

# Newton County Strategic Water Plan

## Forecasts and Capacity Evaluations



Newton County Water Resources Department  
Newton County Water & Sewerage Authority

May 14, 2019



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Prepared For

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**Newton County Water & Sewerage Authority**

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Prepared by



# Executive Summary

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Newton County Water Resources Department and the Newton County Water & Sewerage Authority (NCWSA) have jointly undertaken this Newton County Water System Strategic Plan - a proactive and inclusive process to assess the needs of the systems that rely on the water resources and infrastructure of Newton County.

The Newton County Water Resources Department owns and operates the water supply sources and treatment facilities for the County, which includes the Cornish Creek Reservoir and Water Treatment Plant (WTP). The Water Resources Department also operates the Williams Street WTP, which is owned by the City of Covington. The NCWSA, which purchases water from Newton County, distributes this water to its customers in the unincorporated portions of Newton County and conveys water to the cities within the County as well as wholesale customers located outside the County, including the following:

- City of Covington
- City of Mansfield
- Town of Newborn
- City of Oxford
- City of Porterdale
- Wholesale customers:
  - Alcovy Shores Water & Sewerage Authority
  - Jasper County Water & Sewerage Authority
  - Walton County Water Department

In addition to drinking water, several of the cities and the NCWSA share wastewater treatment facilities. The City of Covington and NCWSA each own and operate a water reclamation facility (WRF) to which Oxford and Porterdale convey wastewater flows for treatment. The NCWSA and Covington jointly own a land application system for effluent management. NCWSA is in the process of constructing a new WRF that will discharge to the Little River, part of the Oconee River Basin, to which Mansfield also has a stream discharge from the Mansfield wastewater treatment facility.

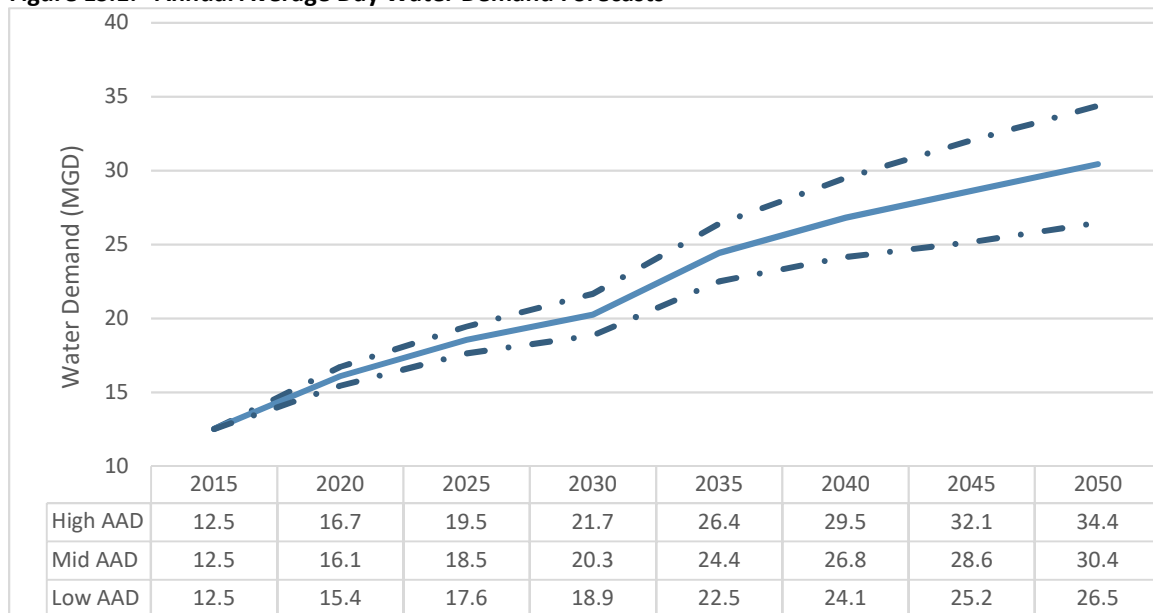
Because the Cities, County and NCWSA share water resources, it is important to work together to develop a long-term view of water supply and treatment needs as well as capacity for wastewater. This Strategic Water System Plan provides an opportunity to capture the vision for growth for service provider and develop future water demands and wastewater flows to identify capacity shortfalls and future needs to support continued economic health.

Overall, the population of Newton County is anticipated to nearly double by 2050 to 195,000 people. Businesses, schools and services will also grow over the planning period to support that population. In addition, Covington-Newton County economic development has actively sought

out new employers for the County with success, attracting large industries such as biopharmaceuticals, data centers and movie studios/production. Several large acreage tracts are identified for targeted industrial development in the eastern portion of the County. Each City and the County was asked to provide input to the planning process by sharing future land use plans and/or comprehensive plans for longer term concepts of growth and development.

Water demand forecasts were developed for each service provider based on population forecasts, planned growth and targeted developments. The water demands for the wholesale customers, Walton County, Alcovy Shores and Jasper County Water & Sewerage Authorities, were provided by representatives for each of these utilities. The water demand for Newton County and its wholesale customers is presented in Figure ES.1. As seen, the middle forecast, the most likely, is expected to increase from 12.5 million gallons per day (MGD) in 2015 to 30.4 MGD in 2050, which is more than doubling over the planning period due primarily to the anticipated industrial growth.

**Figure ES.1: Annual Average Day Water Demand Forecasts**



Comparing the available water supply and treatment to the forecasted water demands is known as a gap analysis. The difference in the values indicates whether additional water supply or treatment capacity is needed over the planning period.

Based on the gap analysis Based on this analysis, Newton County has adequate water supply and the ability to construct adequate water treatment capacity to 2050 and possibly beyond. Walton County has adequate water supply capacity for well beyond 2050 but needs additional water treatment capacity in the near-term. Both Newton County and Walton County have worked together to provide water to customers for many years in a mutually beneficial arrangement; continuing that cooperation and collaboration allows both utilities to have adequate water supply and treatment through the planning horizon and beyond.

Wastewater flow forecasts were also developed for the sewer service providers in the County, which includes NCWSA, Covington, Mansfield, Oxford and Porterdale. The county-wide wastewater flows are expected to increase from 4.3 MGD in 2015 to 13.6 MGD in 2050 on an annual average day basis. The flow forecasts indicate that the wastewater needs in Newton County will more than triple over the planning period, resulting from sewer extensions and industrial development. Over the planning period, expansions will be required at the Yellow River WRF, Covington WRF and the Land Application System. In addition, NCWSA is in the process of design and construction of the new Little River WRF with plans for it to be operational by 2022. The Little River WRF will support the targeted development in the eastern portion of the County.

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# Section 1. Introduction

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Newton County is comprised of several water and wastewater service providers who share the County's water resources. The Newton County Water Resources Department owns and operates the Cornish Creek Water Treatment Plant (WTP) and operates the Williams Street WTP, which is owned by the City of Covington.

The Newton County Water & Sewerage Authority (NCWSA), which purchases water from Newton County to distribute to its customers in the unincorporated portions of Newton County and conveys water to the cities within the County as well as wholesale customers located outside the County.

The cities of Covington, Mansfield, Newborn, Oxford, and Porterdale, located within Newton County, provide water service to customers within each City's service area. In addition, Walton County Water Department (Walton County), Jasper County Water & Sewerage Authority and Alcovy Shores Water & Sewerage Authority also purchase water from Newton County. Each of these systems have interconnected distribution systems with master meters to track the amount of water used within their service boundary.

NCWSA and the Cities of Covington, Oxford and Porterdale also have independent wastewater collection systems and shared treatment and effluent management systems. The City of Mansfield owns and operates a wastewater treatment facility that provides service to its customers.

