ 12.55	$ 13.82	$ 18.19	$ 19.43
% change		*60%*	*31%*	*10%*	*32%*	*7%*
Wastewater Unit Cost	$ 7.94	$ 9.91	$ 39.66	$ 39.66	$ 39.66	$ 39.66
% change		*25%*	*300%*	*0%*	*0%*	*0%*
Alternative 4						
Water Unit Cost	$ 5.98	$ 9.60	$ 12.57	$ 13.84	$ 18.21	$ 19.44
% change		*60%*	*31%*	*10%*	*32%*	*7%*
Wastewater Unit Cost	$ 7.94	$ 9.95	$ 39.46	$ 39.46	$ 39.46	$ 39.46
% change		*25%*	*297%*	*0%*	*0%*	*0%*

Table 23: Asheboro Projected 5,000 Gallon Combined Monthly Bill

Combined Monthly Bill	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"	**$ 95**	**$ 132**	**$ 289**	**$ 296**	**$ 323**	**$ 330**
% change		*39%*	*119%*	*3%*	*9%*	*2%*
Alternative 1	**$ 95**	**$ 132**	**$ 289**	**$ 296**	**$ 323**	**$ 330**
% change		*39%*	*119%*	*3%*	*9%*	*2%*
Alternative 2	**$ 95**	**$ 132**	**$ 289**	**$ 296**	**$ 323**	**$ 330**
% change		*39%*	*119%*	*3%*	*9%*	*2%*
Alternative 3	**$ 95**	**$ 132**	**$ 363**	**$ 371**	**$ 399**	**$ 407**
% change		*39%*	*176%*	*2%*	*7%*	*2%*
Alternative 4	**$ 95**	**$ 132**	**$ 362**	**$ 370**	**$ 398**	**$ 406**
% change		*39%*	*174%*	*2%*	*7%*	*2%*

5.2.5. Identified Support Requirements

Outside funding support, often sourced from state and federal grants or negotiated in partnerships, is recommended within the financial analysis to offset capital costs that would otherwise impose an unreasonable burden on local ratepayers. Given the State Legislature's expressed preference for regional solutions, this analysis conservatively assumes the "Go-It-Alone" scenario receives no external funding while regional alternatives are positioned to secure and leverage substantial outside financial support. By reducing the net project financing required from the utility, this support effectively lowers the total Revenue Requirement and stabilizes the unit cost of service, ensuring that essential infrastructure upgrades can proceed without forcing unsustainable or massive rate increases upon the community. Asheboro has been identified to require outside funding support for Alternatives 3 and 4. Table 24 exhibits the amount of outside funding support identified by alternative.

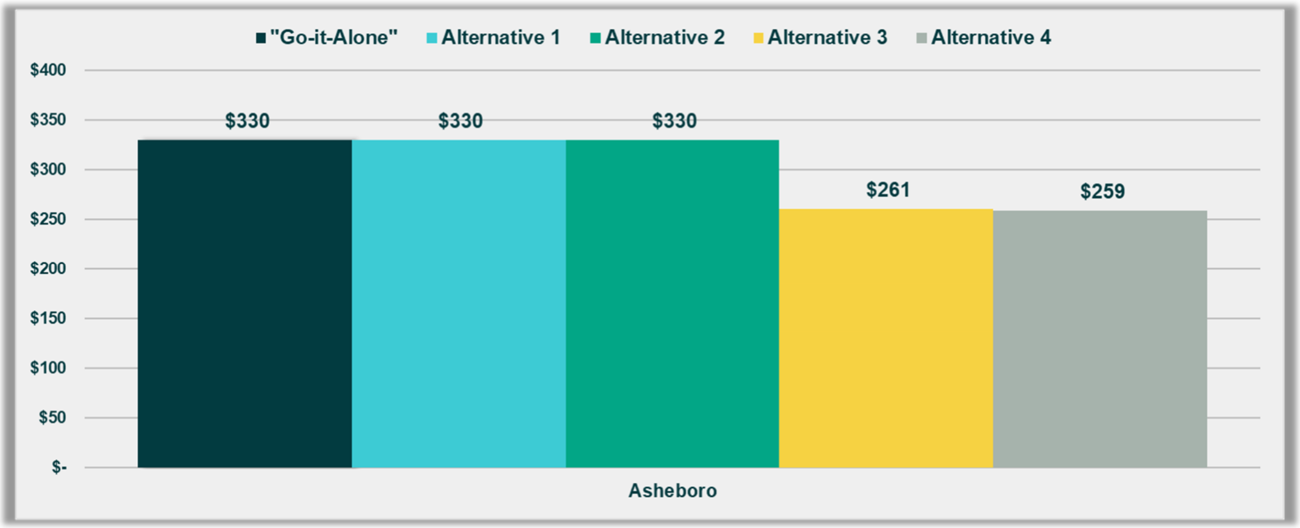
Table 24: Asheboro Identified Outside Funding Support

Decsription	Amount of Outside Funding Support
Alternative 1	**$ -**
Alternative 2	**$ -**
Alternative 3	**$ 472,642,932**
Alternative 4	**$ 473,006,766**

The integration of outside funding support is a crucial element in evaluating the financial feasibility and affordability of the regionalization alternatives, especially when comparing them to the inherent cost burdens of the "Go-It-Alone" scenario. For the “Go-It-Alone” Scenario, outside funding was primarily assumed to be limited to existing Randolph County allocations, offering only localized, small-scale relief.

In contrast, the preferred Alternative 4, which represents the highest degree of regional integration and strategic investment, is projected to maximize the opportunity for securing significant state and federal infrastructure grants and low-interest financing due to its regional scope and focus on efficiency. When these potential external funds are applied to the Alternatives total capital costs, the net impact on ratepayers becomes substantially more favorable. Figure 8 compares the "typical" 5,000-gallon FY2050 monthly combined residential utility bill for the "Go-It-Alone" scenario to each of the Master Plan Alternatives with the identified level of funding support applied.

Figure 8: Asheboro Projected FY50 Monthly Bill Comparison with Support



5.3. Town of Franklinville

5.3.1. Background

The Town of Franklinville currently purchases water from the Town of Ramseur and has approached the City of Asheboro to investigate the possibility of a secondary source to address existing rate concerns. The Town of Franklinville operates a wastewater treatment facility capable of treating 100,000 gallons per day. The facility has been considered for removal from service in Alternatives 3 and 4 with wastewater treatment being purchased from Ramseur in Alternative 3, or at the new regional WWTP in Alternative 4.

5.3.2. Revenue Requirements

The first major task in establishing a unit cost analysis is developing an understanding of the revenue requirements of a utility during the forecast period. Revenue requirements refer to the utility's annual costs that must be recovered through user rates, fees, and charges. Revenue requirements are comprised of cash-based expenses including O&M expenses, cash-funded capital projects, debt service principal and interest payments, annual contributions to reserves, and any operating transfers to other utility or general funds.

1. **Operating Expenses:** O&M expenses represent normal, recurring expenses necessary to sustainably operate and maintain the system during the utility providers' annual accounting cycle. Franklinville's FY2024 reported operating expenses in their audited financial statements served as the basis for the projection of utility operating costs. Operating expenses were escalated from the FY 2024 audit by 4% per year to account for growing utility costs and inflation, which is consistent with longer-term historical trends. Franklinville purchases water treatment from the Town of Ramseur. To recognize Franklinville is subsequently impacted by Ramseur's increase in cost, Franklinville's estimated purchased water cost is projected to increase at the rate of Ramseur's annual unit cost change. Operating expenses were offset by miscellaneous revenues found in the audit. The significant changes to operating expenses between the alternatives are listed below.

    - In Alternatives 3 and 4 Franklinville's existing wastewater treatment plant is retired. All budgeted operating expenses related to their existing WWTP are removed from the revenue requirements, starting in the year Franklinville begins purchasing treatment from either Ramseur or PTRWA.
    - In Alternative 3, Franklinville is assumed to begin purchasing wastewater treatment from Ramseur. The cost of this treatment is based on Ramseur's existing 2nd tier rate per kgal for wastewater service, escalated at 5% per year. In Alternative 4, Franklinville is assumed to begin purchasing treatment at the regional facility once construction is completed. The cost of wastewater treatment is based on a capacity pro rata share of the projected facility operating expenses, informed by Hazen and Sawyer.

2. **Existing Debt:** Existing debt service refers to prior debt issuances and the corresponding annual debt service payments, both principal and interest, that the utility provider is obligated to pay. Franklinville currently has 2 outstanding SRF loans and a USDA loan according to the Local Government Commission's debt reports.

3. **Existing Capital Improvement Plan and Financing:** For water and wastewater utilities, capital expenditures - the costs associated with building, expanding, and rehabilitating long-lived infrastructure - represent the largest, most volatile, and most influential component of the total annual revenue requirement during any planning period. A capital improvement plan was not provided for Franklinville. In this case, Raftelis estimated projected annual capital expenditure based on the depreciation value found in the most recent audited financial statement and escalated that value at 4% annually. Based on the projections using depreciation split between water and wastewater, Franklinville plans to spend approximately $10.8 million (M) in total between FY 2026 and FY 2050 for water capital projects and $2.8 M for wastewater. Raftelis assumes these capital projects will be financed with a blend of debt and equity. The costs associated with the existing capital improvement plan are included in both the "Go-It-Alone" scenario and Master Plan Alternatives. Any identified redundant capital project related cost was removed or replaced depending on Alternative. Table 25 shows the planned capital spending and anticipated funding sources for water and wastewater.

Table 25: Franklinville Existing Capital Improvement Expenditures

		2026 - 2050
CIP Costs		
Water		
Cash Funded	$	6,323,016
Debt Financed		4,492,040
Grant Funded		-
Subtotal: Water CIP Costs	$	10,815,055
Wastewater		
Cash Funded	$	2,752,917
Debt Financed		-
Grant Funded		-
Subtotal: Wastewater CIP Costs	$	2,752,917
Total: Existing Capital Project Costs	**$**	**13,567,972**

4. **"Go-It-Alone" Capital Projects:** The "Go-It-Alone" scenario details the projected capital expenditures required, in addition to the existing CIP, if the nine identified utilities continue to operate mostly independently, without the unified resource planning, financing mechanisms, or consolidated infrastructure envisioned by the regional alternatives. Capital project costs in this scenario are allocated based on capacity and assumed to be debt financed. Franklinville's total allocated "Go-It-Alone" scenario cost is $9.2 M. Table 26 exhibits the water and wastewater project costs allocated to Asheboro in the "Go-It-Alone" Scenario.

Table 26: Franklinville "Go-It-Alone" Capital Project Summary

Capital Project	Total Cost	Allocation %	Randolph County Grants	Allocated Cost	1st Fiscal Year of Debt
Water					
Water service from Greensboro to Franklinville (Hwy 62 down Hwy 22)	$ 9,200,000	100.0%		$ 9,200,000	FY 2032
Wastewater					
Franklineville Upgrade of Existing 0.1 mgd	4,200,000	100%	4,200,000	-	FY 2031
Total: Capital Project Cost	**$ 13,400,000**			**$ 9,200,000**	

5. **Alternative Capital Projects:** The four PTRWA Master Plan alternatives define regional pathways for addressing the projected water and wastewater service demands of Guilford and Randolph Counties through the year 2050. The capital project costs included in each Alternative are allocated based on capacity, in addition to the existing CIP, and assumed to be debt financed. Table 27Table 14 exhibits the wastewater project costs allocated to Franklinville in each of the four Master Plan Alternatives. The water project costs remain the same in the "Go-It-Alone" scenario and all alternatives.

Table 27: Franklinville Alternative Wastewater Capital Project Summary

Wastewater Capital Project	Total Cost	Allocation %	Randolph County Grants	Allocated Cost	1st Fiscal Year of Debt Payments
Alternative 1					
Franklineville Upgrade of Existing 0.1 mgd	$ 4,200,000	100.0%	$ 4,200,000	-	FY 2031
Subtotal: Alternative 1	$ 4,200,000			$ -	
Alternative 2					
Franklineville Upgrade of Existing 0.1 mgd	4,200,000	100.0%	$ 4,200,000	-	FY 2031
Subtotal: Alternative 2	$ 4,200,000			$ -	
Alternative 3					
Franklinville Transfer Lift Station to Ramseur	2,700,000	100.0%	2,700,000	-	FY 2033
Frankinville Sewer Force Main to Ramseur	4,000,000	100.0%	4,000,000	-	FY 2033
Subtotal: Alternative 3	$ 6,700,000			$ -	
Alternative 4					
Franklinville Transfer Lift Station to Ramseur	5,673,200	100.0%	5,673,200	-	FY 2031
Regional Facility Influent Pump Station	122,440,500	1.2%		1,472,861	FY 2031
New Regional WWTP Facility (Phase 1 - 31.4MGD)	1,413,900,000	0.8%		11,271,357	FY 2031
Subtotal: Alternative 4	$1,542,013,700			$ 12,744,218	

5.3.3. Demand Projections

The demand projection volumes act as the divisor in the unit cost calculation to transform the annual revenue requirement into a standardized cost metric that allows for meaningful comparison between scenarios and service providers. The water and wastewater demand projections through 2050 were provided by Hazen and Sawyer for each utility provider and are summarized for Franklinville in annual thousand gallons for water and wastewater in Table 28Table 21. The projected demands do not change by scenario or alternative.

Table 28: Franklinville Water and Wastewater Demand Projections

	2026 *Projected*	**2030** *Projected*	**2035** *Projected*	**2040** *Projected*	**2045** *Projected*	**2050** *Projected*
Demand Projections (kgal)						
Water	39,931	40,150	41,975	43,435	45,625	47,450
% Change		*1%*	*5%*	*3%*	*5%*	*4%*
Wastewater	20,075	25,550	25,550	25,550	27,375	29,200
% Change		*27%*	*0%*	*0%*	*7%*	*7%*

5.3.4. Alternative and Unit Cost Forecast

Table 29 presents the results of Asheboro's unit cost analysis through 2050 for the "Go-It-Alone" scenario and each of the Master Plan alternatives. The unit cost analysis takes Asheboro's annual water and wastewater costs detailed in the revenue requirement section, including added debt financed scenario/alternative capital cost, divided by the water or wastewater projected demand. The annual unit cost difference, including the minimum adjustments for debt service coverage and rate stability constraints detailed in the Methodology section, is applied to the "typical" 5,000 gallon water and wastewater residential bill. The resulting combined "typical" monthly residential bills through 2050 are presented in Table 30.