With the sharing of water resources and infrastructure, it is important to consider the combined needs and plan for future infrastructure to meet those needs. The first step in developing the overall strategic plan is to establish the future needs based on each service providers vision for growth and expansion. The water demands and wastewater flow forecasts for each system is developed through 2050 and presented in this report.

# Section 2. Population Projections

Each connected system is a wholesale customer of Newton County and obtains delivery of this water via the water distribution network operated by the NCWSA. With all the systems relying on the same water supply source and water treatment facilities, as well as discharging wastewater to a shared watershed, this strategic plan provides an ideal opportunity for the systems to discuss challenges and opportunities to meet the future needs of each represented system. To facilitate the discussions, meetings are scheduled to present results from the planning process and provide an opportunity for input and feedback.

In 1997 the Georgia State Legislature passed House Bill (HB) 489 that requires counties and cities to develop a Service Delivery Strategy (SDS) to prevent overlap and duplication of services. The cities within Newton County, as well as the County and the NCWSA established a SDS for various services, including water and sewer service. The SDS defines service area territories for each water and sewer provider within the County. The agreement can be amended and revised; Newton County and its cities have revised the SDS in 2002, 2006 and 2010. The current SDS for water and sewer service areas are shown in Figure 2.1A and 2.1B along with the city limits.

**Figure 2.1A: Water Service Areas**

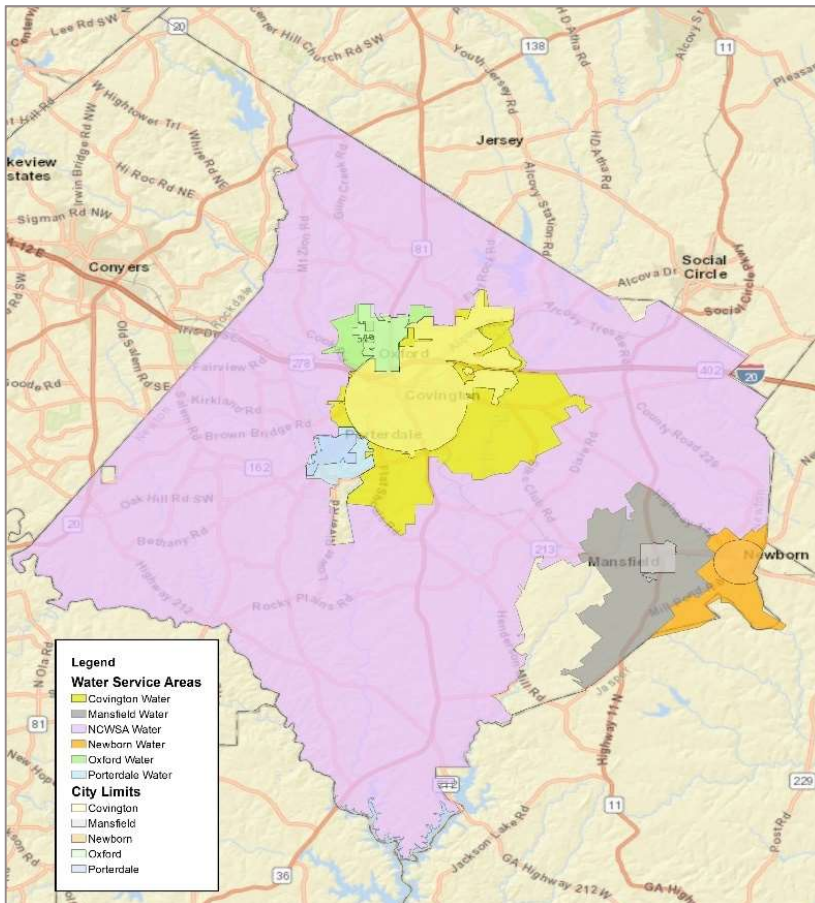
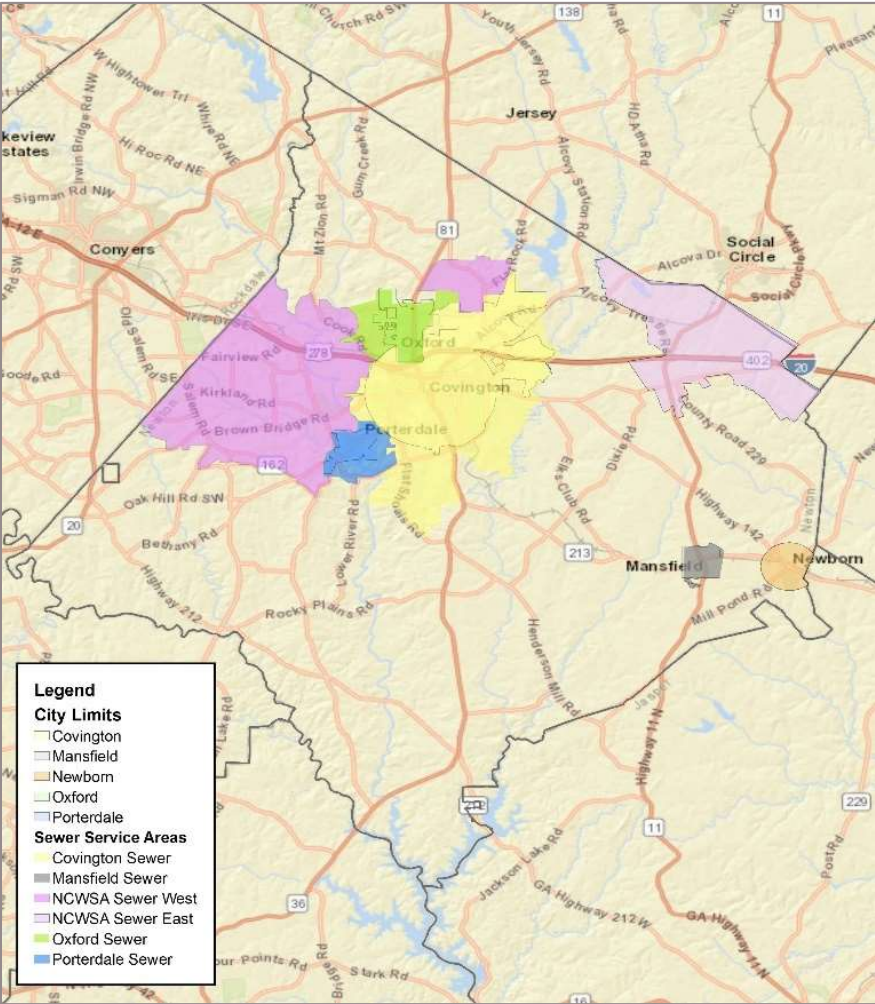




Figure 2.1B: Wastewater Service Areas



### Future Growth and Development Plans

As an initial step in the planning process, meetings with each system as well as planning agencies were conducted to obtain City or system-specific insights into future growth plans and visions. The County and the Cities define this future vision in a Comprehensive Plan and Future Development Map that is updated every 10 years. To gain additional context on plans for growth for each service area, meetings were held with representatives from the following:

- Newton County Development Services
- Covington Planning and Zoning
- Newton County-Covington Economic Development
- City of Oxford
- Town of Newborn
- City of Mansfield
- City of Porterdale
- Alcovy Shores WSA
- Jasper County WSA
- Walton County