Table 29: Franklinville Unit Cost Forecast

Unit Cost per Kgal	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"						
Water Unit Cost	$ 9.90	$ 57.83	$ 116.09	$ 116.09	$ 116.09	$ 116.09
% change		*484%*	*101%*	*0%*	*0%*	*0%*
ewater Unit Cost	$ 9.13	$ 12.87	$ 15.35	$ 18.59	$ 21.04	$ 24.13
% change		*41%*	*19%*	*21%*	*13%*	*15%*
Alternative 1						
Water Unit Cost	$ 9.90	$ 57.69	$ 115.99	$ 115.99	$ 115.99	$ 115.99
% change		*483%*	*101%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 9.13	$ 12.87	$ 15.35	$ 18.59	$ 21.04	$ 24.13
% change		*41%*	*19%*	*21%*	*13%*	*15%*
Alternative 2						
Water Unit Cost	$ 9.90	$ 57.83	$ 116.09	$ 116.09	$ 116.09	$ 116.09
% change		*484%*	*101%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 9.13	$ 12.87	$ 15.35	$ 18.59	$ 21.04	$ 24.13
% change		*41%*	*19%*	*21%*	*13%*	*15%*
Alternative 3						
Water Unit Cost	$ 9.90	$ 57.01	$ 118.39	$ 118.39	$ 118.39	$ 118.39
% change		*476%*	*108%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 9.13	$ 9.67	$ 12.28	$ 15.51	$ 19.25	$ 23.89
% change		*6%*	*27%*	*26%*	*24%*	*24%*
Alternative 4						
Water Unit Cost	$ 9.90	$ 56.87	$ 127.00	$ 127.00	$ 127.00	$ 127.00
% change		*474%*	*123%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 9.13	$ 9.67	$ 46.43	$ 49.12	$ 49.12	$ 49.12
% change		*6%*	*380%*	*6%*	*0%*	*0%*

Table 30: Franklinville Projected 5,000 Gallon Combined Monthly Bill

Combined Monthly Bill	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"	**$ 119**	**$ 448**	**$ 835**	**$ 855**	**$ 870**	**$ 888**
% change		*277%*	*86%*	*2%*	*2%*	*2%*
Alternative 1	**$ 119**	**$ 447**	**$ 834**	**$ 854**	**$ 869**	**$ 888**
% change		*276%*	*87%*	*2%*	*2%*	*2%*
Alternative 2	**$ 119**	**$ 448**	**$ 835**	**$ 855**	**$ 870**	**$ 888**
% change		*277%*	*86%*	*2%*	*2%*	*2%*
Alternative 3	**$ 119**	**$ 423**	**$ 831**	**$ 851**	**$ 874**	**$ 902**
% change		*256%*	*96%*	*2%*	*3%*	*3%*
Alternative 4	**$ 119**	**$ 422**	**$ 1,094**	**$ 1,110**	**$ 1,110**	**$ 1,110**
% change		*255%*	*159%*	*1%*	*0%*	*0%*

5.3.5. Identified Support Requirements

Outside funding support, often sourced from state and federal grants or negotiated in partnerships, is recommended within the financial analysis to offset capital costs that would otherwise impose an unreasonable burden on local ratepayers. Given the State Legislature's expressed preference for regional solutions, this analysis conservatively assumes the "Go-It-Alone" scenario receives no external funding while regional alternatives are positioned to secure and leverage substantial outside financial support. By reducing the net project financing required from the utility, this support effectively lowers the total Revenue Requirement and stabilizes the unit cost of service, ensuring that essential infrastructure upgrades can proceed without forcing unsustainable or massive rate increases upon the community. Franklinville has been identified to require outside funding support for all project cost in all Alternatives. Table 31 exhibits the amount of outside funding support identified by alternative.

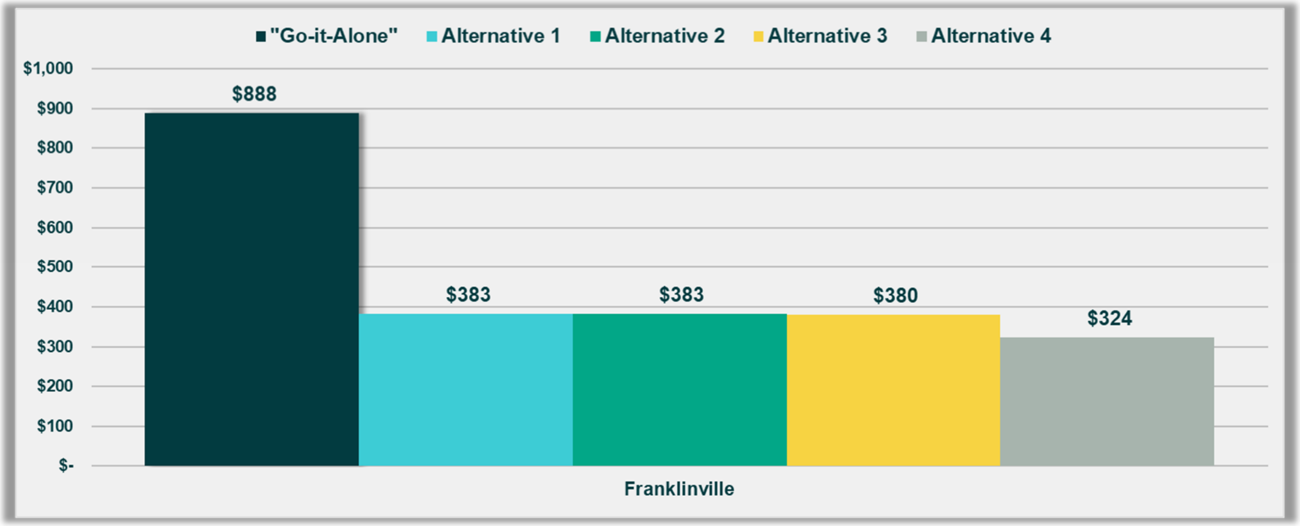
Table 31: Franklinville Identified Outside Funding Support

Decsription	Amount of Outside Funding Support
Alternative 1	$ 9,200,000
Alternative 2	$ 9,200,000
Alternative 3	$ 9,200,000
Alternative 4	$ 21,944,218

The integration of outside funding support is a crucial element in evaluating the financial feasibility and affordability of the regionalization alternatives, especially when comparing them to the inherent cost burdens of the "Go-It-Alone" scenario. For the "Go-It-Alone" Scenario, outside funding was primarily assumed to be limited to existing Randolph County allocations, offering only localized, small-scale relief.

In contrast, the preferred Alternative 4, which represents the highest degree of regional integration and strategic investment, is projected to maximize the opportunity for securing significant state and federal infrastructure grants and low-interest financing due to its regional scope and focus on efficiency. When these potential external funds are applied to the Alternatives total capital costs, the net impact on ratepayers becomes substantially more favorable. Figure 9 compares the "typical" 5,000-gallon FY2050 monthly combined residential utility bill for the "Go-It-Alone" scenario to each of the Master Plan Alternatives with the identified level of funding support applied.

Figure 9: Franklinville Projected FY50 Monthly Bill Comparison with Support



5.4. City of Greensboro

5.4.1. Background

The City of Greensboro owns and operates two water treatment facilities, Townsend WTP and Mitchell WTP, with a series of three reservoirs, Lake Higgins, Brandt and Townsend. The Townsend WTP is a 30 MGD facility located on the Lake Townsend reservoir, however, staff have indicated Townsend is limited to 26 MGD. Mitchell WTP is a 24 MGD facility with an intake on Lake Brandt but is limited to 18 MGD. This report anticipates the Mitchell WTP can provide 20 MGD when needed thus the combined current capacity is limited to 44 MGD and future capacity is limited to 46 MGD. The City also purchases 10.35 MGD from the City of Burlington, Reidsville and PTRWA. The Mitchell WTP Is currently undertaking a design to reduce PFAS concentrations with the Installation of a Granular Activated Carbon facility and should be online in the next few years. This project is included in the "Go-It-Alone" scenario and all Master Plan alternatives. The City of Greensboro owns and operates the T.Z. Osborne WRF, a 56 MGD wastewater facility discharging to South Buffalo Creek in the Haw River sub-basin. The facility was recently upgraded to a five-stage facility capable of removing nitrogen and phosphorus to meet their permit levels. T.Z. Osborne WRF is potentially capable of expanding to 60 MGD with very little upgrade and is currently under a Special Order for Consent for the reduction of 1,4-Dioxane discharge. The facility is reducing their 1,4-Dioxane discharge concentrations through source reduction measures and other pre-treatment. The T.Z. Osburne WRF is anticipated to expand in the "Go-It-Alone" scenario and Alternative 1 and 2. In Alternative 3 and 4, Greensboro's projected demand needs are completely addressed at the new regional wastewater facility in Asheboro.

5.4.2. Revenue Requirements

The first major task in establishing a unit cost analysis is developing an understanding of the revenue requirements of a utility during the forecast period. Revenue requirements refer to the utility's annual costs that must be recovered through user rates, fees, and charges. Revenue requirements are comprised of cash-based expenses including O&M expenses, cash-funded capital projects, debt service principal and interest payments, annual contributions to reserves, and any operating transfers to other utility or general funds.

1. **Operating Expenses:** O&M expenses represent normal, recurring expenses necessary to sustainably operate and maintain the system during the utility providers' annual accounting cycle. Greensboro's existing financial planning model, developed by Raftelis, served as the basis for the projection of utility operating costs. Operating expenses were escalated in the financial planning model by 4% to 5% per year to account for growing utility costs and inflation, which is consistent with longer-term historical trends. Operating expenses were offset by miscellaneous revenues found in the financial planning model. The significant changes to operating expenses between the alternatives are listed below.

    - Starting the year that the new regional facility construction is completed, Greensboro will start making purchases for sewer treatment at the facility. These purchases are based on a capacity pro rata share of the projected facility operating expenses, informed by Hazen and Sawyer.

2. **Existing Debt:** Existing debt service refers to prior debt issuances and the corresponding annual debt service payments, both principal and interest, that the utility provider is obligated to pay. Greensboro currently has seven outstanding combined enterprise revenue refunding bond issuances according to the existing financial planning model.

3. **Existing Capital Improvement Plan and Financing:** For water and wastewater utilities, capital expenditures - the costs associated with building, expanding, and rehabilitating long-lived infrastructure - represent the largest, most volatile, and most influential component of the total annual revenue requirement during any planning period. A 10-year capital improvement plan through FY2036 was provided for Greensboro. To estimate capital cost for the planning period beyond the CIP, depreciation escalated at 4% annually was used. Based on the CIP and capital projections split between water and wastewater, Greensboro plans to spend approximately $1.075 billion (B) in total between FY 2026 and FY 2050 for water capital projects and $1.170 B for wastewater. Raftelis assumes these capital projects will be financed with a blend of equity and debt. The costs associated with the existing capital improvement plan are included in both the "Go-It-Alone" scenario and Master Plan Alternatives. Any identified redundant capital project related cost was removed or replaced depending on Alternative. Table 32Table 18 shows the planned capital spending and anticipated funding sources for water and wastewater.

Table 32: Greensboro Existing Capital Improvement Expenditures

		2026 - 2050
CIP Costs		
Water		
Cash Funded	$	838,285,934
Debt Financed		236,653,220
Grant Funded		-
Subtotal: Water CIP Costs	$	1,074,939,154
Wastewater		
Cash Funded	$	729,801,690
Debt Financed		439,751,721
Grant Funded		-
Subtotal: Wastewater CIP Costs	$	1,169,553,411
Total: Existing Capital Project Costs	**$**	**2,244,492,564**

4. **"Go-It-Alone" Capital Projects:** The "Go-It-Alone" scenario details the projected capital expenditures required, in addition to the existing CIP, if the nine identified utilities continue to operate mostly independently, without the unified resource planning, financing mechanisms, or consolidated infrastructure envisioned by the regional alternatives. Capital project costs in this scenario are allocated based on capacity and assumed to be debt financed. Greensboro's total allocated "Go-It-Alone" scenario cost is $844.1 M. Table 33 exhibits the water and wastewater project costs allocated to Greensboro in the "Go-It-Alone" Scenario.

Table 33: Greensboro "Go-It-Alone" Capital Project Summary

Capital Project	Total Cost	Allocation %	Allocated Cost	1st Fiscal Year of Debt Payments
Water				
PTRWA Expansion to 26.7 MGD	$ 94,075,000	89.0%	$ 83,758,108	FY 2028
PTRWA Advanced Treatment Upgrade 26.7 mgd	146,900,000	69.4%	101,948,600	FY 2031
PTRWA Expansion to 48 mgd	234,000,000	57.5%	134,550,000	FY 2042
PTRWA Advanced Treatment Upgrade to 48 MGD	66,000,000	57.5%	37,950,000	FY 2042
PTRWA Residuals Facility Expansion to 26.7 mgd	42,220,000	69.4%	29,300,680	FY 2031
PTRWA Residuals Facility Expansion to 48 mgd	42,200,000	57.5%	24,265,000	FY 2042
Mitchell Advanced Treatment Upgrades (54 MGD)	192,515,586	100.0%	192,515,586	FY 2026
Townsend Advanced Treatment Upgrades	76,000,000	100.0%	76,000,000	FY 2027
Water service from Greensboro to North of the Lakes	22,800,000	100.0%	22,800,000	FY 2026
Greensboro HWY 62 Pump Station Expansion	1,500,000	100.0%	1,500,000	FY 2029
Second Waterline from HWY 62 to Sutton Rd - Hwy 73 Greensboro	35,200,000	100.0%	35,200,000	FY 2029
Second Waterline from Sutton Rd - Hwy 73 to S Holden Rd Greensboro	14,300,000	100.0%	14,300,000	FY 2029
Wastewater				
Expansion of TZO WRF from 56 mgd to 60 mgd	90,000,000	100%	90,000,000	FY 2034
Total: Capital Project Cost	**$ 1,057,710,586**		**$ 844,087,974**	

5. **Alternative Capital Projects:** The four PTRWA Master Plan alternatives define regional pathways for addressing the projected water and wastewater service demands of Guilford and Randolph

Counties through the year 2050. The capital project costs included in each Alternative are allocated based on capacity, in addition to the existing CIP, and assumed to be debt financed. Table 34Table 14 exhibits the wastewater project costs allocated to Greensboro in each of the four Master Plan Alternatives. The water project costs remain the same in the "Go-It-Alone" scenario and all alternatives.

Table 34: Greensboro Alternative Wastewater Capital Project Summary

Wastewater Capital Project	Total Cost	Allocation %	Allocated Cost	1st Fiscal Year of Debt Payments
Alternative 1				
Greensboro Transfer Lift Station and Sewer Force Main from Greensboro to Gravity Section	$ 102,895,000	100.0%	$ 102,895,000	FY 2031
Gravity Sewer from Greensboro FM to High Point Tie-in	55,673,800	100.0%	55,673,800	FY 2031
Gravity Section from GSO/HP to New Deep River WWTP Location	140,745,800	40.0%	56,298,320	FY 2031
Greensboro TZO WRF from 56mgd to 60mgd	90,000,000	100.0%	90,000,000	FY 2034
New 9.5 mgd WWTP Facility in the Deep River	427,500,000	36.5%	156,037,500	FY 2031
Expand to 25 mgd Greensboro/HP WWTP Facility in the Deep Riv	418,500,000	36.5%	152,752,500	FY 2039
Influent Pump Station (GSO, HP)	93,180,100	40.0%	37,272,040	FY 2031
Subtotal: Alternative 1	$ 1,328,494,700		$ 650,929,160	
Alternative 2				
Expansion of TZO WRF from 56 mgd to 60 mgd	90,000,000	100.0%	90,000,000	FY 2034
New 18.5 mgd WWTP Facility in the Deep River	832,500,000	50.3%	418,867,925	FY 2038
Greensboro Transfer Lift Station and Sewer Force Main from Greensboro to Gravity Section	102,828,700	100.0%	102,828,700	FY 2038
Gravity Sewer from Greensboro FM to High Point Tie-in	55,673,800	100.0%	55,673,800	FY 2038
Gravity Section from GSO/HP to New Deep River WWTP Location	125,456,500	40.0%	50,182,600	FY 2038
Influent Pump Station (GSO, HP)	64,808,900	40.0%	25,923,560	FY 2038
Subtotal: Alternative 2	$ 1,271,267,900		$ 743,476,585	
Alternative 3				
Greensboro Transfer Pump Station to Regional Facility	123,305,000	100.0%	123,305,000	FY 2030
Gravity Sewer from Greensboro FM to High Point Junction Box	55,673,800	100.0%	55,673,800	FY 2030
Gravity Section from GSO/HP Junction to Randleman Tie-in	133,047,200	50.0%	66,523,600	FY 2030
Gravity Section from Randleman Tie-in to Regional Facility	44,154,500	46.0%	20,311,070	FY 2030
Regional Facility Influent Pump Station	122,440,500	46.0%	56,322,630	FY 2031
New Regional WWTP Facility (Phase 1 - 30.2MGD)	1,357,700,000	23.2%	314,986,400	FY 2031
New Regional WWTP Facility (Phase 2 - 42.8MGD)	342,100,000	50.0%	171,050,000	FY 2040
Subtotal: Alternative 3	$ 2,178,421,000		$ 808,172,500	
Alternative 4				
Greensboro Transfer Pump Station to Regional Facility	123,305,000	100.0%	123,305,000	FY 2030
Gravity Sewer from Greensboro FM to High Point Junction Box	55,673,800	100.0%	55,673,800	FY 2030
Gravity Section from GSO/HP Junction to Randleman Tie-in	133,047,200	50.0%	66,523,600	FY 2030
Gravity Section from Randleman Tie-in to Regional Facility	44,154,500	46.0%	20,311,070	FY 2030
Regional Facility Influent Pump Station	122,440,500	43.2%	52,924,344	FY 2031
New Regional WWTP Facility (Phase 1 - 31.4MGD)	1,413,900,000	22.2%	314,549,499	FY 2031
New Regional WWTP Facility (Phase 2 - 44.1MGD)	342,600,000	50.0%	171,300,000	FY 2040
Subtotal: Alternative 4	$ 2,235,121,000		$ 804,587,313	

5.4.3. Demand Projections

The demand projection volumes act as the divisor in the unit cost calculation to transform the annual revenue requirement into a standardized cost metric that allows for meaningful comparison between scenarios and service providers. The water and wastewater demand projections through 2050 were provided by Hazen and

Sawyer for each utility provider and are summarized for Greensboro in annual thousand gallons for water and wastewater in Table 35Table 21. The projected demands do not change by scenario or alternative.

Table 35: Greensboro Water and Wastewater Demand Projections

	2026	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
Demand Projections (kgal)						
Water	14,402,900	16,198,700	17,333,850	18,560,250	19,385,150	20,210,050
% Change		*12%*	*7%*	*7%*	*4%*	*4%*
Wastewater	13,344,400	14,486,850	15,465,050	16,443,250	17,432,400	18,421,550
% Change		*9%*	*7%*	*6%*	*6%*	*6%*

5.4.4. Alternative and Unit Cost Forecast

Table 36 presents the results of Greensboro's unit cost analysis through 2050 for the "Go-It-Alone" scenario and each of the Master Plan alternatives. The unit cost analysis takes Greensboro's annual water and wastewater costs detailed in the revenue requirement section, including added debt financed scenario/alternative capital cost, divided by the water or wastewater projected demand. The annual unit cost difference, including the minimum adjustments for debt service coverage and rate stability constraints detailed in the Methodology section, is applied to the "typical" 5,000 gallon water and wastewater residential bill. The resulting combined "typical" monthly residential bills through 2050 are presented in Table 37.

Table 36: Greensboro Unit Cost Forecast

Unit Cost per Kgal	**2026** *Projected*	**2030** *Projected*	**2035** *Projected*	**2040** *Projected*	**2045** *Projected*	**2050** *Projected*
"Go-It-Alone"						
Water Unit Cost	$ 6.33	$ 8.19	$ 9.34	$ 9.34	$ 10.45	$ 11.31
% change		*29%*	*14%*	*0%*	*12%*	*8%*
Vastewater Unit Cost	$ 6.73	$ 7.49	$ 8.53	$ 9.84	$ 10.26	$ 11.28
% change		*11%*	*14%*	*15%*	*4%*	*10%*
Alternative 1						
Water Unit Cost	$ 6.33	$ 8.19	$ 9.55	$ 9.55	$ 10.59	$ 11.31
% change		*29%*	*17%*	*0%*	*11%*	*7%*
Wastewater Unit Cost	$ 6.73	$ 7.49	$ 10.75	$ 12.69	$ 13.10	$ 13.77
% change		*11%*	*44%*	*18%*	*3%*	*5%*
Alternative 2						
Water Unit Cost	$ 6.33	$ 8.19	$ 9.34	$ 9.64	$ 10.66	$ 11.31
% change		*29%*	*14%*	*3%*	*11%*	*6%*
Wastewater Unit Cost	$ 6.73	$ 7.49	$ 8.53	$ 13.03	$ 13.51	$ 14.08
% change		*11%*	*14%*	*53%*	*4%*	*4%*
Alternative 3						
Water Unit Cost	$ 6.33	$ 8.19	$ 9.72	$ 9.72	$ 10.96	$ 11.51
% change		*29%*	*19%*	*0%*	*13%*	*5%*
Wastewater Unit Cost	$ 6.73	$ 8.06	$ 11.80	$ 13.42	$ 14.47	$ 14.85
% change		*20%*	*47%*	*14%*	*8%*	*3%*
Alternative 4						
Water Unit Cost	$ 6.33	$ 8.19	$ 9.71	$ 9.71	$ 10.96	$ 11.51
% change		*29%*	*19%*	*0%*	*13%*	*5%*
Wastewater Unit Cost	$ 6.73	$ 8.06	$ 11.77	$ 13.38	$ 14.41	$ 14.81
% change		*20%*	*46%*	*14%*	*8%*	*3%*

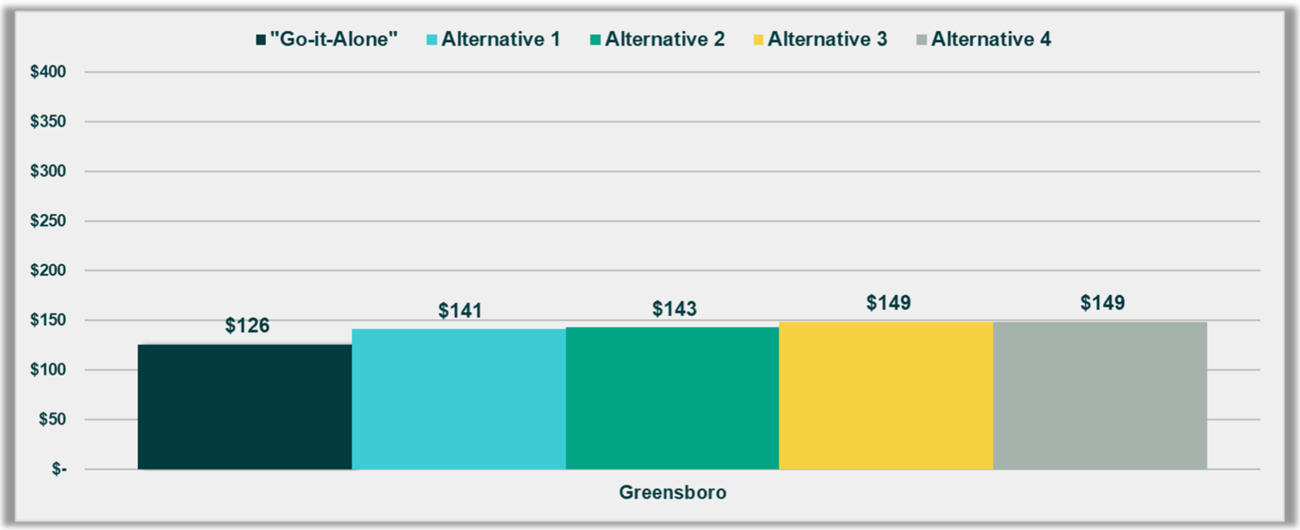
Table 37: Greensboro Projected 5,000 Gallon Combined Monthly Bill

Combined Monthly Bill	**2026** *Projected*	**2030** *Projected*	**2035** *Projected*	**2040** *Projected*	**2045** *Projected*	**2050** *Projected*
"Go-It-Alone"	**$ 73**	**$ 87**	**$ 99**	**$ 107**	**$ 116**	**$ 126**
% change		*19%*	*14%*	*8%*	*8%*	*9%*
Alternative 1	**$ 73**	**$ 87**	**$ 114**	**$ 126**	**$ 134**	**$ 141**
% change		*19%*	*31%*	*10%*	*6%*	*6%*
Alternative 2	**$ 73**	**$ 87**	**$ 99**	**$ 128**	**$ 136**	**$ 143**
% change		*19%*	*14%*	*29%*	*6%*	*5%*
Alternative 3	**$ 73**	**$ 91**	**$ 121**	**$ 131**	**$ 144**	**$ 149**
% change		*24%*	*34%*	*8%*	*10%*	*4%*
Alternative 4	**$ 73**	**$ 91**	**$ 121**	**$ 131**	**$ 143**	**$ 149**
% change		*24%*	*33%*	*8%*	*10%*	*4%*

5.4.5. Identified Support Requirements

Outside funding support, often sourced from state and federal grants or negotiated in partnerships, is recommended within the financial analysis to offset capital costs that would otherwise impose an unreasonable burden on local ratepayers. Given the State Legislature's expressed preference for regional solutions, this analysis conservatively assumes the "Go-It-Alone" scenario receives no external funding while regional alternatives are positioned to secure and leverage substantial outside financial support. By reducing the net project financing required from the utility, this support effectively lowers the total Revenue Requirement and stabilizes the unit cost of service, ensuring that essential infrastructure upgrades can proceed without forcing unsustainable or massive rate increases upon the community. Greensboro was not identified to require outside funding support. Figure 10 compares the "typical" 5,000-gallon FY2050 monthly combined residential utility bill for the "Go-It-Alone" scenario to each of the Master Plan Alternatives with the identified level of funding support applied.

Figure 10: Greensboro Projected FY50 Monthly Bill Comparison with Support



5.5. City of High Point

5.5.1. Background

The City of High Point owns and operates the Ward WTP with a treatment capacity of 24 MGD. The City also purchases water from PTRWA at an annual average of 2.73 MGD and sells water to Jamestown at an annual average of 0.4 MGD. The raw water comes from City Lake and Oak Hollow Lake and totals a safe yield of approximately 34 MGD. The City of High Point owns and operates the Eastside WWTP in the Deep River sub-basin and the Westside WWTP in the Yadkin River basin. The Eastside WWTP is a 26 MGD facility discharging to Randleman Lake, downstream of the intake for PTRWA. Westside WWTP is a 10 MGD facility. Both facilities have the ability to reduce TN and TP to their permit levels and are operating successfully. The Eastside WWTP facility has recently received speculative limits for expansion to 32 MGD. However, Randleman Lake, Eastside's discharge water body, is a water supply lake and opportunities to divert this 6 MGD expansion to a regional facility are addressed in Alternatives 1, 3, and 4.

5.5.2. Revenue Requirements

The first major task in establishing a unit cost analysis is developing an understanding of the revenue requirements of a utility during the forecast period. Revenue requirements refer to the utility's annual costs that must be recovered through user rates, fees, and charges. Revenue requirements are comprised of cash-based expenses including O&M expenses, cash-funded capital projects, debt service principal and interest payments, annual contributions to reserves, and any operating transfers to other utility or general funds.

1. **Operating Expenses:** O&M expenses represent normal, recurring expenses necessary to sustainably operate and maintain the system during the utility providers' annual accounting cycle. High Point's FY2026 operating budget served as the basis for the projection of utility operating costs. Operating expenses were escalated from the FY 2026 budget by 4% per year to account for growing utility costs and inflation, which is consistent with longer-term historical trends. Operating expenses were offset by miscellaneous revenues found in the financial planning model. The significant changes to operating expenses between the alternatives are listed below.

    - Starting the year that the new regional facility construction is completed, High Point will start making purchases for sewer treatment at the facility. These purchases are based on a capacity pro rata share of the projected facility operating expenses, informed by Hazen and Sawyer.

2. **Existing Debt:** Existing debt service refers to prior debt issuances and the corresponding annual debt service payments, both principal and interest, that the utility provider is obligated to pay. High Point currently has six outstanding combined enterprise revenue bond issuances and one SRF loan according to the Local Government Commission's debt reports.

3. **Existing Capital Improvement Plan and Financing:** For water and wastewater utilities, capital expenditures - the costs associated with building, expanding, and rehabilitating long-lived infrastructure - represent the largest, most volatile, and most influential component of the total annual revenue requirement during any planning period. A 5-year capital improvement plan through FY2030 was provided for High Point. To estimate capital cost for the planning period beyond the CIP, depreciation escalated at 4% annually was used. Based on the CIP and capital projections split between water and wastewater, High Point plans to spend approximately $421.2 million (M) in total between FY 2026 and FY 2050 for water capital projects and $534.8 M for wastewater. Raftelis assumes these capital projects will be financed with a blend of equity and debt. The costs associated with the existing capital improvement plan are included in both the "Go-It-Alone" scenario and Master Plan Alternatives. Any identified redundant capital project related cost was removed or replaced depending on Alternative. Table 38Table 18 shows the planned capital spending and anticipated funding sources for water and wastewater.

Table 38: High Point Existing Capital Improvement Expenditures

		2026 - 2050
CIP Costs		
Water		
Cash Funded	$	341,839,420
Debt Financed		79,409,631
Grant Funded		-
Subtotal: Water CIP Costs	$	421,249,051
Wastewater		
Cash Funded	$	339,887,931
Debt Financed		194,878,440
Grant Funded		-
Subtotal: Wastewater CIP Costs	$	534,766,371
Total: Existing Capital Project Costs	**$**	**956,015,422**

4. **"Go-It-Alone" Capital Projects:** The "Go-It-Alone" scenario details the projected capital expenditures required, in addition to the existing CIP, if the nine identified utilities continue to operate mostly independently, without the unified resource planning, financing mechanisms, or consolidated infrastructure envisioned by the regional alternatives. Capital project costs in this scenario are allocated based on capacity and assumed to be debt financed. High Point's total allocated "Go-It-Alone" scenario cost is $1.061 billion. Table 39 exhibits the water and wastewater project costs allocated to High Point in the "Go-It-Alone" Scenario.

Table 39: High Point "Go-It-Alone" Capital Project Summary

Capital Project	Total Cost	Allocation %	Allocated Cost	1st Fiscal Year of Debt Payments
Water				
PTRWA Advanced Treatment Upgrade 26.7 mgd	$ 146,900,000	8.5%	$ 12,486,500	FY 2031
PTRWA Expansion to 36 MGD	181,400,000	57.0%	103,398,000	FY 2034
PTRWA Advanced Treatment Upgrade to 36 MGD	51,200,000	57.0%	29,184,000	FY 2034
PTRWA Expansion to 48 mgd	234,000,000	13.0%	30,420,000	FY 2042
PTRWA Advanced Treatment Upgrade to 48 MGD	66,000,000	13.0%	8,580,000	FY 2042
PTRWA Residuals Facility Expansion to 26.7 mgd	42,220,000	8.5%	3,588,700	FY 2031
PTRWA Residuals Facility Expansion to 36 mgd	32,700,000	57.0%	18,639,000	FY 2034
PTRWA Residuals Facility Expansion to 48 mgd	42,200,000	13.0%	5,486,000	FY 2042
High Point Ward WTP Advanced Treatment Upgrade	95,900,000	100.0%	95,900,000	FY 2028
Wastewater				
Upgrade High Point's Eastside WWTP	585,000,000	83%	483,795,000	FY 2032
Expand High Point Eastside to 32 mgd	270,000,000	100%	270,000,000	FY 2031
Total: Capital Project Cost	**$ 1,747,520,000**		**$ 1,061,477,200**	

5. **Alternative Capital Projects:** The four PTRWA Master Plan alternatives define regional pathways for addressing the projected water and wastewater service demands of Guilford and Randolph Counties through the year 2050. The capital project costs included in each Alternative are allocated

based on capacity, in addition to the existing CIP, and assumed to be debt financed. Table 40Table 14 exhibits the wastewater project costs allocated to High Point in each of the four Master Plan Alternatives. The water project costs remain the same in the "Go-It-Alone" scenario and all alternatives.