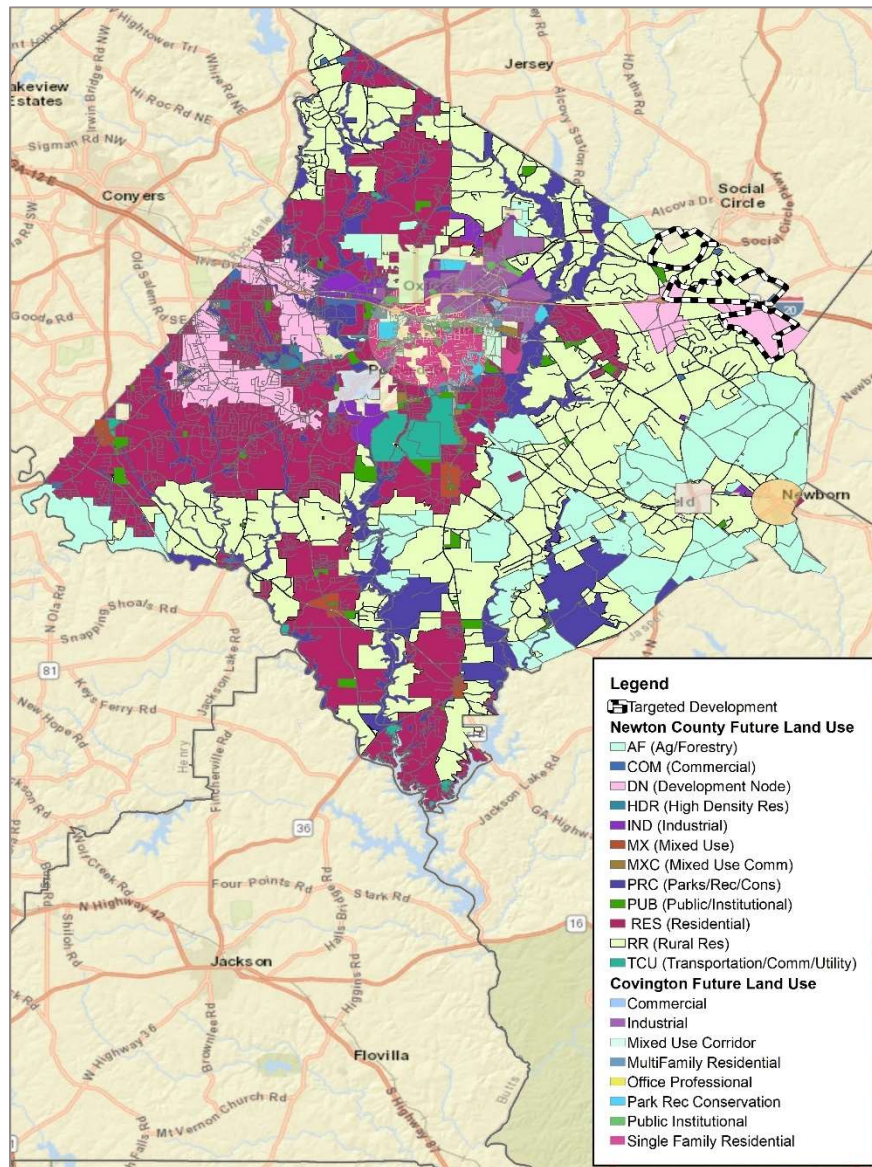
A brief summary of future development plans is presented below:

**Newton County** updated its Comprehensive Plan in 2018, providing the basis for future planning for the County. The Comprehensive Plan indicates higher density residential growth in the western portion of the County, near Rockdale County, which is consistent with current development trends. East of Hwy 11 and south of Hwy 278, residents desire to maintain the rural character. From discussions with the Newton County-Covington Economic Development director, the County has identified three mega-sites for targeted development in the I-20 corridor near Walton and Morgan Counties. These mega-sites are well suited for large industrial developments; the preferred industry types are automobile manufacturing, bio-pharmaceuticals and/or data centers. Ancillary adjacent development is needed to support these industries, such as hotels, training/conference centers and restaurants. Figure 2.3 presents the location of the proposed mega-sites and planned commercial and industrial development.

**City of Covington** also updated its Comprehensive Plan in 2018, providing a plan for growth and development within the City. The City (and the County) have enjoyed renewed interest as a location for the film industry. To accommodate and encourage the film industry, the County and the City are jointly working to develop studio infrastructure, under the working name of Three Ring Studios. The entertainment media site, located near the Covington airport and downtown, would be developed over 700 acres and provide sound stages and other support services for the film industry. Based on the Comprehensive Plan and conversations with the Planning Department, there is a move towards multifamily residential infill, with mixed use being the preferred development type, particularly the midrise type apartment with lobbies and commercial support services located in the building. The City does not anticipate large water using industries to locate within the City.

Figure 2.2 presents the future land use map for Newton County and the City of Covington along with areas of targeted development. Note the pinks and purples on the map indicate areas for future industrial and development nodes. The reds indicate higher density residential while the yellows and greens show areas where rural residential and agricultural is planned. Generally, the higher density residential development is located on the western side of the County.

Figure 2.2: Future Land Use and Targeted Development Areas



**City of Mansfield** updated its Comprehensive Plan in 2016. The historic downtown area is undergoing renovations and updates, providing opportunities for retail and restaurants to locate in the area. Growth opportunities in the County in the Stanton Springs area near I-20 may have implications for the City as the employees look for a community in which to live.

**Town of Newborn** is currently updating its Comprehensive Plan. The town has a quaint downtown area, with opportunities for retail, including a recently located Dollar General just outside of the downtown area. Newborn plans to remain a residential community and is focused on preserving its historic character.

**City of Oxford** adopted its 2018 Comprehensive Plan Update in February 2018. The City of Oxford is home to Emory University's Oxford College, which has a campus population of approximately 1,000 students and 1,100 faculty and administrative staff. The City of Oxford has

a residential community feel which it desires to maintain. Limited commercial growth is anticipated over the planning period.

**City of Porterdale**, formerly a mill town, is experiencing regentrification as the old mill was purchased and renovated into lofts overlooking the Yellow River. The residential development spurred commercial and retail development. Additional retail and restaurant development is anticipated for the City along with additional residential growth. The City updated its Comprehensive Plan in 2016.

**Alcovy Shores Water & Sewer Authority** provides water service to a residential community, Alcovy Shores, located on Jackson Lake just inside Jasper County as well as a commercial customer just outside the entrance to the development. The Alcovy Shores community is fully built out. In 2017, the Alcovy Shores WSA had 277 active customers. According to the water system permit conditions, a maximum of 285 service connections are allowable without approval by GA EPD. As a result, Alcovy Shores Water and Sewer Authority expects its water demands to remain relatively unchanged over the planning period.

**Jasper County Water & Sewer Authority** purchases water from Newton County to provide water to residential customers. Jasper County WSA does not anticipate any significant changes in growth or water demands over the planning period.