Table 40: High Point Alternative Wastewater Capital Project Summary

Wastewater Capital Project	Total Cost	Allocation %	Allocated Cost	1st Fiscal Year of Debt Payments
Alternative 1				
High Point Transfer Lift Station and Sewer Force Main from High Point to Gravity Section	$ 196,413,100	100.0%	$ 196,413,100	FY 2031
Gravity Section from GSO/HP to New Deep River WWTP Location	140,745,800	60.0%	84,447,480	FY 2031
New 9.5 mgd WWTP Facility in the Deep River	427,500,000	54.8%	234,270,000	FY 2031
Expand to 25 mgd Greensboro/HP WWTP Facility in the Deep Riv	418,500,000	54.8%	229,338,000	FY 2039
Influent Pump Station (GSO, HP)	93,180,100	60.0%	55,908,060	FY 2031
Upgrade High Point's Eastside WWTP	585,000,000	82.7%	483,795,000	FY 2032
Subtotal: Alternative 1	$ 1,861,339,000		$ 1,284,171,640	
Alternative 2				
Upgrade High Point's Eastside WWTP	585,000,000	82.7%	483,795,000	FY 2032
Expand High Point Eastside to 32 mgd	270,000,000	100.0%	270,000,000	FY 2032
New 18.5 mgd WWTP Facility in the Deep River	832,500,000	37.7%	314,150,943	FY 2038
High Point Transfer Lift Station and Sewer Force Main from High Point to Gravity Section	138,546,200	100.0%	138,546,200	FY 2038
Gravity Section from GSO/HP to New Deep River WWTP Location	125,456,500	60.0%	75,273,900	FY 2038
Influent Pump Station (GSO, HP)	64,808,900	60.0%	38,885,340	FY 2038
Subtotal: Alternative 2	$ 2,016,311,600		$ 1,320,651,383	
Alternative 3				
High Point Transfer Pump Station to Regional Facility	197,375,100	100.0%	197,375,100	FY 2030
Gravity Section from GSO/HP Junction to Randleman Tie-in	133,047,200	50.0%	66,523,600	FY 2030
Gravity Section from Randleman Tie-in to Regional Facility	44,154,500	46.0%	20,311,070	FY 2030
Upgrade High Point's Eastside WWTP	585,000,000	82.7%	483,795,000	FY 2032
Regional Facility Influent Pump Station	122,440,500	46.0%	56,322,630	FY 2031
New Regional WWTP Facility (Phase 1 - 30.2MGD)	1,357,700,000	23.2%	314,986,400	FY 2031
New Regional WWTP Facility (Phase 2 - 42.8MGD)	342,100,000	50.0%	171,050,000	FY 2040
Subtotal: Alternative 3	$ 2,781,817,300		$ 1,310,363,800	
Alternative 4				
High Point Transfer Pump Station to Regional Facility	197,375,100	100.0%	197,375,100	FY 2030
Gravity Section from GSO/HP Junction to Randleman Tie-in	133,047,200	50.0%	66,523,600	FY 2030
Gravity Section from Randleman Tie-in to Regional Facility	44,154,500	46.0%	20,311,070	FY 2030
Upgrade High Point's Eastside WWTP	585,000,000	82.7%	483,795,000	FY 2032
Regional Facility Influent Pump Station	122,440,500	43.2%	52,924,344	FY 2031
New Regional WWTP Facility (Phase 1 - 31.4MGD)	1,413,900,000	22.2%	314,549,499	FY 2031
New Regional WWTP Facility (Phase 2 - 44.1MGD)	342,600,000	50.0%	171,300,000	FY 2040
Subtotal: Alternative 4	$ 2,838,517,300		$ 1,306,778,613	

5.5.3. Demand Projections

The demand projection volumes act as the divisor in the unit cost calculation to transform the annual revenue requirement into a standardized cost metric that allows for meaningful comparison between scenarios and service providers. The water and wastewater demand projections through 2050 were provided by Hazen and Sawyer for each utility provider and are summarized for High Point in annual thousand gallons for water and wastewater in Table 41Table 21. The projected demands do not change by scenario or alternative.

Table 41: High Point Water and Wastewater Demand Projections

	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
Demand Projections (kgal)						
Water	5,047,950	5,234,100	5,599,100	5,964,100	6,493,350	7,022,600
% Change		*4%*	*7%*	*7%*	*9%*	*8%*
Wastewater	5,401,057	5,900,164	6,334,406	6,768,648	7,296,105	7,823,561
% Change		*9%*	*7%*	*7%*	*8%*	*7%*

5.5.4. Alternative and Unit Cost Forecast

Table 42 presents the results of High Point's unit cost analysis through 2050 for the "Go-It-Alone" scenario and each of the Master Plan alternatives. The unit cost analysis takes High Point's annual water and wastewater costs detailed in the revenue requirement section, including added debt financed scenario/alternative capital cost, divided by the water or wastewater projected demand. The annual unit cost difference, including the minimum adjustments for debt service coverage and rate stability constraints detailed in the Methodology section, is applied to the "typical" 5,000 gallon water and wastewater residential bill. The resulting combined "typical" monthly residential bills through 2050 are presented in Table 43.

Table 42: High Point Unit Cost Forecast

Unit Cost per Kgal	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"						
Water Unit Cost	$ 5.71	$ 10.53	$ 12.40	$ 12.46	$ 12.46	$ 12.46
% change		*85%*	*18%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 5.46	$ 7.79	$ 18.56	$ 18.56	$ 18.56	$ 18.56
% change		*43%*	*138%*	*0%*	*0%*	*0%*
Alternative 1						
Water Unit Cost	$ 5.71	$ 9.30	$ 12.44	$ 12.82	$ 12.82	$ 12.82
% change		*63%*	*34%*	*3%*	*0%*	*0%*
Wastewater Unit Cost	$ 5.46	$ 7.76	$ 23.42	$ 25.36	$ 26.09	$ 26.09
% change		*42%*	*202%*	*8%*	*3%*	*0%*
Alternative 2						
Water Unit Cost	$ 5.71	$ 9.30	$ 12.15	$ 12.91	$ 12.91	$ 12.91
% change		*63%*	*31%*	*6%*	*0%*	*0%*
Wastewater Unit Cost	$ 5.46	$ 7.76	$ 18.46	$ 25.05	$ 25.31	$ 25.31
% change		*42%*	*138%*	*36%*	*1%*	*0%*
Alternative 3						
Water Unit Cost	$ 5.71	$ 9.62	$ 12.50	$ 12.74	$ 12.74	$ 12.74
% change		*69%*	*30%*	*2%*	*0%*	*0%*
Wastewater Unit Cost	$ 5.46	$ 9.47	$ 24.87	$ 24.91	$ 26.21	$ 26.21
% change		*73%*	*163%*	*0%*	*5%*	*0%*
Alternative 4						
Water Unit Cost	$ 5.71	$ 9.62	$ 12.50	$ 12.74	$ 12.74	$ 12.74
% change		*69%*	*30%*	*2%*	*0%*	*0%*
Wastewater Unit Cost	$ 5.46	$ 9.47	$ 24.78	$ 24.81	$ 26.08	$ 26.08
% change		*73%*	*162%*	*0%*	*5%*	*0%*

Table 43: High Point Projected 5,000 Gallon Combined Monthly Bill

Combined Monthly Bill	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"	**$ 101**	**$ 160**	**$ 298**	**$ 298**	**$ 298**	**$ 298**
% change		*58%*	*86%*	*0%*	*0%*	*0%*
Alternative 1	**$ 101**	**$ 152**	**$ 354**	**$ 380**	**$ 388**	**$ 388**
% change		*50%*	*134%*	*7%*	*2%*	*0%*
Alternative 2	**$ 101**	**$ 152**	**$ 295**	**$ 377**	**$ 380**	**$ 380**
% change		*50%*	*94%*	*28%*	*1%*	*0%*
Alternative 3	**$ 101**	**$ 174**	**$ 372**	**$ 374**	**$ 389**	**$ 389**
% change		*72%*	*114%*	*1%*	*4%*	*0%*
Alternative 4	**$ 101**	**$ 174**	**$ 371**	**$ 373**	**$ 387**	**$ 387**
% change		*72%*	*113%*	*1%*	*4%*	*0%*

5.5.5. Identified Support Requirements

Outside funding support, often sourced from state and federal grants or negotiated in partnerships, is recommended within the financial analysis to offset capital costs that would otherwise impose an unreasonable burden on local ratepayers. Given the State Legislature's expressed preference for regional solutions, this analysis conservatively assumes the "Go-It-Alone" scenario receives no external funding while regional alternatives are positioned to secure and leverage substantial outside financial support. By reducing the net project financing required from the utility, this support effectively lowers the total Revenue Requirement and stabilizes the unit cost of service, ensuring that essential infrastructure upgrades can proceed without forcing unsustainable or massive rate increases upon the community. High Point has been identified to require outside funding support for project cost in all Alternatives. Table 44 exhibits the amount of outside funding support identified by alternative.

Table 44: High Point Identified Outside Funding Support

Decsription	Amount of Outside Funding Support
Alternative 1	**$ 234,270,000**
Alternative 2	**$ 314,150,943**
Alternative 3	**$ 314,986,400**
Alternative 4	**$ 314,549,499**

The integration of outside funding support is a crucial element in evaluating the financial feasibility and affordability of the regionalization alternatives, especially when comparing them to the inherent cost burdens of the "Go-It-Alone" scenario. For the "Go-It-Alone" Scenario, outside funding was primarily assumed to be limited to existing Randolph County allocations, offering only localized, small-scale relief.

In contrast, the preferred Alternative 4, which represents the highest degree of regional integration and strategic investment, is projected to maximize the opportunity for securing significant state and federal infrastructure grants and low-interest financing due to its regional scope and focus on efficiency. When these potential external funds are applied to the Alternatives total capital costs, the net impact on ratepayers becomes substantially more favorable. Figure 11 compares the "typical" 5,000-gallon FY2050 monthly combined residential utility bill for the "Go-It-Alone" scenario to each of the Master Plan Alternatives with the identified level of funding support applied.

Figure 11: High Point Projected FY50 Monthly Bill Comparison with Support

5.6. Town of Jamestown

5.6.1. Background

The Town of Jamestown purchases their water supply from the City of High Point and The City of Greensboro as a delivery point from PTRWA. The City of High Point and PTRWA appear to be capable of providing their water supply for the foreseeable future. The Town of Jamestown owns 2 MGD capacity in the Eastside WWTP, which will meet their needs in 2050.

5.6.2. Revenue Requirements

The first major task in establishing a unit cost analysis is developing an understanding of the revenue requirements of a utility during the forecast period. Revenue requirements refer to the utility's annual costs that must be recovered through user rates, fees, and charges. Revenue requirements are comprised of cash-based expenses including O&M expenses, cash-funded capital projects, debt service principal and interest payments, annual contributions to reserves, and any operating transfers to other utility or general funds.

1. **Operating Expenses:** O&M expenses represent normal, recurring expenses necessary to sustainably operate and maintain the system during the utility providers' annual accounting cycle. Jamestown's existing financial planning model, developed by Raftelis, served as the basis for the projection of utility operating costs. Operating expenses were escalated in the financial planning model by approximately 5% per year to account for growing utility costs and inflation, which is consistent with longer-term historical trends. Operating expenses were offset by miscellaneous revenues found in the financial planning model. Jamestown purchases sewer treatment from the City of High Point. To recognize Jamestown is subsequently impacted by High Points increase in cost, Jamestown's purchased sewer cost is projected to increase at the rate of High Point's annual unit cost change. There are no specific changes in operating costs by between the "Go-It-Alone" scenario or any alternative.

2. **Existing Debt:** Existing debt service refers to prior debt issuances and the corresponding annual debt service payments, both principal and interest, that the utility provider is obligated to pay. Jamestown currently has three outstanding direct borrowings according to the financial planning model.

3. **Existing Capital Improvement Plan and Financing:** For water and wastewater utilities, capital expenditures - the costs associated with building, expanding, and rehabilitating long-lived infrastructure - represent the largest, most volatile, and most influential component of the total annual revenue requirement during any planning period. A 6-year capital improvement plan through FY2031 was provided for Jamestown. To estimate capital cost for the planning period beyond the CIP, depreciation escalated at 4% annually was used. Based on the CIP and capital projections split between water and wastewater, Jamestown plans to spend approximately $19.1.8 million (M) in total between FY 2026 and FY 2050 for water capital projects and $22.3 M for wastewater. Raftelis assumes these capital projects will be financed with a blend debt and equity. The costs associated with the existing capital improvement plan are included in both the "Go-It-Alone" scenario and Master Plan Alternative. Table 45 shows the planned capital spending and anticipated funding sources for water and wastewater.

Table 45: Jamestown Existing Capital Improvement Expenditures

		2026 - 2050
CIP Costs		
Water		
Cash Funded	$	19,086,296
Debt Financed		-
Grant Funded		-
Subtotal: Water CIP Costs	$	19,086,296
Wastewater		
Cash Funded	$	18,484,857
Debt Financed		3,776,920
Grant Funded		-
Subtotal: Wastewater CIP Costs	$	22,261,777
Total: Existing Capital Project Costs	**$**	**41,348,073**

4. **"Go-It-Alone" Capital Projects:** The "Go-It-Alone" scenario details the projected capital expenditures required, in addition to the existing CIP, if the nine identified utilities continue to operate mostly independently, without the unified resource planning, financing mechanisms, or consolidated infrastructure envisioned by the regional alternatives. Capital project costs in this scenario are allocated based on capacity and assumed to be debt financed. Jamestown's total allocated "Go-It-Alone" scenario cost is $56.9 million. Table 46 exhibits the water and wastewater project costs allocated to Jamestown in the "Go-It-Alone" Scenario.

Table 46: Jamestown "Go-It-Alone" Capital Project Summary

Capital Project	Total Cost	Allocation %	Allocated Cost	1st Fiscal Year of Debt Payments
Water				
PTRWA Expansion to 26.7 MGD	$ 94,075,000	3.5%	$ 3,331,823	FY 2028
PTRWA Advanced Treatment Upgrade 26.7 mgd	146,900,000	4.5%	6,610,500	FY 2031
PTRWA Residuals Facility Expansion to 26.7 mgd	42,220,000	4.5%	1,899,900	FY 2031
Wastewater				
Upgrade High Point's Eastside WWTP	585,000,000	7.7%	45,045,000	FY 2032
Total: Capital Project Cost	**$ 868,195,000**		**$ 56,887,223**	

5. **Alternative Capital Projects:** The four PTRWA Master Plan alternatives define regional pathways for addressing the projected water and wastewater service demands of Guilford and Randolph Counties through the year 2050. The capital project costs included in each Alternative are allocated based on capacity, in addition to the existing CIP, and assumed to be debt financed. Table 47 exhibits the wastewater project costs allocated to Jamestown in each of the four Master Plan Alternatives. The water and wastewater project costs remain the same in the "Go-It-Alone" scenario and all alternatives.

Table 47: Jamestown Alternative Wastewater Capital Project Summary

Wastewater Capital Project	Total Cost	Allocation %	Allocated Cost	1st Fiscal Year of Debt Payments
Alternative 1				
Upgrade High Point's Eastside WWTP	$ 585,000,000	7.7%	$ 45,045,000	FY 2032
Subtotal: Alternative 1	$ 585,000,000		$ 45,045,000	
Alternative 2				
Upgrade High Point's Eastside WWTP	585,000,000	7.7%	45,045,000	FY 2032
Subtotal: Alternative 2	$ 585,000,000		$ 45,045,000	
Alternative 3				
Upgrade High Point's Eastside WWTP	585,000,000	7.7%	45,045,000	FY 2032
Subtotal: Alternative 3	$ 585,000,000		$ 45,045,000	
Alternative 4				
Upgrade High Point's Eastside WWTP	585,000,000	7.7%	45,045,000	FY 2032
Subtotal: Alternative 4	$ 585,000,000		$ 45,045,000	

5.6.3. Demand Projections

The demand projection volumes act as the divisor in the unit cost calculation to transform the annual revenue requirement into a standardized cost metric that allows for meaningful comparison between scenarios and service providers. The water and wastewater demand projections through 2050 were provided by Hazen and Sawyer for each utility provider and are summarized for Jamestown in annual thousand gallons for water and wastewater in Table 48. The projected demands do not change by scenario or alternative.

Table 48: Jamestown Water and Wastewater Demand Projections

	2026 *Projected*	**2030** *Projected*	**2035** *Projected*	**2040** *Projected*	**2045** *Projected*	**2050** *Projected*
Demand Projections (kgal)						
Water	253,675	337,625	390,550	443,475	494,575	545,675
% Change		*33%*	*16%*	*14%*	*12%*	*10%*
Wastewater	293,825	361,350	414,275	467,200	518,300	569,400
% Change		*23%*	*15%*	*13%*	*11%*	*10%*

5.6.4. Unit Cost Forecast and Bill Impacts

Table 49 presents the results of Jamestown's unit cost analysis through 2050 for the "Go-It-Alone" scenario and each of the Master Plan alternatives. The unit cost analysis takes Jamestown's annual water and wastewater costs detailed in the revenue requirement section, including added debt financed scenario/alternative capital cost, divided by the water or wastewater projected demand. The annual unit cost difference, including the minimum adjustments for debt service coverage and rate stability constraints detailed in the Methodology section, is applied to the "typical" 5,000 gallon water and wastewater residential bill. The resulting combined "typical" monthly residential bills through 2050 are presented in Table 50.

Table 49: Jamestown Unit Cost Forecast

Unit Cost per Kgal	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"						
Water Unit Cost	$ 5.82	$ 9.64	$ 12.51	$ 12.64	$ 13.74	$ 15.21
% change		*66%*	*30%*	*1%*	*9%*	*11%*
Wastewater Unit Cost	$ 9.16	$ 10.29	$ 23.88	$ 23.88	$ 23.88	$ 23.88
% change		*12%*	*132%*	*0%*	*0%*	*0%*
Alternative 1						
Water Unit Cost	$ 5.82	$ 9.64	$ 12.51	$ 12.58	$ 13.70	$ 15.20
% change		*66%*	*30%*	*1%*	*9%*	*11%*
Wastewater Unit Cost	$ 9.16	$ 10.27	$ 25.66	$ 25.66	$ 25.66	$ 25.66
% change		*12%*	*150%*	*0%*	*0%*	*0%*
Alternative 2						
Water Unit Cost	$ 5.82	$ 9.64	$ 12.51	$ 12.58	$ 13.70	$ 15.20
% change		*66%*	*30%*	*1%*	*9%*	*11%*
Wastewater Unit Cost	$ 9.16	$ 10.27	$ 23.76	$ 24.10	$ 24.10	$ 24.10
% change		*12%*	*131%*	*1%*	*0%*	*0%*
Alternative 3						
Water Unit Cost	$ 5.82	$ 9.64	$ 12.51	$ 12.59	$ 13.70	$ 15.20
% change		*66%*	*30%*	*1%*	*9%*	*11%*
Wastewater Unit Cost	$ 9.16	$ 10.53	$ 26.20	$ 26.20	$ 26.20	$ 26.20
% change		*15%*	*149%*	*0%*	*0%*	*0%*
Alternative 4						
Water Unit Cost	$ 5.82	$ 9.64	$ 12.51	$ 12.59	$ 13.70	$ 15.20
% change		*66%*	*30%*	*1%*	*9%*	*11%*
Wastewater Unit Cost	$ 9.16	$ 10.53	$ 26.18	$ 26.18	$ 26.18	$ 26.18
% change		*15%*	*149%*	*0%*	*0%*	*0%*

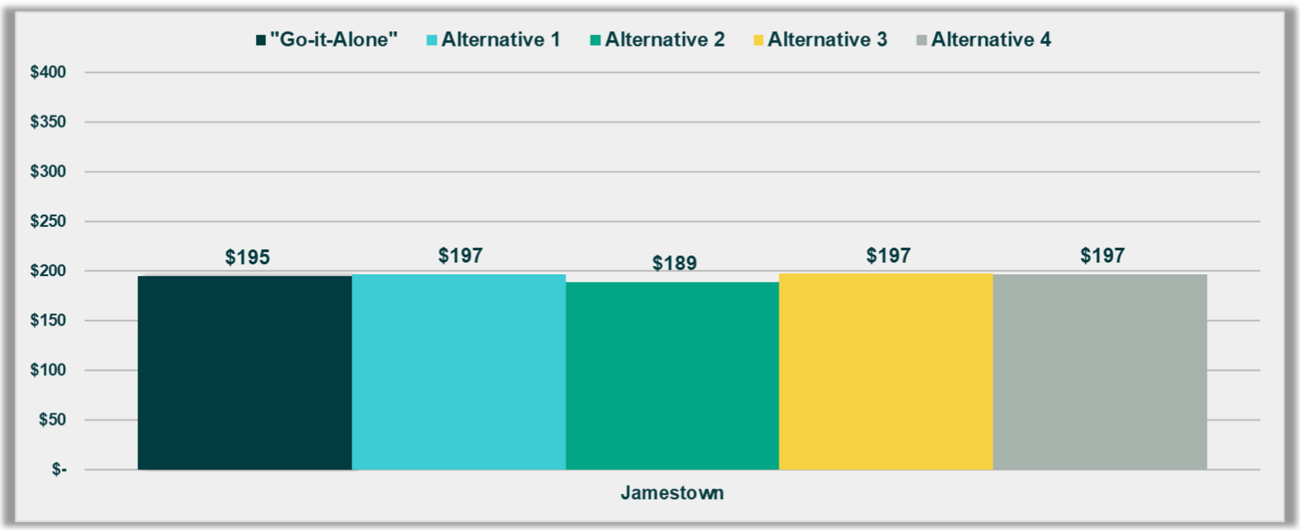
Table 50: Jamestown Projected 5,000 Gallon Combined Monthly Bill

Combined Monthly Bill	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"	**$ 75**	**$ 100**	**$ 182**	**$ 183**	**$ 188**	**$ 195**
% change		*33%*	*83%*	*0%*	*3%*	*4%*
Alternative 1	**$ 75**	**$ 100**	**$ 191**	**$ 191**	**$ 197**	**$ 204**
% change		*33%*	*92%*	*0%*	*3%*	*4%*
Alternative 2	**$ 75**	**$ 100**	**$ 181**	**$ 183**	**$ 189**	**$ 197**
% change		*33%*	*82%*	*1%*	*3%*	*4%*
Alternative 3	**$ 75**	**$ 101**	**$ 194**	**$ 194**	**$ 199**	**$ 207**
% change		*35%*	*92%*	*0%*	*3%*	*4%*
Alternative 4	**$ 75**	**$ 101**	**$ 193**	**$ 194**	**$ 199**	**$ 207**
% change		*35%*	*92%*	*0%*	*3%*	*4%*

5.6.5. Identified Support Requirements

Outside funding support, often sourced from state and federal grants or negotiated in partnerships, is recommended within the financial analysis to offset capital costs that would otherwise impose an unreasonable burden on local ratepayers. Given the State Legislature's expressed preference for regional solutions, this analysis conservatively assumes the "Go-It-Alone" scenario receives no external funding while regional alternatives are positioned to secure and leverage substantial outside financial support. By reducing the net project financing required from the utility, this support effectively lowers the total Revenue Requirement and stabilizes the unit cost of service, ensuring that essential infrastructure upgrades can proceed without forcing unsustainable or massive rate increases upon the community. Jamestown was not identified to require outside funding support. Figure 12 compares the “typical” 5,000-gallon FY2050 monthly combined residential utility bill for the “Go-It-Alone” scenario to each of the Master Plan Alternatives with the identified level of funding support applied.

Figure 12: Jamestown Projected FY50 Monthly Bill Comparison with Support



5.7. Town of Liberty

5.7.1. Background

The Town of Liberty currently operates a groundwater supplied system with a series of 8 wells across the town. The system is limited to 0.56 MGD which is not anticipated to meet the 2050 demands and may be difficult to expand. Connections to Ramseur and Greensboro are being investigated to serve the area. The “Go-It-Alone” scenario and all Master Plan alternatives include projects that incorporate Liberty interconnections for water service in the future. The Town of Liberty operates a spray field irrigation wastewater facility with a capacity of 0.55 MGD. The facility has reported in other ongoing studies they do not have enough available land to effectively expand the facility and will need to regionalize with a different facility to meet future demands. The “Go-It-Alone” scenario and all Master Plan alternatives include projects that incorporate Liberty interconnections to Greensboro for wastewater service in the future.

5.7.2. Revenue Requirements

The first major task in establishing a unit cost analysis is developing an understanding of the revenue requirements of a utility during the forecast period. Revenue requirements refer to the utility's annual costs that must be recovered through user rates, fees, and charges. Revenue requirements are comprised of cash-based expenses including O&M expenses, cash-funded capital projects, debt service principal and interest payments, annual contributions to reserves, and any operating transfers to other utility or general funds.

1. **Operating Expenses:** O&M expenses represent normal, recurring expenses necessary to sustainably operate and maintain the system during the utility providers' annual accounting cycle. Liberty's FY2025 operating budget served as the basis for the projection of utility operating costs. Operating expenses were escalated from the FY 2025 budget by 4% per year to account for growing utility costs and inflation, which is consistent with longer-term historical trends. Operating expenses were offset by miscellaneous revenues found in the audit. The significant changes to operating expenses between the alternatives are listed below.

    - In Alternatives 1-4 Liberty's existing wells and spray field are anticipated to be retired. All budgeted operating expenses related to their existing wells and spray field are removed from the revenue requirements, starting in the year Liberty begins purchasing water and wastewater treatment from Greensboro.
    - In Alternative 1-4, Liberty is assumed to begin purchasing water and wastewater treatment from Greensboro. The cost of water treatment is based on PTRWA's projected rate per kgal for water service with a wheeling rate attached, escalated at 5% per year. The cost of wastewater treatment is based on a discounted residential Greensboro rate per kgal for wastewater service, escalated at 5% per year.

2. **Existing Debt:** Existing debt service refers to prior debt issuances and the corresponding annual debt service payments, both principal and interest, that the utility provider is obligated to pay. Liberty currently has 1 outstanding direct borrowing according to the Local Government Commission's debt reports.

3. **Existing Capital Improvement Plan and Financing:** For water and wastewater utilities, capital expenditures - the costs associated with building, expanding, and rehabilitating long-lived infrastructure - represent the largest, most volatile, and most influential component of the total annual revenue requirement during any planning period. An 8-year capital improvement plan through FY2033 was provided for Liberty. To estimate capital cost for the planning period beyond the CIP, depreciation escalated at 4% annually was used. Based on the CIP and capital projections split between water and wastewater, Liberty plans to spend approximately $27.5 million (M) in total between FY 2026 and FY 2050 for water capital projects and $35.1 M for wastewater. Raftelis assumes these capital projects will be financed with a blend of debt and equity. The costs associated with the existing capital improvement plan are included in both the "Go-It-Alone" scenario and Master Plan Alternatives. Any identified redundant capital project related cost was removed or replaced depending on Alternative. Table 51 shows the planned capital spending and anticipated funding sources for water and wastewater.

Table 51: Liberty Existing Capital Improvement Expenditures

		2026 - 2050
CIP Costs		
Water		
Cash Funded	$	24,229,540
Debt Financed		3,291,426
Grant Funded		-
Subtotal: Water CIP Costs	$	27,520,966
Wastewater		
Cash Funded	$	33,517,272
Debt Financed		1,576,631
Grant Funded		-
Subtotal: Wastewater CIP Costs	$	35,093,903
Total: Existing Capital Project Costs	**$**	**62,614,868**

4. **"Go-It-Alone" Capital Projects:** The "Go-It-Alone" scenario details the projected capital expenditures required, in addition to the existing CIP, if the nine identified utilities continue to operate mostly independently, without the unified resource planning, financing mechanisms, or consolidated infrastructure envisioned by the regional alternatives. Capital project costs in this scenario are allocated based on capacity and assumed to be debt financed. Liberty's total allocated "Go-It-Alone" scenario cost is $33.6 M. Table 26 exhibits the water and wastewater project costs allocated to Asheboro in the "Go-It-Alone" Scenario.

Table 52: Liberty "Go-It-Alone" Capital Project Summary

Capital Project	Total Cost	Allocation %	Randolph County Grants	Allocated Cost	1st Fiscal Year of Debt Payments
Water					
Water service from Ramseur to Liberty (Hwy 421 @ Hwy 49)	$ 14,200,000	100.0%	3,800,000	10,400,000	FY 2027
Ramsuer to Liberty Booster Pump Station	1,100,000	100.0%		1,100,000	FY 2027
Liberty Water Line from Greensboro - Toyota facility	9,500,000	100.0%	9,500,000	-	FY 2028
Pump Station	1,500,000	100.0%	1,500,000	-	FY 2028
Wastewater					
Liberty Transfer Lift Station to Greensboro	12,600,000	100.0%		12,600,000	FY 2037
Liberty Sewer Force Main to Greensboro	9,500,000	100.0%		9,500,000	FY 2037
Total: Capital Project Cost	**$ 48,400,000**		**$ 14,800,000**	**$ 33,600,000**	

5. **Alternative Capital Projects:** The four PTRWA Master Plan alternatives define regional pathways for addressing the projected water and wastewater service demands of Guilford and Randolph Counties through the year 2050. The capital project costs included in each Alternative are allocated based on capacity, in addition to the existing CIP, and assumed to be debt financed. Table 53Table 14

exhibits the wastewater project costs allocated to Liberty in each of the four Master Plan Alternatives. The water project costs remain the same in the "Go-It-Alone" scenario and all alternatives.

Table 53: Liberty Alternative Wastewater Capital Project Summary

Wastewater Capital Project	Total Cost	Allocation %	Randolph County Grants	Allocated Cost	1st Fiscal Year of Debt
Alternative 1					
Liberty Transfer Lift Station to Greensboro	$ 12,600,000	100.0%	$ 2,500,000	$ 10,100,000	FY 2037
Liberty Sewer Force Main to Greensboro	9,500,000	100.0%	9,500,000	-	FY 2037
Subtotal: Alternative 1	$ 22,100,000			$ 10,100,000	
Alternative 2					
Liberty Transfer Lift Station to Greensboro	12,600,000	100.0%		12,600,000	FY 2037
Liberty Sewer Force Main to Greensboro	9,500,000	100.0%		9,500,000	FY 2037
Subtotal: Alternative 2	$ 22,100,000			$ 22,100,000	
Alternative 3					
Liberty Transfer Lift Station to Greensboro	12,600,000	100.0%	2,500,000	10,100,000	FY 2037
Liberty Sewer Force Main to Greensboro	9,500,000	100.0%	9,500,000	-	FY 2037
Subtotal: Alternative 3	$ 22,100,000			$ 10,100,000	
Alternative 4					
Liberty Transfer Lift Station to Greensboro	12,600,000	100.0%	2,500,000	10,100,000	FY 2037
Liberty Sewer Force Main to Greensboro	9,500,000	100.0%	9,500,000	-	FY 2037
Subtotal: Alternative 4	$ 22,100,000			$ 10,100,000	

5.7.3. Demand Projections

The demand projection volumes act as the divisor in the unit cost calculation to transform the annual revenue requirement into a standardized cost metric that allows for meaningful comparison between scenarios and service providers. The water and wastewater demand projections through 2050 were provided by Hazen and Sawyer for each utility provider and are summarized for Liberty in annual thousand gallons for water and wastewater in Table 54Table 21. The projected demands do not change by scenario or alternative.

Table 54: Liberty Water and Wastewater Demand Projections

	2026 *Projected*	**2030** *Projected*	**2035** *Projected*	**2040** *Projected*	**2045** *Projected*	**2050** *Projected*
Demand Projections (kgal)						
Water	124,100	142,350	166,075	189,800	215,350	240,900
% Change		*15%*	*17%*	*14%*	*13%*	*12%*
Wastewater	131,400	153,300	187,975	222,650	275,575	328,500
% Change		*17%*	*23%*	*18%*	*24%*	*19%*

5.7.4. Alternative and Unit Cost Forecast

Table 55 presents the results of Liberty's unit cost analysis through 2050 for the "Go-It-Alone" scenario and each of the Master Plan alternatives. The unit cost analysis takes Liberty's annual water and wastewater costs detailed in the revenue requirement section, including added debt financed scenario/alternative capital cost, divided by the water or wastewater projected demand. The annual unit cost difference, including the minimum adjustments for debt service coverage and rate stability constraints detailed in the Methodology section, is applied to the "typical" 5,000 gallon water and wastewater residential bill. The resulting combined "typical" monthly residential bills through 2050 are presented in Table 56Table 30.