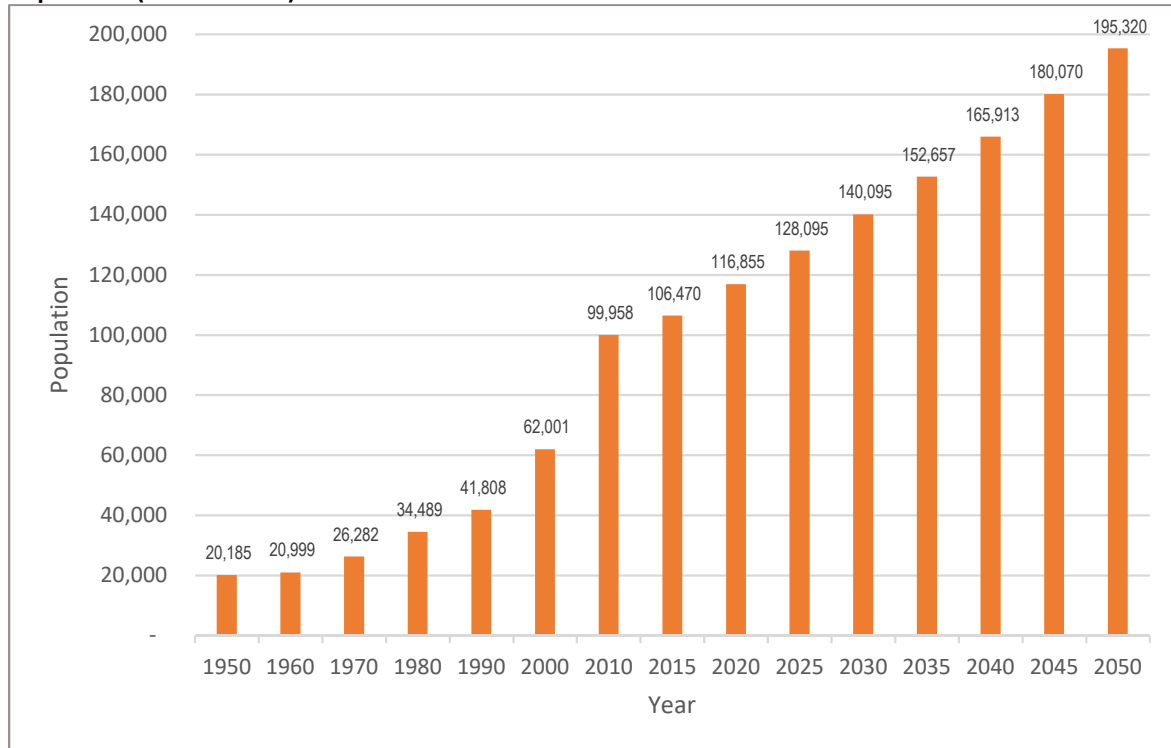
**Walton County Water Department** has a contractual agreement with Newton County Water Resources Department for a maximum of 25% of the Cornish Creek WTP capacity, which is currently 6.25 million gallons per day (MGD). Walton expects primarily residential growth but has also included a reserve capacity in water demands to allocate a portion of water for economic development initiatives.

## Population Growth

Anticipated population growth is an important element for consideration in developing water demands and wastewater flow forecasts. Residential and commercial water demands and wastewater flows are directly related to the population served. Industrial water demands and wastewater flows are related to the type of manufacturing and production process and is considered separately.

Historical population data from the 1950 to 2010 decennial census were obtained, along with population forecasts from 2015 to 2050, developed by the Georgia Office of Planning and Budget (OPB). The historic and projected populations for Newton County are presented in Figure 2.3.

**Figure 2.3: Newton County Population: Historic U.S. Census Population (1950-2010) and OPB Projected Population (2015 to 2050)**

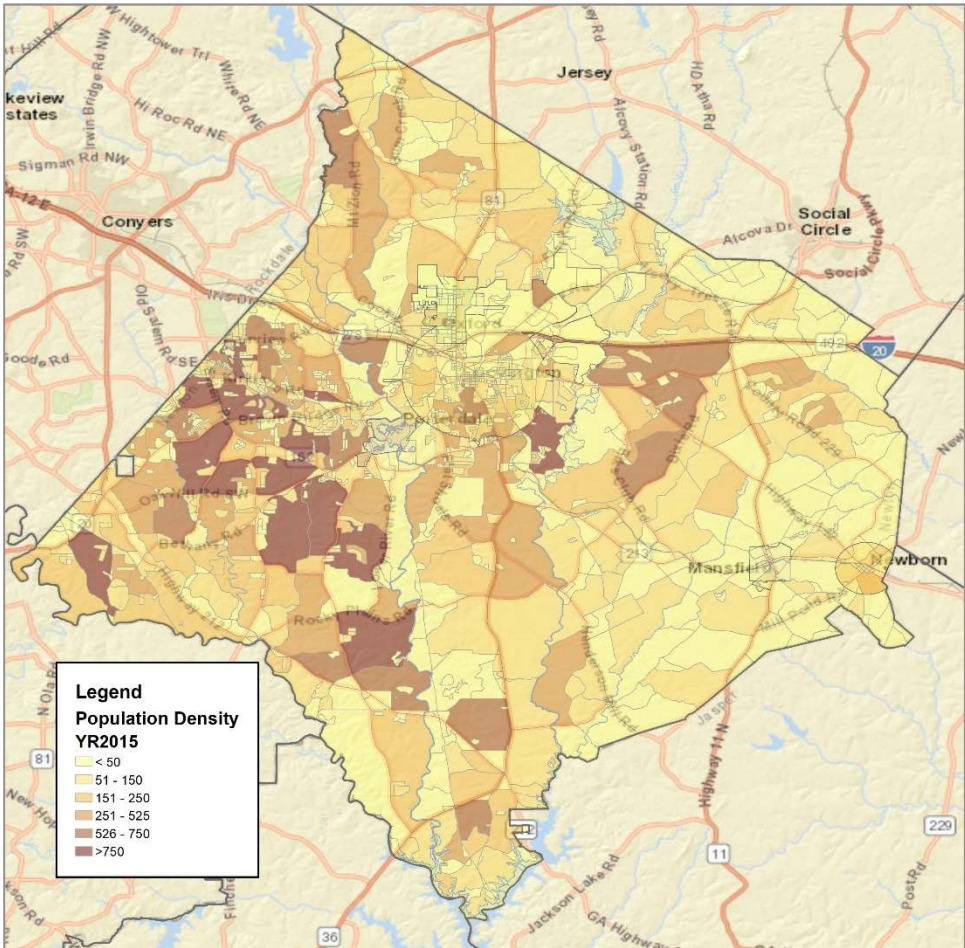


As seen in Figure 2.3, the most dramatic population change occurred between 2000 and 2010 when a 60% increase in the population occurred. With the economic downturn that began in 2008, the population growth has slowed, but is still robust. The housing market is strong, and the County enjoys the lowest unemployment rate in the State of Georgia. Over the planning period, the growth rate is expected to be steady with the population nearly doubling.

While the overall population forecasts are important, it is also vital for infrastructure planning to identify where people are located and will be located within the county. Geospatial population data was obtained for census blocks within Newton County from the U.S. Census Bureau. The Census Block Group data can then be aggregated into City Limit boundaries, water and wastewater service area boundaries and watershed basins based on United States Geologic Survey (USGS) Hydrologic Unit Code basin delineations (HUC-12 boundaries). From discussions with the Newton County Development Services Director, the population distribution among census blocks within the County has remained stable for the past three census counts. Based on this observation, it was assumed that the future population distribution would be the same as current.

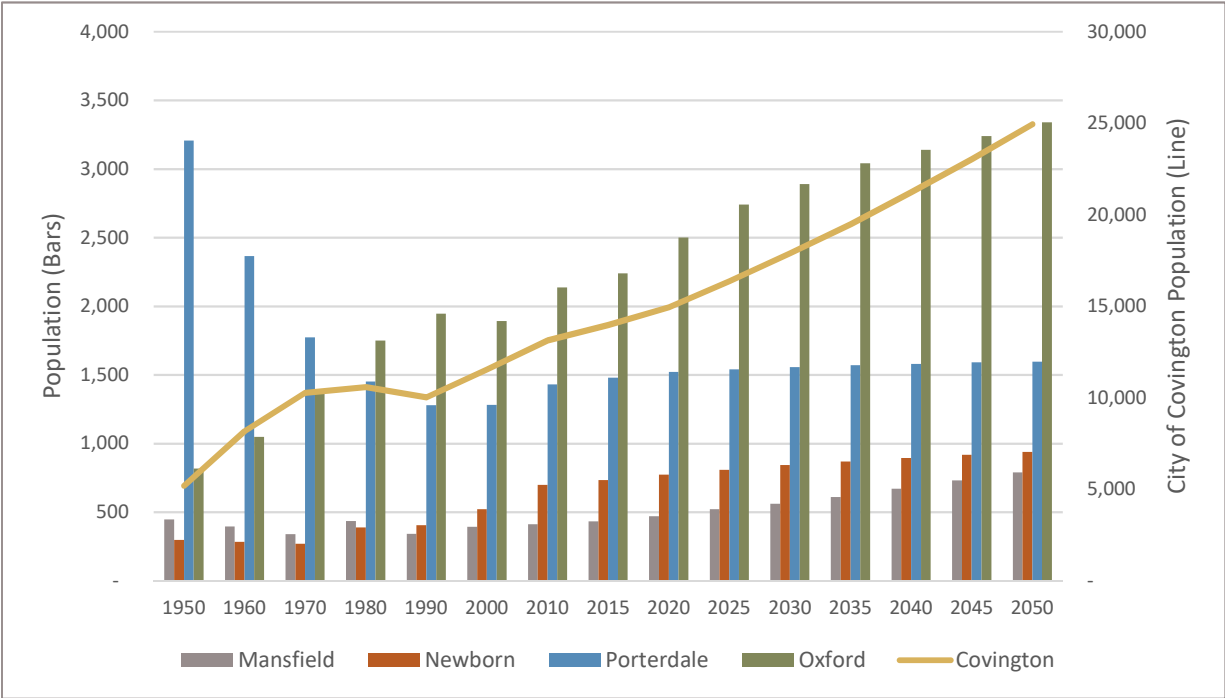
Figure 2.4 presents the population distribution for the County in 2015; the darker shades indicate higher population counts while the lighter shades indicate more rural development and fewer people.