Table 55: Liberty Unit Cost Forecast

Unit Cost per Kgal	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"						
Water Unit Cost	$ 7.17	$ 16.05	$ 19.96	$ 20.77	$ 22.03	$ 23.92
% change		*124%*	*24%*	*4%*	*6%*	*9%*
Wastewater Unit Cost	$ 4.24	$ 5.48	$ 12.63	$ 22.26	$ 22.30	$ 23.53
% change		*29%*	*130%*	*76%*	*0%*	*6%*
Alternative 1						
Water Unit Cost	$ 7.17	$ 16.05	$ 19.96	$ 20.77	$ 22.03	$ 23.92
% change		*124%*	*24%*	*4%*	*6%*	*9%*
Wastewater Unit Cost	$ 4.24	$ 5.48	$ 12.63	$ 18.92	$ 19.60	$ 21.27
% change		*29%*	*130%*	*50%*	*4%*	*8%*
Alternative 2						
Water Unit Cost	$ 7.17	$ 16.05	$ 19.96	$ 20.77	$ 22.03	$ 23.92
% change		*124%*	*24%*	*4%*	*6%*	*9%*
Wastewater Unit Cost	$ 4.24	$ 5.48	$ 12.63	$ 22.26	$ 22.30	$ 23.53
% change		*29%*	*130%*	*76%*	*0%*	*6%*
Alternative 3						
Water Unit Cost	$ 7.17	$ 16.05	$ 19.96	$ 20.77	$ 22.03	$ 23.92
% change		*124%*	*24%*	*4%*	*6%*	*9%*
Wastewater Unit Cost	$ 4.24	$ 5.48	$ 12.63	$ 18.92	$ 19.60	$ 21.27
% change		*29%*	*130%*	*50%*	*4%*	*8%*
Alternative 4						
Water Unit Cost	$ 7.17	$ 16.05	$ 19.96	$ 20.77	$ 22.03	$ 23.92
% change		*124%*	*24%*	*4%*	*6%*	*9%*
Wastewater Unit Cost	$ 4.24	$ 5.48	$ 12.63	$ 18.92	$ 19.60	$ 21.27
% change		*29%*	*130%*	*50%*	*4%*	*8%*

Table 56: Liberty Projected 5,000 Gallon Combined Monthly Bill

Combined Monthly Bill	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"	**$ 94**	**$ 158**	**$ 272**	**$ 401**	**$ 409**	**$ 435**
% change		*68%*	*72%*	*48%*	*2%*	*6%*
Alternative 1	**$ 94**	**$ 158**	**$ 272**	**$ 358**	**$ 374**	**$ 406**
% change		*68%*	*72%*	*32%*	*4%*	*9%*
Alternative 2	**$ 94**	**$ 158**	**$ 272**	**$ 401**	**$ 409**	**$ 435**
% change		*68%*	*72%*	*48%*	*2%*	*6%*
Alternative 3	**$ 94**	**$ 158**	**$ 272**	**$ 358**	**$ 374**	**$ 406**
% change		*68%*	*72%*	*32%*	*4%*	*9%*
Alternative 4	**$ 94**	**$ 158**	**$ 272**	**$ 358**	**$ 374**	**$ 406**
% change		*68%*	*72%*	*32%*	*4%*	*9%*

5.7.5. Identified Support Requirements

Outside funding support, often sourced from state and federal grants or negotiated in partnerships, is recommended within the financial analysis to offset capital costs that would otherwise impose an unreasonable burden on local ratepayers. Given the State Legislature's expressed preference for regional solutions, this analysis conservatively assumes the "Go-It-Alone" scenario receives no external funding while regional alternatives are positioned to secure and leverage substantial outside financial support. By reducing the net project financing required from the utility, this support effectively lowers the total Revenue Requirement and stabilizes the unit cost of service, ensuring that essential infrastructure upgrades can proceed without forcing unsustainable or massive rate increases upon the community. Liberty has been identified to require outside funding support for all project cost in all Alternatives. Table 57 exhibits the amount of outside funding support identified by alternative.

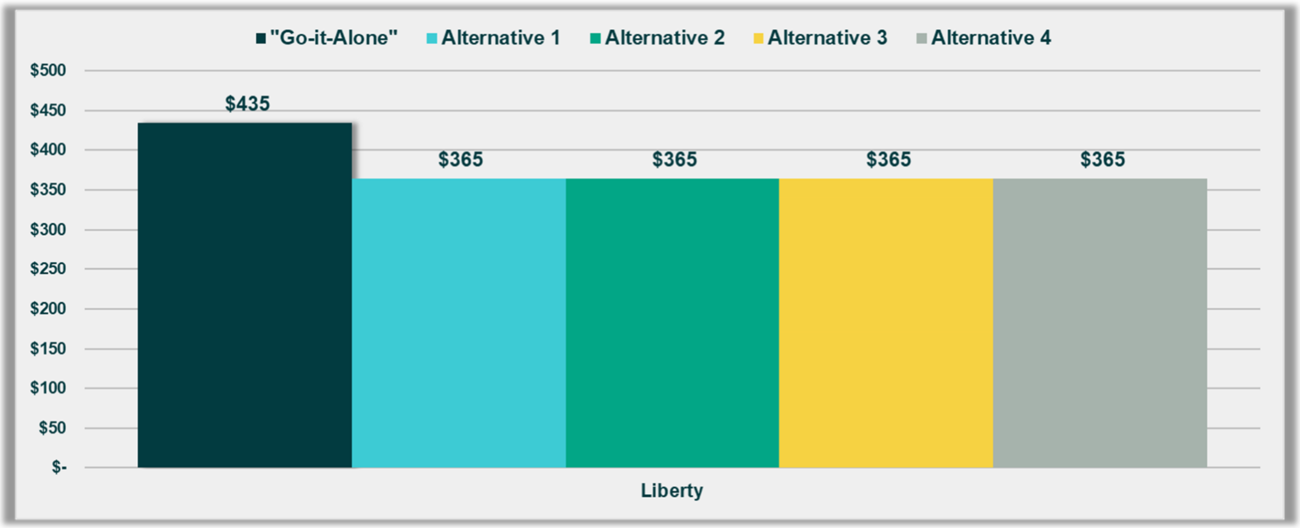
Table 57: Liberty Identified Outside Funding Support

Decsription	Amount of Outside Funding Support
Alternative 1	**$ 21,600,000**
Alternative 2	**$ 33,600,000**
Alternative 3	**$ 21,600,000**
Alternative 4	**$ 21,600,000**

The integration of outside funding support is a crucial element in evaluating the financial feasibility and affordability of the regionalization alternatives, especially when comparing them to the inherent cost burdens of the "Go-It-Alone" scenario. For the “Go-It-Alone” Scenario, outside funding was primarily assumed to be limited to existing Randolph County allocations, offering only localized, small-scale relief.

In contrast, the preferred Alternative 4, which represents the highest degree of regional integration and strategic investment, is projected to maximize the opportunity for securing significant state and federal infrastructure grants and low-interest financing due to its regional scope and focus on efficiency. When these potential external funds are applied to the Alternatives total capital costs, the net impact on ratepayers becomes substantially more favorable. Figure 13 compares the "typical" 5,000-gallon FY2050 monthly combined residential utility bill for the "Go-It-Alone" scenario to each of the Master Plan Alternatives with the identified level of funding support applied.

Figure 13: Liberty Projected FY50 Monthly Bill Comparison with Support



5.8. Town of Ramseur

5.8.1. Background

The Town of Ramseur operates a water treatment facility rated for 1 MGD. The facility is currently on free chlorine and has approached Randolph County for funding to convert to chloramines similar to others in the area. The facility is in need of upgrades and has access to a raw water supply of 6.6 MGD. The required upgrades and projected expansions are incorporated into the "Go-It-Alone" scenario and all of the Master plan alternatives. The Town of Ramseur operates a wastewater treatment plant on the Deep River with a maximum month treatment capacity of 0.48 MGD. The facility is not capable of taking on much additional flow without upgrades and expansion. These upgrades and varying levels of WWTP expansion are included in both the "Go-It-Alone" scenario and Alternatives 1 through 3. The Towns future wastewater treatment demand is addressed at the proposed regional wastewater facility in Alternative 4.

5.8.2. Revenue Requirements

The first major task in establishing a unit cost analysis is developing an understanding of the revenue requirements of a utility during the forecast period. Revenue requirements refer to the utility's annual costs that must be recovered through user rates, fees, and charges. Revenue requirements are comprised of cash-based expenses including O&M expenses, cash-funded capital projects, debt service principal and interest payments, annual contributions to reserves, and any operating transfers to other utility or general funds.

1. **Operating Expenses:** O&M expenses represent normal, recurring expenses necessary to sustainably operate and maintain the system during the utility providers' annual accounting cycle. Ramseur's FY2024 operating budget served as the basis for the projection of utility operating costs. Operating expenses were escalated from the FY 2024 budget by 4% per year to account for growing utility costs and inflation, which is consistent with longer-term historical trends. Operating expenses were offset by miscellaneous revenues found in the budget. The significant changes to operating expenses between the alternatives are listed below.

    - In Alternative 4 Ramseur's existing wastewater treatment plant is retired. All budgeted operating expenses related to their existing WWTP are removed from the revenue requirements, starting in the year the new regional facility construction is completed.
    - Starting the year that the new regional facility construction is completed, Ramseur will start making purchases for sewer treatment at the facility. These purchases are based on a capacity pro rata share of the projected facility operating expenses, informed by Hazen and Sawyer.

2. **Existing Debt:** Existing debt service refers to prior debt issuances and the corresponding annual debt service payments, both principal and interest, that the utility provider is obligated to pay. Ramseur currently has four outstanding State Revolving Fund ("SRF") loans according to the Local Government Commission's debt reports.

3. **Existing Capital Improvement Plan and Financing:** For water and wastewater utilities, capital expenditures - the costs associated with building, expanding, and rehabilitating long-lived infrastructure - represent the largest, most volatile, and most influential component of the total annual revenue requirement during any planning period. A 10-year capital improvement plan through FY2035 was provided for Ramseur. To estimate capital cost for the planning period beyond the CIP, depreciation escalated at 4% annually was used. Based on the CIP and capital projections split between water and wastewater, Ramseur plans to spend approximately $15.5 million (M) in total between FY 2026 and FY 2050 for water capital projects and $26.7 M for wastewater. Raftelis assumes these capital projects will be financed with a blend of equity and debt. The costs associated with the existing capital improvement plan are included in both the "Go-It-Alone" scenario and Master Plan Alternatives. Any identified redundant capital project related cost was removed or replaced depending on Alternative. Table 58 shows the planned capital spending and anticipated funding sources for water and wastewater.

Table 58: Ramseur Existing Capital Improvement Expenditures

		2026 - 2050
CIP Costs		
Water		
Cash Funded	$	4,776,056
Debt Financed		10,736,885
Grant Funded		-
Subtotal: Water CIP Costs	$	15,512,941
Wastewater		
Cash Funded	$	6,271,807
Debt Financed		20,436,012
Grant Funded		-
Subtotal: Wastewater CIP Costs	$	26,707,819
Total: Existing Capital Project Costs	**$**	**42,220,761**

4. **"Go-It-Alone" Capital Projects:** The "Go-It-Alone" scenario details the projected capital expenditures required, in addition to the existing CIP, if the nine identified utilities continue to operate mostly independently, without the unified resource planning, financing mechanisms, or consolidated infrastructure envisioned by the regional alternatives. Capital project costs in this scenario are allocated based on capacity and assumed to be debt financed. Ramseur's total allocated "Go-It-Alone" scenario cost is $77.4 M. Table 59 exhibits the water and wastewater project costs allocated to Ramseur in the "Go-It-Alone" Scenario.

Table 59: Ramseur "Go-It-Alone" Capital Project Summary

Capital Project	Total Cost	Allocation %	Randolph County Grant	Allocated Cost	1st Fiscal Year of Debt
Water					
RAMSEUR -Rehabilitation and Upgrade to existing facility	$ 23,400,000	100.0%		$ 23,400,000	FY 2028
RAMSEUR - Advanced Treatment Upgrade at 1.5mg	6,000,000	100.0%		6,000,000	FY 2028
RAMSEUR - Expansion of Existing facility from 1.5mgd to 3mgd	29,300,000	100.0%		29,300,000	FY 2031
RAMSEUR - Advanced Treatment Upgrade	6,000,000	100.0%		6,000,000	FY 2031
Wastewater					
Ramseur WWTP Upgrade of Existing 0.46mgd	19,300,000	100.0%	6,600,000	12,700,000	FY 2027
Ramseur WWTP Expansion to 1mgd	28,400,000	100%	28,400,000	-	FY 2027
Total: Capital Project Cost	**$ 112,400,000**		**$ 35,000,000**	**$ 77,400,000**	

5. **Alternative Capital Projects:** The four PTRWA Master Plan alternatives define regional pathways for addressing the projected water and wastewater service demands of Guilford and Randolph Counties through the year 2050. The capital project costs included in each Alternative are allocated

based on capacity, in addition to the existing CIP, and assumed to be debt financed. Table 60Table 14 exhibits the wastewater project costs allocated to Ramseur in each of the four Master Plan Alternatives. The water project costs remain the same in the "Go-It-Alone" scenario and all alternatives.

Table 60: Ramseur Alternative Wastewater Capital Project Summary

Wastewater Capital Project	Total Cost	Allocation %	Randolph County Grant	Allocated Cost	1st Fiscal Year of Debt Payments
Alternative 1					
Ramseur WWTP Upgrade of Existing 0.46mgd	$ 19,300,000	100.0%	9,100,000	$ 10,200,000	FY 2027
Ramseur WWTP Expansion to 1mgd	28,400,000	100.0%	28,400,000	-	FY 2027
Subtotal: Alternative 1	$ 47,700,000			$ 10,200,000	
Alternative 2					
Ramseur WWTP Upgrade of Existing 0.46mgd	19,300,000	100.0%	6,600,000	12,700,000	FY 2027
Ramseur WWTP Expansion to 1mgd	28,400,000	100.0%	28,400,000	-	FY 2027
Subtotal: Alternative 2	$ 47,700,000			$ 12,700,000	
Alternative 3				-	
Rehabilitation and Upgrade to existing Ramseur WWTP	19,300,000	100.0%		19,300,000	FY 2032
Expansion of Ramser WWTP to 1.25	41,500,000	100.0%	35,000,000	6,500,000	FY 2032
Subtotal: Alternative 3	$ 60,800,000			$ 25,800,000	
Alternative 4					
Ramseur Transfer Lift Station to Regional Facility	17,007,900	100.0%	17,007,900	-	FY 2032
Ramseur Sewer Force Main to Regional Facility	60,278,400	100.0%	19,018,900	41,259,500	FY 2032
Regional Facility Influent Pump Station	122,440,500	4.8%		5,857,191	FY 2031
New Regional WWTP Facility (Phase 1 - 31.4MGD)	1,413,900,000	3.2%		44,823,304	FY 2031
Subtotal: Alternative 4	$ 1,613,626,800			$ 91,939,995	

5.8.3. Demand Projections

The demand projection volumes act as the divisor in the unit cost calculation to transform the annual revenue requirement into a standardized cost metric that allows for meaningful comparison between scenarios and service providers. The water and wastewater demand projections through 2050 were provided by Hazen and Sawyer for each utility provider and are summarized for Ramseur in annual thousand gallons for water and wastewater in Table 61. The projected demands do not change by scenario or alternative.

Table 61: Ramseur Water and Wastewater Demand Projections

	2026 *Projected*	**2030** *Projected*	**2035** *Projected*	**2040** *Projected*	**2045** *Projected*	**2050** *Projected*
Demand Projections (kgal)						
Water	201,699	222,650	246,375	270,100	293,825	317,550
% Change		*10%*	*11%*	*10%*	*9%*	*8%*
Wastewater	87,600	109,500	147,825	211,700	213,525	215,350
% Change		*25%*	*35%*	*43%*	*1%*	*1%*

5.8.4. Alternative and Unit Cost Forecast

Table 62 presents the results of Ramseur's unit cost analysis through 2050 for the "Go-It-Alone" scenario and each of the Master Plan alternatives. The unit cost analysis takes Ramseur's annual water and wastewater costs detailed in the revenue requirement section, including added debt financed scenario/alternative capital cost, divided by the water or wastewater projected demand. The annual unit cost difference, including the minimum adjustments for debt service coverage and rate stability constraints detailed in the Methodology section, is applied to the "typical" 5,000 gallon water and wastewater residential bill. The resulting combined "typical" monthly residential bills through 2050 are presented in Table 63.