Figure 2.4: Population Distribution in Newton County



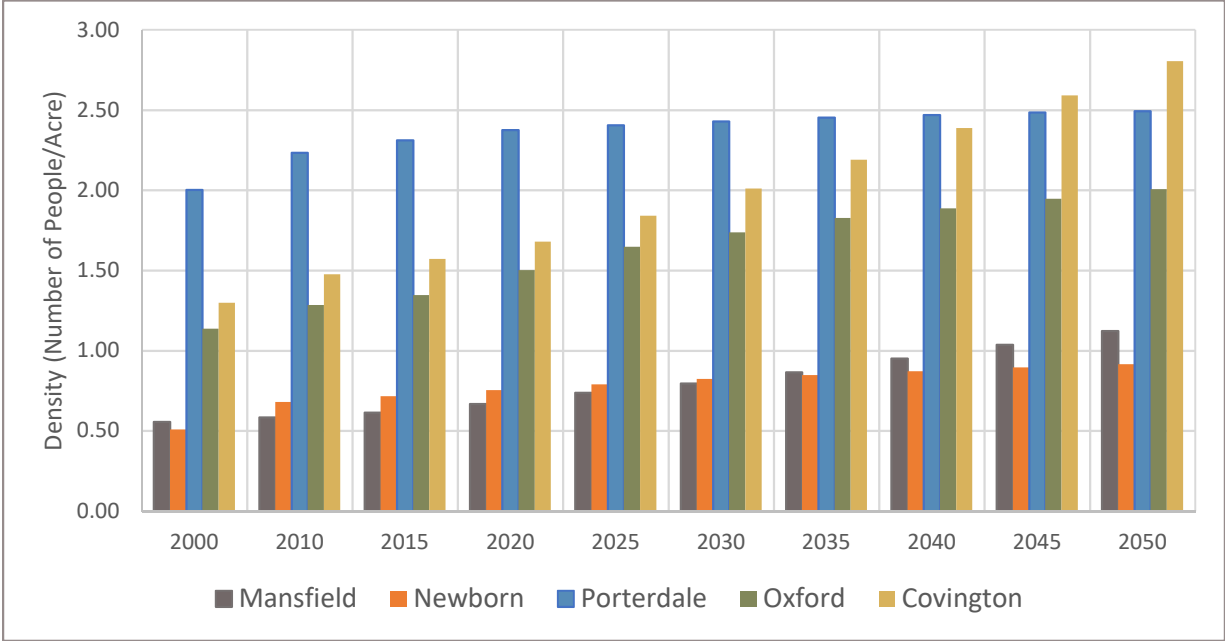
The population within the City Limits of each city within Newton County was obtained from the U.S. Census Bureau for years 1950 through 2015. Using GIS tools, and census block data, the population within each city was estimated for timesteps from 2015 through 2050. The population within each City is presented in Figure 2.6 for years 1950 through 2050. As seen in Figure 2.5, the population of Porterdale has an interesting change with a significant decline following the closure of the textile mills and a rebounding of population following the redevelopment of the mill into loft apartments. The population of Covington and Oxford are growing at the fastest rate.

Figure 2.5: Population Projections within Cities of Newton County



The population density was calculated for each City to assess whether the projections make sense. Figure 2.6 presents the population density for each city. The City of Covington is forecast to have a density of 2.5 to 3 people/acre in 2050; this density is similar to a McDonough or Newnan, GA demographic, which seems reasonable for Covington. Porterdale also has a higher population density, due to its smaller corporate boundary. The lower densities in Mansfield and Newborn are reasonable for the types of current and expected development.

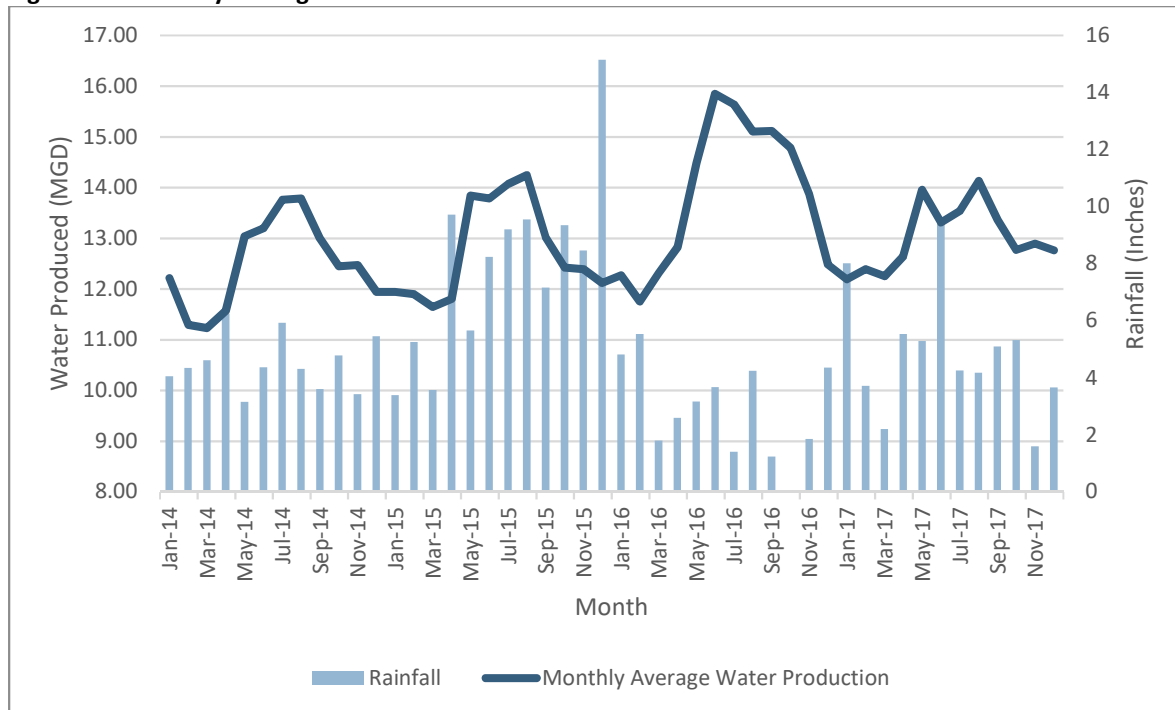
Figure 2.6: Population Density



# Section 3. Water Demand Forecasts

To forecast the water demands, system data is reviewed to develop metrics of water consumption. Newton County Water Resources Department provided water production data for the previous four years (January 2014 through December 2017). This data is presented in Figure 3.1 along with historical rainfall. As seen in the chart, 2016 was a dry year, which tends to increase water demands; while, 2015 was a wet year. Years 2014 and 2017 had near average rainfall amounts.

**Figure 3.1: Monthly Average Water Production and Rainfall**



From this data set, historical annual average day and maximum day water demands are obtained. The maximum day to annual average day ratio is an important factor for sizing water treatment and distribution systems. The water production data summary is presented in Table 3.1.

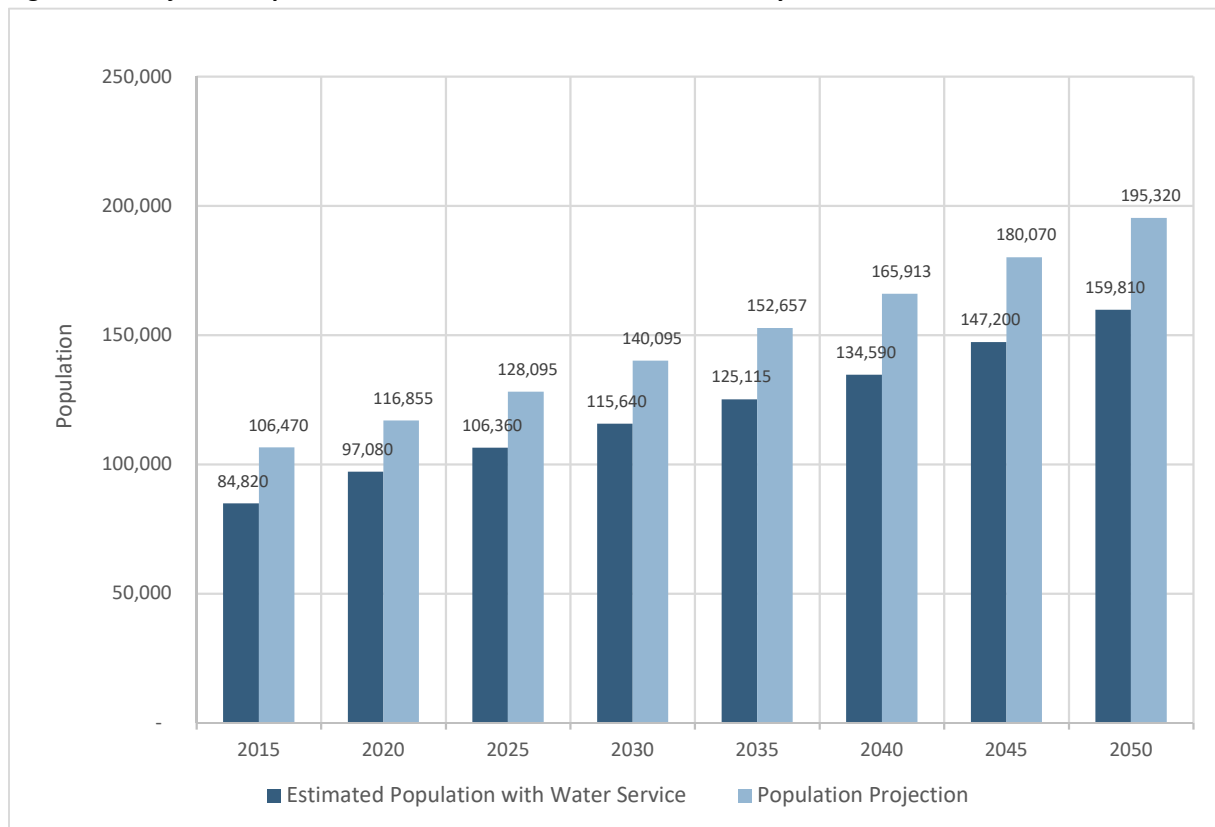
**Table 3.1: Water Production Summary**

	2014	2015	2016	2017
Maximum Day (MGD)	15.55	16.29	17.80	15.99
Average Day (MGD)	12.51	12.77	13.88	13.02
Max Day to Average Day Ratio	1.24	1.28	1.28	1.23
Total Annual Rainfall (in)	54.3	94.7	34.6	58.5



Currently, about 80% of the Newton County population has public water service while the remaining 20% (approximately 21,000 people) are self-supplied by private groundwater wells. To anticipate future water demands an estimate of future population with water service must be developed. Based on future land use maps, the areas designated for rural agricultural land use are assumed to continue to be self-supplied. Figure 3.2 presents the estimated population with water service and self-supplied through 2050. The 2050 self-supplied population is estimated to be 35,000 people, or approximately 18%.

**Figure 3.2: Projected Population with Water Service in Newton County**



To develop water demand forecasts for NCWSA and the Cities of Newton County, statistics of water consumption based on Newton County's water production and billing rates are calculated. These statistics are then applied to the population projections to develop water demand forecasts. For wholesale customers, including Alcovy Shores, Walton County and Jasper County WSA's, the demands provided by each authority is used.

The water providers within Newton County as well as Alcovy Shores WSA provided water billing data to provide insight into the types of customers (residential, commercial, industrial, institutional) and associated usage. Data was provided for the past three to four calendar years (2014 to 2017), as available.

From this data, several key factors were calculated, including:

**Non-Revenue Water Estimate:** Water losses are unavoidable in any water distribution system, and all water systems experience some degree of water loss, or non-revenue water that results

from legitimate but unmetered uses (such as fire protection), faulty meters and leaks. The difference in what is billed versus what was supplied to the system provides an indication of non-revenue water. For the City of Covington and NCWSA, the metered amount of water purchased from Newton County was compared to the billing data on an annual basis. These two providers had the most comprehensive data sets and thus provided the best information with which to estimate non-revenue water. The average non-revenue water is roughly 16%, which is towards the low end of the typical range of 10% to 30% for water systems. A longer-term goal to reduce system water loss to 12% is recommended.

**Water Usage Rate:** Based on the water billing data and water production data, the water usage per person for all systems in the County was calculated. The total water usage per person, which includes residential, commercial, institutional and industrial customers is 99 gallons per capita per day (gpcd). The residential water usage rate is 57 gpcd.

**Residential vs. Non-Residential Customers:** From the billing data, the water usage by customer type was calculated. Based on the consumption, a ratio between existing residential and non-residential was established. Knowing this ratio provided a basis for forecasting non-residential demand with future population growth.

## Future Water Demand Forecasts for Newton County

Future residential water demands for each service provider located in Newton County was developed using a rate of 60 gpcd. This rate was multiplied by the future served population to calculate the future residential water demand.

Growth in the commercial and institutional sectors tends to correlate with the residential growth as businesses and schools are needed to provide goods and services. A ratio of water usage for residential and non-residential customers was applied to the forecast residential water use to estimate the commercial and institutional water demands.

Predicting future industrial water demands is more difficult as many factors determine whether a large industry will move to an area and the amount of water required to support the manufacturing process. For the proposed targeted development locations, or “mega-sites” in eastern Newton County, an estimate of water demands for the planned types of industry was developed based on land area. In addition to these planned mega-sites, an industrial reserve is also included in the water demands to provide Newton County’s water providers with the ability to meet future needs if an industry should desire to locate in that service area.

Another consideration in forecasting future flows is uncertainty. The closer the planning horizon is to the current time, the less uncertainty there is. However, as the planning horizon moves away from the present, more uncertainty is introduced, from weather events to economic changes, many elements impact water needs. Thus, an uncertainty factor is added to the water demand projections that increases from 4% in 2020 to 13% in 2050, which is the same factors used for the Metropolitan North Georgia Water Planning District based on a statistical analysis of variables.

The metrics used to forecast future demands are presented in Table 3.2.