Table 62: Ramseur Unit Cost Forecast

Unit Cost per Kgal	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"						
Water Unit Cost	$ 3.35	$ 17.41	$ 31.82	$ 31.82	$ 31.82	$ 31.82
% change		*420%*	*83%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.92	$ 23.17	$ 26.40	$ 26.40	$ 26.40	$ 26.40
% change		*192%*	*14%*	*0%*	*0%*	*0%*
Alternative 1						
Water Unit Cost	$ 3.35	$ 17.36	$ 31.79	$ 31.79	$ 31.79	$ 31.79
% change		*419%*	*83%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.92	$ 21.60	$ 24.99	$ 24.99	$ 24.99	$ 24.99
% change		*173%*	*16%*	*0%*	*0%*	*0%*
Alternative 2						
Water Unit Cost	$ 3.35	$ 17.41	$ 31.82	$ 31.82	$ 31.82	$ 31.82
% change		*420%*	*83%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.92	$ 23.17	$ 26.40	$ 26.40	$ 26.40	$ 26.40
% change		*192%*	*14%*	*0%*	*0%*	*0%*
Alternative 3						
Water Unit Cost	$ 3.35	$ 17.13	$ 31.99	$ 31.99	$ 31.99	$ 31.99
% change		*412%*	*87%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.92	$ 17.68	$ 40.81	$ 40.81	$ 40.81	$ 40.81
% change		*123%*	*131%*	*0%*	*0%*	*0%*
Alternative 4						
Water Unit Cost	$ 3.35	$ 17.09	$ 32.49	$ 32.49	$ 32.49	$ 32.49
% change		*411%*	*90%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.92	$ 16.32	$ 88.08	$ 88.08	$ 88.08	$ 88.08
% change		*106%*	*440%*	*0%*	*0%*	*0%*

Table 63: Ramseur Projected 5,000 Gallon Combined Monthly Bill

Combined Monthly Bill	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"	**$ 100**	**$ 413**	**$ 699**	**$ 699**	**$ 718**	**$ 742**
% change		*312%*	*69%*	*0%*	*3%*	*3%*
Alternative 1	**$ 100**	**$ 403**	**$ 691**	**$ 691**	**$ 711**	**$ 735**
% change		*301%*	*72%*	*0%*	*3%*	*3%*
Alternative 2	**$ 100**	**$ 413**	**$ 699**	**$ 699**	**$ 718**	**$ 742**
% change		*312%*	*69%*	*0%*	*3%*	*3%*
Alternative 3	**$ 100**	**$ 361**	**$ 722**	**$ 722**	**$ 739**	**$ 759**
% change		*260%*	*100%*	*0%*	*2%*	*3%*
Alternative 4	**$ 100**	**$ 357**	**$ 1,007**	**$ 1,007**	**$ 1,019**	**$ 1,028**
% change		*256%*	*182%*	*0%*	*1%*	*1%*

5.8.5. Identified Support Requirements

Outside funding support, often sourced from state and federal grants or negotiated in partnerships, is recommended within the financial analysis to offset capital costs that would otherwise impose an unreasonable burden on local ratepayers. Given the State Legislature's expressed preference for regional solutions, this analysis conservatively assumes the "Go-It-Alone" scenario receives no external funding while regional alternatives are positioned to secure and leverage substantial outside financial support. By reducing the net project financing required from the utility, this support effectively lowers the total Revenue Requirement and stabilizes the unit cost of service, ensuring that essential infrastructure upgrades can proceed without forcing unsustainable or massive rate increases upon the community. Ramseur has been identified to require outside funding support for all capital project cost in all the Alternatives. Table 64 exhibits the amount of outside funding support identified by alternative.

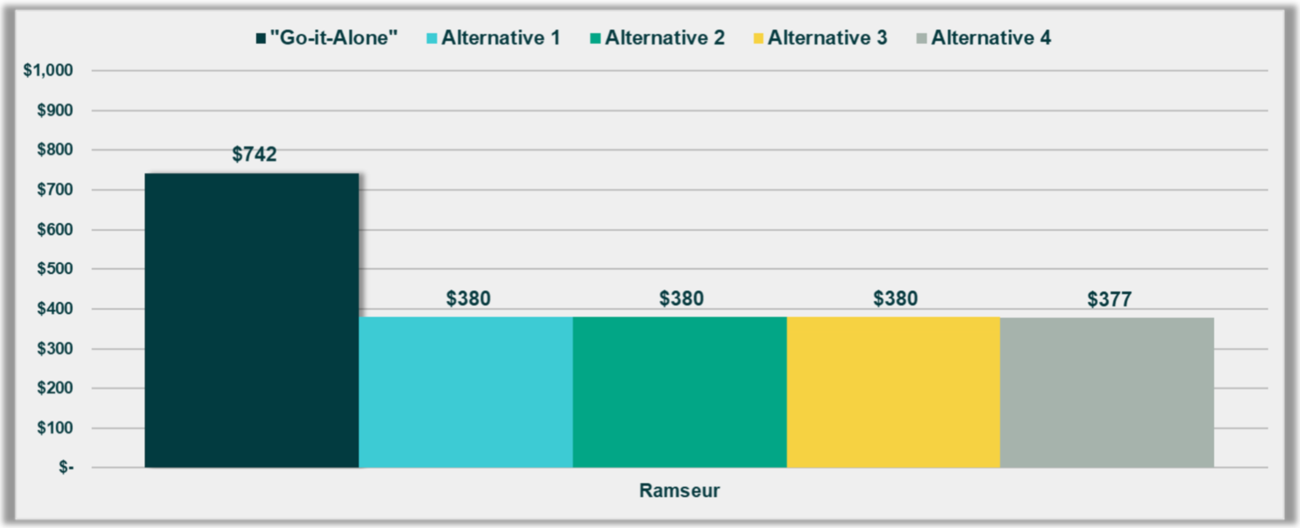
Table 64: Ramseur Identified Outside Funding Support

Decsription	Amount of Outside Funding Support
Alternative 1	**$ 74,900,000**
Alternative 2	**$ 77,400,000**
Alternative 3	**$ 90,500,000**
Alternative 4	**$ 156,639,995**

The integration of outside funding support is a crucial element in evaluating the financial feasibility and affordability of the regionalization alternatives, especially when comparing them to the inherent cost burdens of the "Go-It-Alone" scenario. For the “Go-It-Alone” Scenario, outside funding was primarily assumed to be limited to existing Randolph County allocations, offering only localized, small-scale relief.

In contrast, the preferred Alternative 4, which represents the highest degree of regional integration and strategic investment, is projected to maximize the opportunity for securing significant state and federal infrastructure grants and low-interest financing due to its regional scope and focus on efficiency. When these potential external funds are applied to the Alternatives total capital costs, the net impact on ratepayers becomes substantially more favorable. Figure 14 compares the "typical" 5,000-gallon FY2050 monthly combined residential utility bill for the "Go-It-Alone" scenario to each of the Master Plan Alternatives with the identified level of funding support applied.

Figure 14: Ramseur Projected FY50 Monthly Bill Comparison with Support



5.9. City of Randleman

5.9.1. Background

The City of Randleman purchases water from the PTRWA exclusively and does not have a water treatment facility. PTRWA will be able to meet their water needs for the foreseeable future. The City of Randleman currently operates a WWTP with a maximum month capacity of 1.745 MGD. The "Go-It-Alone" scenario includes minimal upgrades to the existing plant. In all the Master Plan alternatives Randleman's wastewater capacity at its existing wastewater plant is retired and replaced at the proposed regional facility located in either Randleman or Asheboro.

5.9.2. Revenue Requirements

The first major task in establishing a unit cost analysis is developing an understanding of the revenue requirements of a utility during the forecast period. Revenue requirements refer to the utility's annual costs that must be recovered through user rates, fees, and charges. Revenue requirements are comprised of cash-based expenses including O&M expenses, cash-funded capital projects, debt service principal and interest payments, annual contributions to reserves, and any operating transfers to other utility or general funds.

1. **Operating Expenses:** O&M expenses represent normal, recurring expenses necessary to sustainably operate and maintain the system during the utility providers' annual accounting cycle. Randleman's FY2026 operating budget served as the basis for the projection of utility operating costs. Operating expenses were escalated from the FY 2026 budget by 4% per year to account for growing utility costs and inflation, which is consistent with longer-term historical trends. Operating expenses were offset by miscellaneous revenues found in the budget. The significant changes to operating expenses between the alternatives are listed below.

    - In Alternatives 1-4 Randleman's existing wastewater treatment plant is retired. All budgeted operating expenses related to their existing WWTP are removed from the revenue requirements, starting in the year the new regional facility construction is completed.
    - Starting the year that the new regional facility construction is completed, Randleman will start making purchases for sewer treatment at the facility. These purchases are based on a capacity pro rata share of the projected facility operating expenses, informed by Hazen and Sawyer.

2. **Existing Debt:** Existing debt service refers to prior debt issuances and the corresponding annual debt service payments, both principal and interest, that the utility provider is obligated to pay. Randleman currently has two outstanding direct borrowings and 3 SRF loans according to the Local Government Commission's debt reports.

3. **Existing Capital Improvement Plan and Financing:** For water and wastewater utilities, capital expenditures - the costs associated with building, expanding, and rehabilitating long-lived infrastructure - represent the largest, most volatile, and most influential component of the total annual revenue requirement during any planning period. An 8-year water capital improvement plan through FY2032 was provided for Randleman. A capital improvement plan was not provided for the wastewater system. In this case, Raftelis estimated projected annual capital expenditure based on the estimated wastewater depreciation value found in the most recent audited financial statement and escalated that value at 4% annually. To estimate capital cost for the planning period beyond the CIP, depreciation escalated at 4% annually was used. Based on the CIP and capital projections split between water and wastewater, Randleman plans to spend approximately $7.9 million (M) in total between FY 2026 and FY 2050 for water capital projects and $66.5 M for wastewater. Raftelis assumes these capital projects will be financed with a blend of equity and debt. The costs associated with the existing capital improvement plan are included in both the "Go-It-Alone" scenario and Master Plan Alternatives. Any identified redundant capital project related cost was removed or replaced depending on Alternative. Table 65 shows the planned capital spending and anticipated funding sources for water and wastewater.

Table 65: Randleman Existing Capital Improvement Expenditures

		2026 - 2050
CIP Costs		
Water		
Cash Funded	$	7,933,476
Debt Financed		-
Grant Funded		-
Subtotal: Water CIP Costs	$	7,933,476
Wastewater		
Cash Funded	$	-
Debt Financed		66,466,160
Grant Funded		-
Subtotal: Wastewater CIP Costs	$	66,466,160
Total: Existing Capital Project Costs	**$**	**74,399,636**

4. **"Go-It-Alone" Capital Projects:** The "Go-It-Alone" scenario details the projected capital expenditures required, in addition to the existing CIP, if the nine identified utilities continue to operate mostly independently, without the unified resource planning, financing mechanisms, or consolidated infrastructure envisioned by the regional alternatives. Capital project costs in this scenario are allocated based on capacity and assumed to be debt financed. Randleman's total allocated "Go-It-Alone" scenario cost is $134.8. Table 66 exhibits the water and wastewater project costs allocated to Randleman in the "Go-It-Alone" Scenario.

Table 66: Randleman "Go-It-Alone" Capital Project Summary

Capital Project	Total Cost	Allocation %	Randolph County Grant	Allocated Cost	1st Fiscal Year of Debt Payments
Water					
PTRWA Advanced Treatment Upgrade 26.7 mgd	$ 146,900,000	3.7%		$ 5,435,300	FY 2031
PTRWA Expansion to 36 MGD	181,400,000	26.0%		47,164,000	FY 2034
PTRWA Advanced Treatment Upgrade to 36 MGD	51,200,000	26.0%		13,312,000	FY 2034
PTRWA Residuals Facility Expansion to 26.7 mgd	42,220,000	3.7%		1,562,140	FY 2031
PTRWA Residuals Facility Expansion to 36 mgd	32,700,000	26.0%		8,502,000	FY 2034
Wastewater					
Randleman minimal upgrade of existing 1.745 mgd	73,300,000	100%	14,500,000	58,800,000	FY 2031
Total: Capital Project Cost	**$ 527,720,000**			**$ 134,775,440**	

5. **Alternative Capital Projects:** The four PTRWA Master Plan alternatives define regional pathways for addressing the projected water and wastewater service demands of Guilford and Randolph Counties through the year 2050. The capital project costs included in each Alternative are allocated based on capacity, in addition to the existing CIP, and assumed to be debt financed. Table 20Table 14 exhibits the wastewater project costs allocated to Randleman in each of the four Master Plan

Alternatives. The water project costs remain the same in the "Go-It-Alone" scenario and all alternatives.

Table 67: Randleman Alternative Wastewater Capital Project Summary

Wastewater Capital Project	Total Cost	Allocation %	Randolph County Grant	Allocated Cost	1st Fiscal Year of Debt Payments
Alternative 1					
New 9.5 mgd WWTP Facility in the Deep River	$ 427,500,000	8.7%		$ 37,192,500	FY 2031
Expand to 25 mgd Greensboro/HP WWTP Facility in the Deep River	418,500,000	8.7%		36,409,500	FY 2039
Subtotal: Alternative 1	$ 846,000,000			$ 73,602,000	
Alternative 2					
Randleman minimal upgrade of existing 1.745 mgd	39,300,000	100.0%	14,500,000	24,800,000	FY 2031
New 18.5 mgd WWTP Facility in the Deep River	832,500,000	11.9%		99,481,132	FY 2038
Subtotal: Alternative 2	$ 871,800,000			$ 124,281,132	
Alternative 3					
Gravity Section from Randleman to Gravity Main Tie-in	1,995,500	100.0%		1,995,500	FY 2030
Gravity Section from Randleman Tie-in to Regional Facility	44,154,500	8.0%		3,532,360	FY 2030
Regional Facility Influent Pump Station	122,440,500	8.0%		9,795,240	FY 2031
New Regional WWTP Facility (Phase 1 - 30.2MGD)	1,357,700,000	7.3%		99,112,100	FY 2031
Subtotal: Alternative 3	$ 1,526,290,500			$ 114,435,200	
Alternative 4					
Gravity Section from Randleman to Gravity Main Tie-in	1,995,500	100.0%		1,995,500	FY 2030
Gravity Section from Randleman Tie-in to Regional Facility	44,154,500	8.0%		3,532,360	FY 2030
Regional Facility Influent Pump Station	122,440,500	7.6%		9,261,760	FY 2031
New Regional WWTP Facility (Phase 1 - 31.4MGD)	1,413,900,000	7.0%		99,607,341	FY 2031
Subtotal: Alternative 4	$ 1,582,490,500			$ 114,396,962	

5.9.3. Demand Projections

The demand projection volumes act as the divisor in the unit cost calculation to transform the annual revenue requirement into a standardized cost metric that allows for meaningful comparison between scenarios and service providers. The water and wastewater demand projections through 2050 were provided by Hazen and Sawyer for each utility provider and are summarized for Randleman in annual thousand gallons for water and wastewater in Table 68. The projected demands do not change by scenario or alternative.

Table 68: Randleman Water and Wastewater Demand Projections

	2026 *Projected*	**2030** *Projected*	**2035** *Projected*	**2040** *Projected*	**2045** *Projected*	**2050** *Projected*
Demand Projections (kgal)						
Water	304,775	319,375	379,600	439,825	501,875	563,925
% Change		*5%*	*19%*	*16%*	*14%*	*12%*
Wastewater	231,775	281,050	341,275	401,500	459,900	518,300
% Change		*21%*	*21%*	*18%*	*15%*	*13%*

5.9.4. Alternative and Unit Cost Forecast

Table 69 presents the results of Randleman's unit cost analysis through 2050 for the "Go-It-Alone" scenario and each of the Master Plan alternatives. The unit cost analysis takes Randleman's annual water and wastewater costs detailed in the revenue requirement section, including added debt financed scenario/alternative capital cost, divided by the water or wastewater projected demand. The annual unit cost difference, including the minimum adjustments for debt service coverage and rate stability constraints detailed in the Methodology section, is applied to the "typical" 5,000 gallon water and wastewater residential bill. The resulting combined "typical" monthly residential bills through 2050 are presented in Table 70.