**Table 3.2: Metrics for Water Demand Forecasting in Newton County**

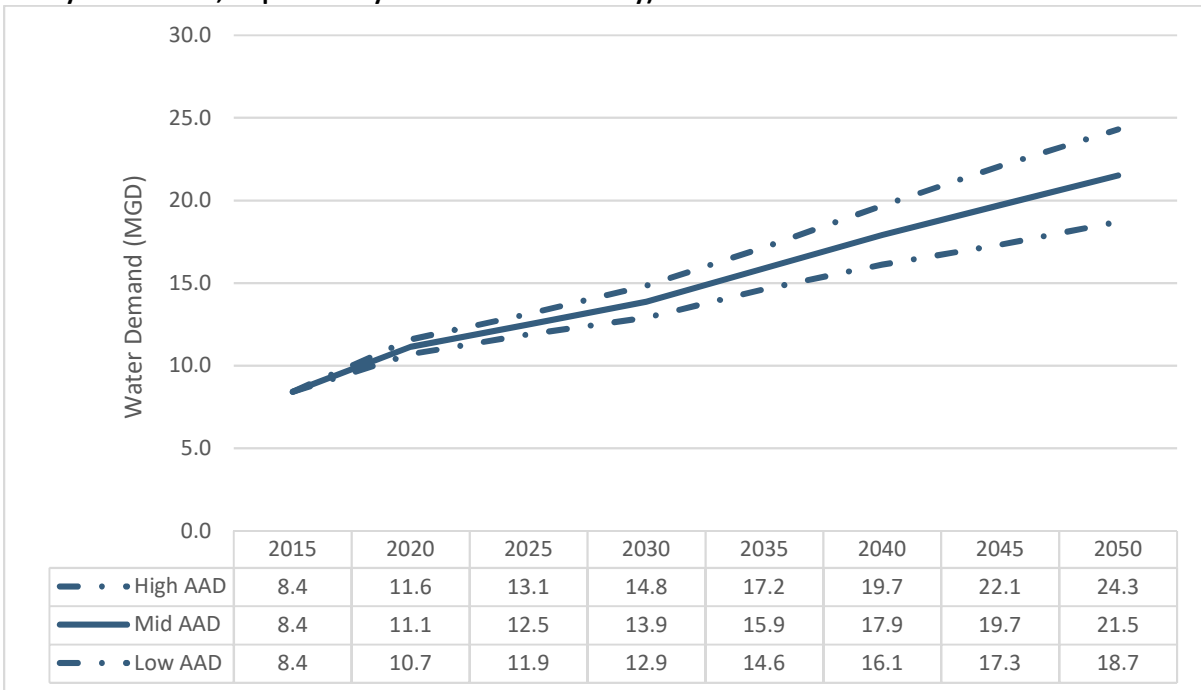
	2015	2020	2030	2040	2050
Residential Per Capita Rate (gpcd)	57	60	60	60	60
Non-Revenue Water	16%	16%	15%	14%	12%
Uncertainty Factor	-	4%	7%	10%	13%
Industrial Reserve (% of total demand)	-	15%	15%	15%	15%
Total Per Capita Rate (gpcd)	99	115	120	133	135

As seen in Table 3.2, the total per capita rate is increasing slightly over the planning period as the non-residential demands increase.

Considering population growth with associated commercial and institutional growth as well as future industry, the overall annual average water demand for all service providers in Newton County is expected to increase from 8.4 MGD to 21.5 MGD.

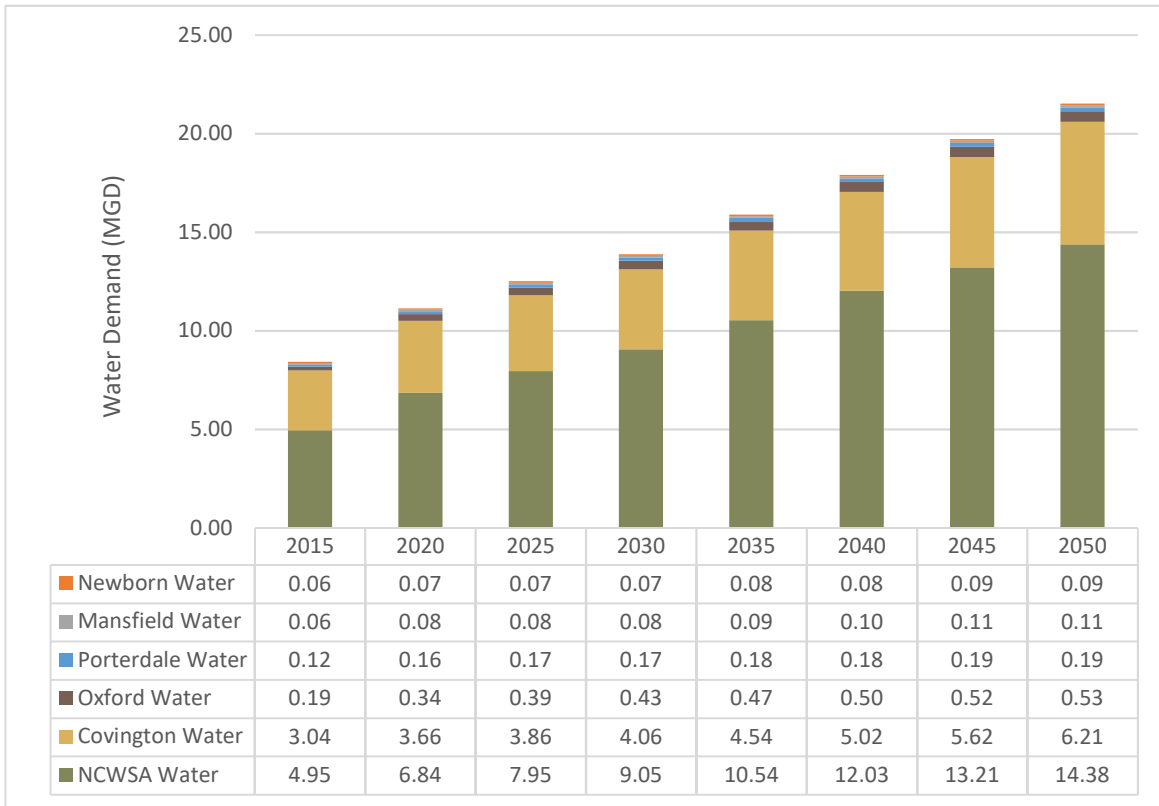
As shown in Figure 3.3, an envelope of water demand forecasts is developed to indicate the range of possible water demands over the planning period. The envelope is forecast by multiplying the projected demand by the uncertainty factor, both positive and negative, to estimate the higher and lower bounds. The middle forecast is the water demand scenario that is most expected; however, the upper and lower bounds present possible outcomes with the 2050 water demand ranging from 18.7 MGD to 24.3 MGD on an annual average day basis.

**Figure 3.3: Annual Average Day Water Demand for Newton County (does not include demand for Alcovy Shores WSA, Jasper County WSA or Walton County)**



The water demands for providers located in Newton County are summarized in Figure 3.4, based on the middle forecast annual average day.

**Figure 3.4: Annual Average Day Water Demands by Newton County Providers**



## Water Demands for Wholesale Customers

To maintain service for customers of the Newton County water system, the water demand needs for Walton County Water Department, Alcovy Shores and Jasper County Water and Sewerage Authorities (WSA) also need to be included in the forecasts for water supply. Information was provided by each Authority to support Newton County’s Strategic Water Plan; their cooperation and support is much appreciated.

**Alcovy Shores WSA** expects to maintain its current water demand of 0.03 MGD through the planning period as it is a built-out community.

**Jasper County WSA** does not anticipate much growth in the area served by Newton County. An increase in water demand was included for Jasper County WSA increasing its current annual average day demand of 0.06 MGD to 0.14 MGD by 2050.