Table 69: Randleman Unit Cost Forecast

Unit Cost per Kgal	**2026** *Projected*	**2030** *Projected*	**2035** *Projected*	**2040** *Projected*	**2045** *Projected*	**2050** *Projected*
"Go-It-Alone"						
Water Unit Cost	$ 4.64	$ 4.64	$ 22.66	$ 22.66	$ 22.66	$ 22.66
% change		*0%*	*389%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 7.55	$ 8.78	$ 26.93	$ 26.93	$ 26.93	$ 26.93
% change		*16%*	*207%*	*0%*	*0%*	*0%*
Alternative 1						
Water Unit Cost	$ 4.64	$ 4.84	$ 23.42	$ 23.42	$ 23.42	$ 23.42
% change		*4%*	*384%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 6.18	$ 8.25	$ 19.93	$ 27.07	$ 32.32	$ 32.32
% change		*33%*	*142%*	*36%*	*19%*	*0%*
Alternative 2						
Water Unit Cost	$ 4.64	$ 4.84	$ 22.96	$ 22.96	$ 22.96	$ 22.96
% change		*4%*	*375%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 6.18	$ 8.25	$ 17.34	$ 40.61	$ 41.62	$ 41.62
% change		*33%*	*110%*	*134%*	*2%*	*0%*
Alternative 3						
Water Unit Cost	$ 4.64	$ 4.85	$ 23.69	$ 23.69	$ 23.69	$ 23.69
% change		*5%*	*388%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 6.18	$ 9.08	$ 43.22	$ 43.22	$ 43.22	$ 43.22
% change		*47%*	*376%*	*0%*	*0%*	*0%*
Alternative 4						
Water Unit Cost	$ 4.64	$ 4.85	$ 23.72	$ 23.72	$ 23.72	$ 23.72
% change		*5%*	*389%*	*0%*	*0%*	*0%*
Wastewater Unit Cost	$ 6.18	$ 9.08	$ 42.95	$ 42.95	$ 42.95	$ 42.95
% change		*47%*	*373%*	*0%*	*0%*	*0%*

Table 70: Randleman Projected 5,000 Gallon Combined Monthly Bill

Combined Monthly Bill	2026 *Projected*	2030 *Projected*	2035 *Projected*	2040 *Projected*	2045 *Projected*	2050 *Projected*
"Go-It-Alone"	**$ 97**	**$ 105**	**$ 411**	**$ 411**	**$ 411**	**$ 411**
% change		*8%*	*291%*	*0%*	*0%*	*0%*
Alternative 1	**$ 97**	**$ 116**	**$ 402**	**$ 458**	**$ 500**	**$ 500**
% change		*19%*	*248%*	*14%*	*9%*	*0%*
Alternative 2	**$ 97**	**$ 116**	**$ 377**	**$ 560**	**$ 568**	**$ 568**
% change		*19%*	*226%*	*49%*	*1%*	*0%*
Alternative 3	**$ 97**	**$ 122**	**$ 588**	**$ 588**	**$ 588**	**$ 588**
% change		*26%*	*381%*	*0%*	*0%*	*0%*
Alternative 4	**$ 97**	**$ 122**	**$ 586**	**$ 586**	**$ 586**	**$ 586**
% change		*26%*	*380%*	*0%*	*0%*	*0%*

5.9.5. Identified Support Requirements

Outside funding support, often sourced from state and federal grants or negotiated in partnerships, is recommended within the financial analysis to offset capital costs that would otherwise impose an unreasonable burden on local ratepayers. Given the State Legislature's expressed preference for regional solutions, this analysis conservatively assumes the "Go-It-Alone" scenario receives no external funding while regional alternatives are positioned to secure and leverage substantial outside financial support. By reducing the net project financing required from the utility, this support effectively lowers the total Revenue Requirement and stabilizes the unit cost of service, ensuring that essential infrastructure upgrades can proceed without forcing unsustainable or massive rate increases upon the community. Randleman has been identified to require outside funding support in all Alternatives. Table 71 exhibits the amount of outside funding support identified by alternative.

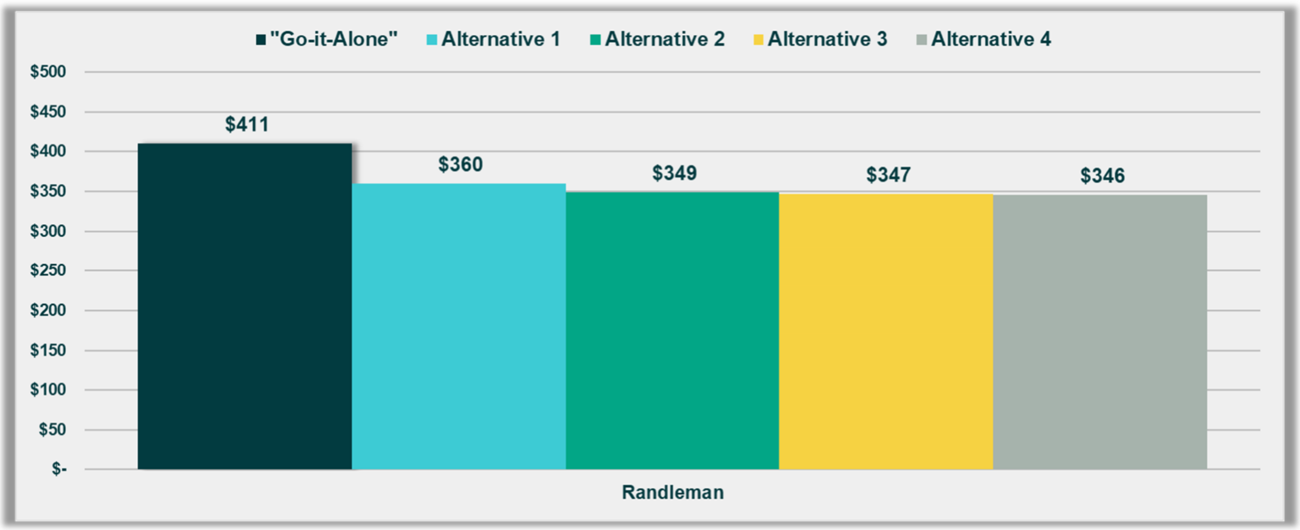
Table 71: Randleman Identified Outside Funding Support

Decsription	Amount of Outside Funding Support
Alternative 1	**$ 83,666,140**
Alternative 2	**$ 134,345,272**
Alternative 3	**$ 124,499,340**
Alternative 4	**$ 124,461,102**

The integration of outside funding support is a crucial element in evaluating the financial feasibility and affordability of the regionalization alternatives, especially when comparing them to the inherent cost burdens of the "Go-It-Alone" scenario. For the "Go-It-Alone" Scenario, outside funding was primarily assumed to be limited to existing Randolph County allocations, offering only localized, small-scale relief.

In contrast, the preferred Alternative 4, which represents the highest degree of regional integration and strategic investment, is projected to maximize the opportunity for securing significant state and federal infrastructure grants and low-interest financing due to its regional scope and focus on efficiency. When these potential external funds are applied to the Alternatives total capital costs, the net impact on ratepayers becomes substantially more favorable. Figure 15 compares the "typical" 5,000-gallon FY2050 monthly combined residential utility bill for the "Go-It-Alone" scenario to each of the Master Plan Alternatives with the identified level of funding support applied.

Figure 15: Randleman Projected FY50 Monthly Bill Comparison with Support



6. Summary of Recommendations

Based on the unit cost analysis comparing the "typical" utility bill impacts for the four regionalization alternative master plans against the "Go-It-Alone" scenario, the following strategic financial recommendations are crucial for ensuring the successful implementation of the preferred alternative plan.

- **Financial Planning:** Each individual utility should conduct detailed financial planning and rate analysis using the project costs that develop from the PTRWA Regional Alternative Master Plan. This will provide a level of detailed financial evaluation that will be comprehensive enough to provide more accurate insights to the extent in which utilities are willing to participate in various alternatives.

- **Acquire Outside Funding Support:** For any regional alternative plan to be feasible, as it pertains to the financial viability and reasonability of projected "typical" customer bills, a level of outside funding support is needed to subsidize the capital cost for the most vulnerable communities. It should be noted that outside funding support will also be required in the "Go-it-alone" scenario, otherwise vulnerable utilities will continue to defer necessary capital maintenance and improvements. While individual utilities in the "Go-It-Alone" scenario could potentially acquire grant funding, the North Carolina State Legislature has indicated a clear strategic preference for supporting regional solutions, as demonstrated by House Bill 694, which directs the UNC Environmental Finance Center to study regionalization with the intention of identifying pathways to lower the cost of utility services across the State. Therefore, for the purposes of this comparative analysis, it is conservatively assumed that the "Go-It-Alone" scenario would not receive outside funding support, while a regionalization Alternative would likely be positioned to receive and leverage a higher level of external financial assistance. Table 72 displays the identified level of outside funding support required for each utility in each alternative plan for projected water and wastewater charges to remain reasonable in FY2050.

Table 72: Identified Level of Funding Support

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Utility Provider				
Greensboro	$ -	$ -	$ -	$ -
High Point	234,270,000	314,150,943	314,986,400	314,549,499
Archdale	-	-	-	-
Jamestown	-	-	-	-
Randleman	83,666,140	134,345,272	124,499,340	124,461,102
Asheboro	-	-	472,642,932	473,006,766
Liberty	21,600,000	33,600,000	21,600,000	21,600,000
Franklinville	9,200,000	9,200,000	9,200,000	21,944,218
Ramseur	74,900,000	77,400,000	90,500,000	156,639,995
Total: Funding Support	**$ 423,636,140**	**$ 568,696,215**	**$ 1,033,428,672**	**$ 1,112,201,580**

Acquire Outside Funding Support (cont.): Every dollar of alternative plan regional project cost for Liberty, Franklinville, and Ramseur is identified to require outside funding. The outside funding support for the designated utilities will significantly reduce the burden of the large upfront capital investment that is required in all alternative plans. The impacts the funding support will have on the FY2050 "typical" water and wastewater residential customer bills is shown in Figure 16 and Figure

17Figure 5. It is crucial to highlight that, with the outside funding support, Figure 17 illustrates the Guilford County utilities paying at or above the "Go-It-Alone" scenario for their alternative master plan capital projects and a majority of the Randolph County utilities paying at or below for theirs. It should be noted that Alternatives 1-4 are more expensive for Greensboro and High Point because they are acquiring more wastewater capacity than in the "Go-It-Alone" scenario. The "Go-It-Alone" scenario does not address the full future wastewater demands for the region.

Figure 16: Projected FY50 Monthly Bills by Alternative with Support (5 kgal)

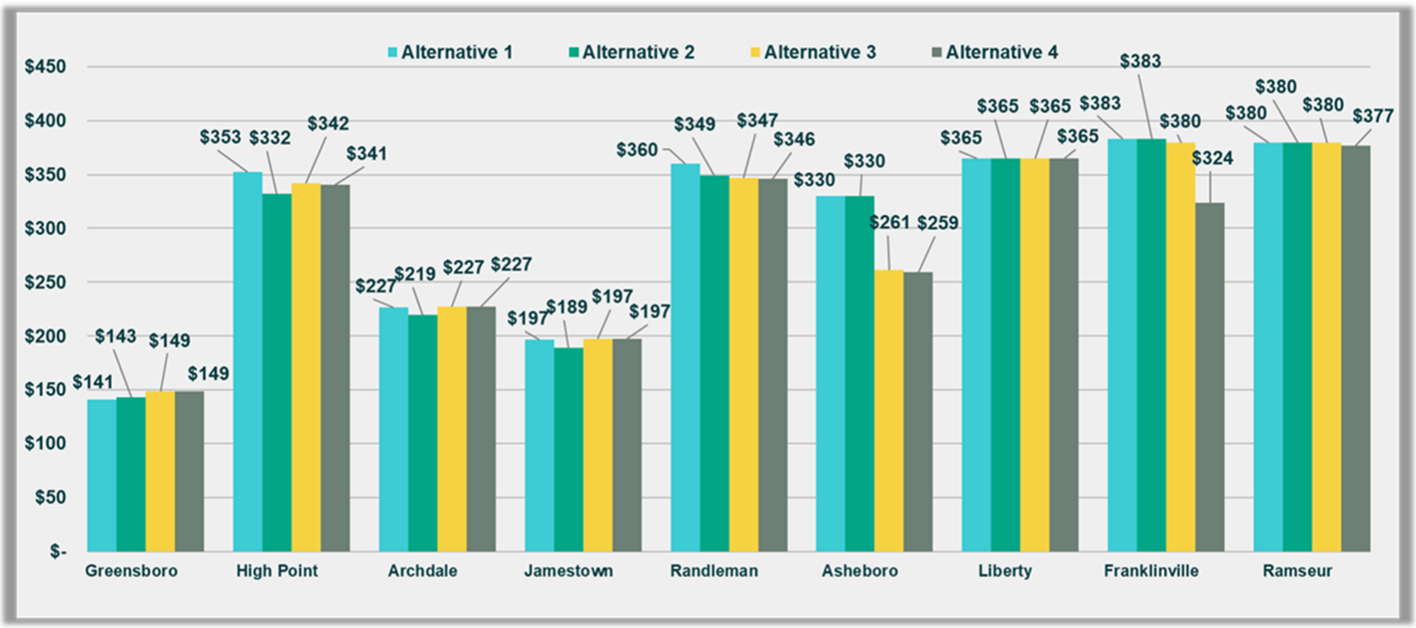
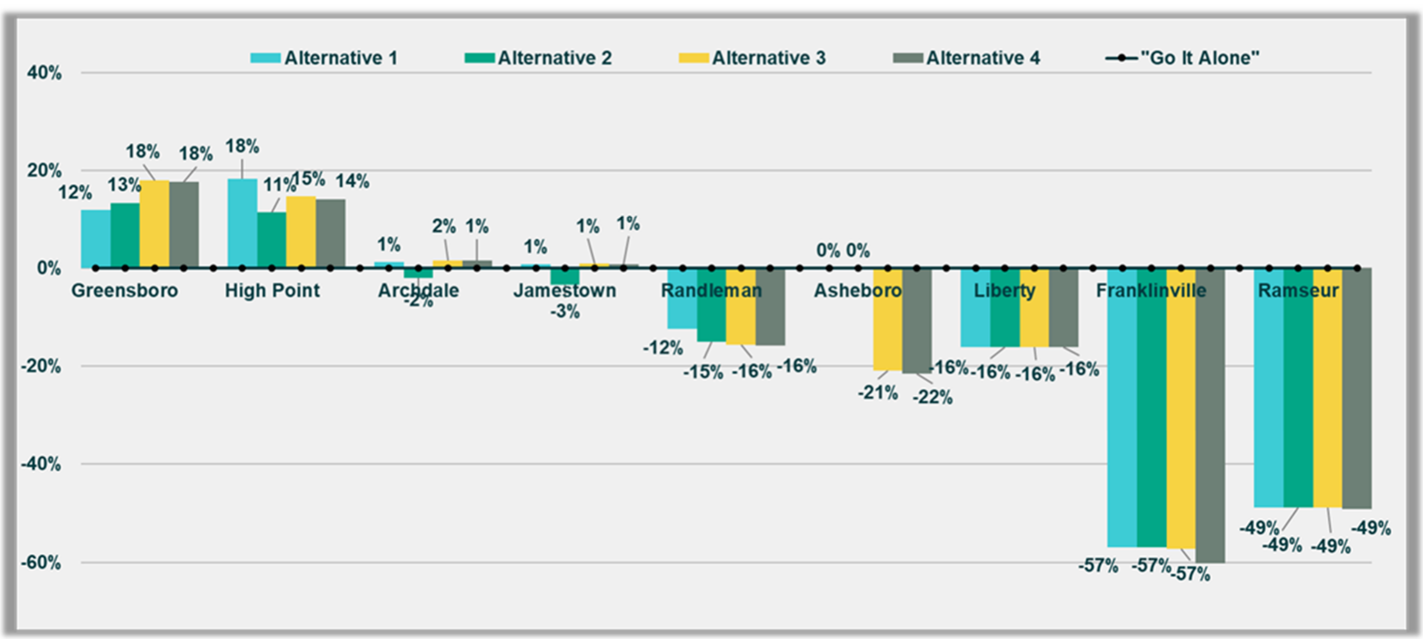


Figure 17: Alternative Plans with Support vs. "Go-It-Alone" FY50 Monthly Bills % Difference



*The "Go-It-Alone" scenario does not address the full wastewater demands for the region through 2050

- **Pursue Alternative Plan:** Each of the nine utilities will need to work with PTRWA and/or the planned utility provider to begin the engineering, financial, and governance processes for the implementation of the selected alternative plan. Communication of financial objectives and challenges will be key to the success of Guilford and Randolph County water and wastewater regionalization efforts.

- **Explore Additional Regionalization Solutions:** The PTRWA Master Plan alternatives present regional solutions in the framework of wholesale water and wastewater capacity allocations, as is currently the model for water treatment at PTRWA. Other formal partnerships such as interlocal agreements for purchasing treatment or contracting of infrastructure management can alleviate the high cost of maintaining and operating a full utility system, especially for the communities that lack the economies of scale to effectively do so. If a stakeholder's primary regional objective is to achieve regional rate parity with peers, consolidation of the of utility services is the most practical regional solution.