**Walton County’s** water demand is the most complex of the three. Walton County has an agreement with Newton County Water Resources to purchase up to of 25% of the Cornish Creek WTP capacity, or 6.25 MGD. This amount can be increased if Walton County chooses to

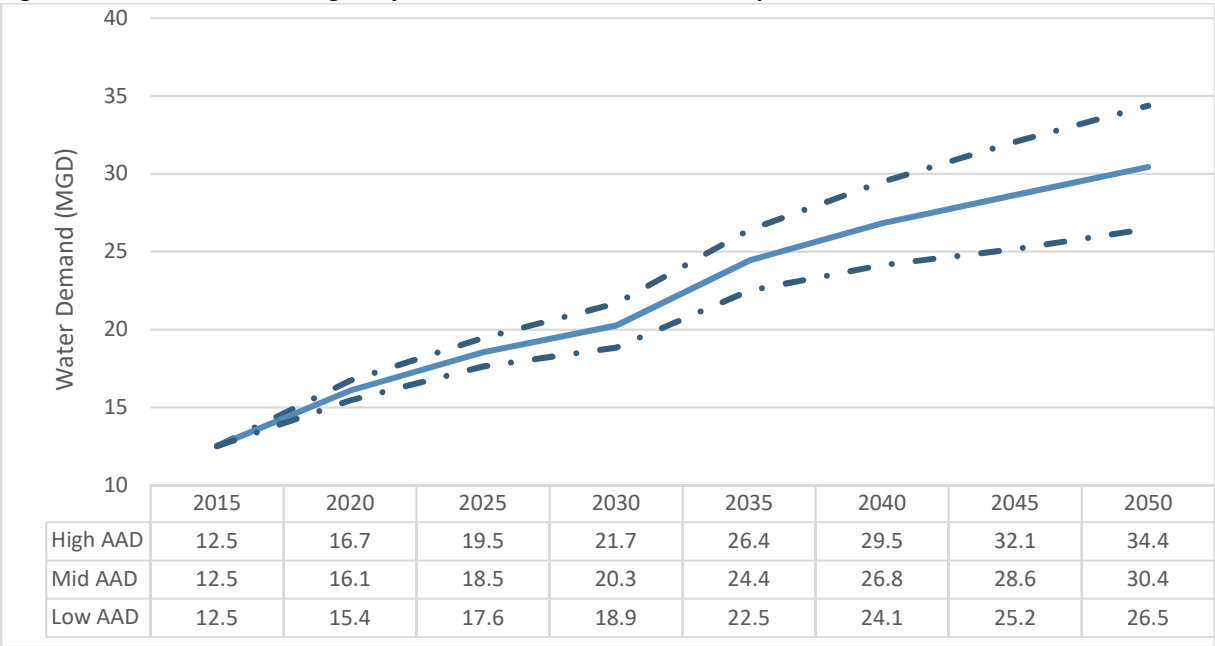
participate in future WTP expansions. Without supplemental water supply, the maximum capacity of the Cornish Creek WTP is 35 MGD, and thus the maximum water supply that Walton County could obtain from Newton is 8.75 MGD. The water demand for Walton County, provided by their engineering consultant, Precision Planning, Inc. (PPI) is provided in Table 3.3 along with the capped supply for Walton based on the contractual agreements. The contract cap assumes that the Cornish Creek WTP is expanded between 2030 and 2035 to its maximum capacity of 35 MGD without supplemental water supply. As seen in Table 3.3, Walton County's needs outpace the supply based on the capped agreement. To provide future water supplies, the Walton County recently finished construction of the Hard Labor Creek Reservoir. The balance between when to move to the new facility and how much water to purchase from Newton County is discussed in further detail in Section 4 of this document.

**Table 3.3: Walton County Water Department's Projected Water Demands**

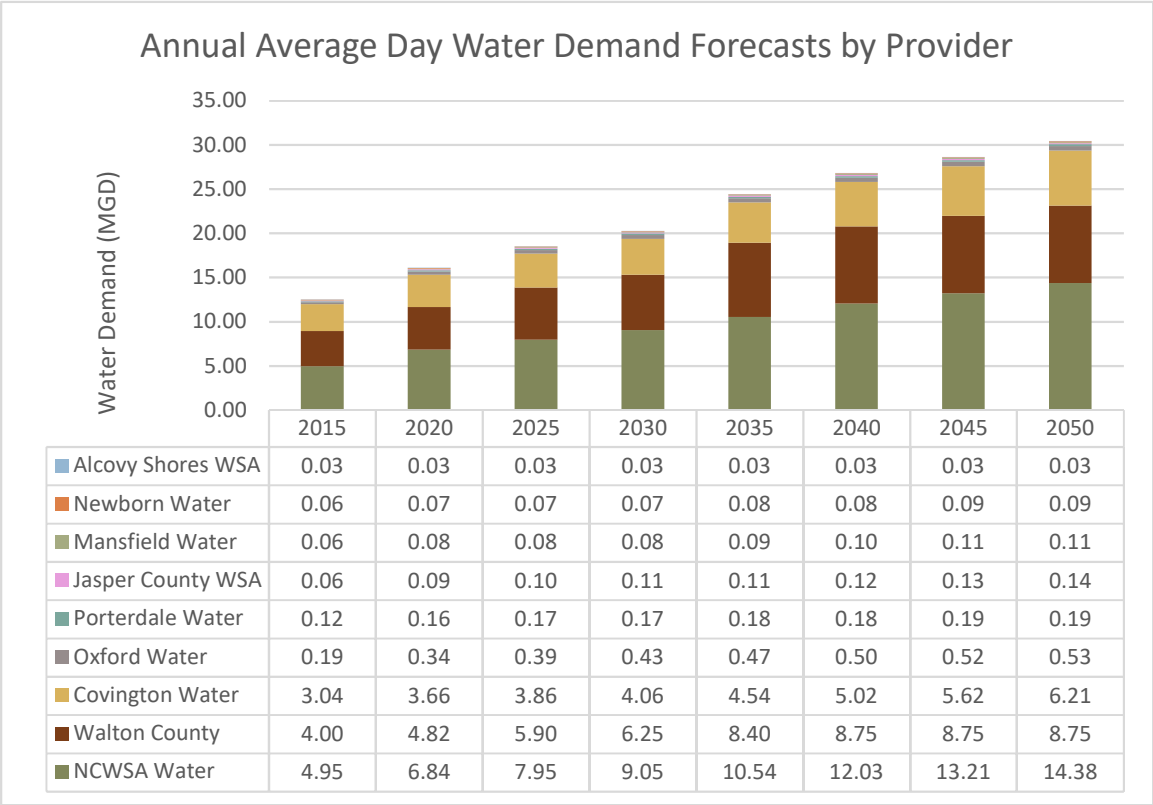
	Water Demands (MGD)							
	2015	2020	2025	2030	2035	2040	2045	2050
Annual Average Day Demand (provided by PPI)	4.0	4.8	5.9	7.1	8.4	9.9	11.6	13.4
Annual Average Day Demand supplied by Newton County with Contract Cap	4.0	4.8	5.9	6.25	8.4	8.75	8.75	8.75
Maximum Day Demand (provided by PPI)	8.1	10.7	13.1	15.8	18.8	22.0	25.8	29.8
Maximum Day Demand supplied by Newton County with Contract Cap	6.25	6.25	6.25	6.25	8.75	8.75	8.75	8.75

Including the water demands of the Newton County water providers and the wholesale customers located outside of the County, the total annual average day demand ranges between 27.2 MGD and 34.8 MGD. Figure 3.5 presents the overall water demand forecast envelope; while Figure 3.6 presents the water demand forecasts by provider.

**Figure 3.5 Total Annual Average Day Water Demand Forecast Envelope**



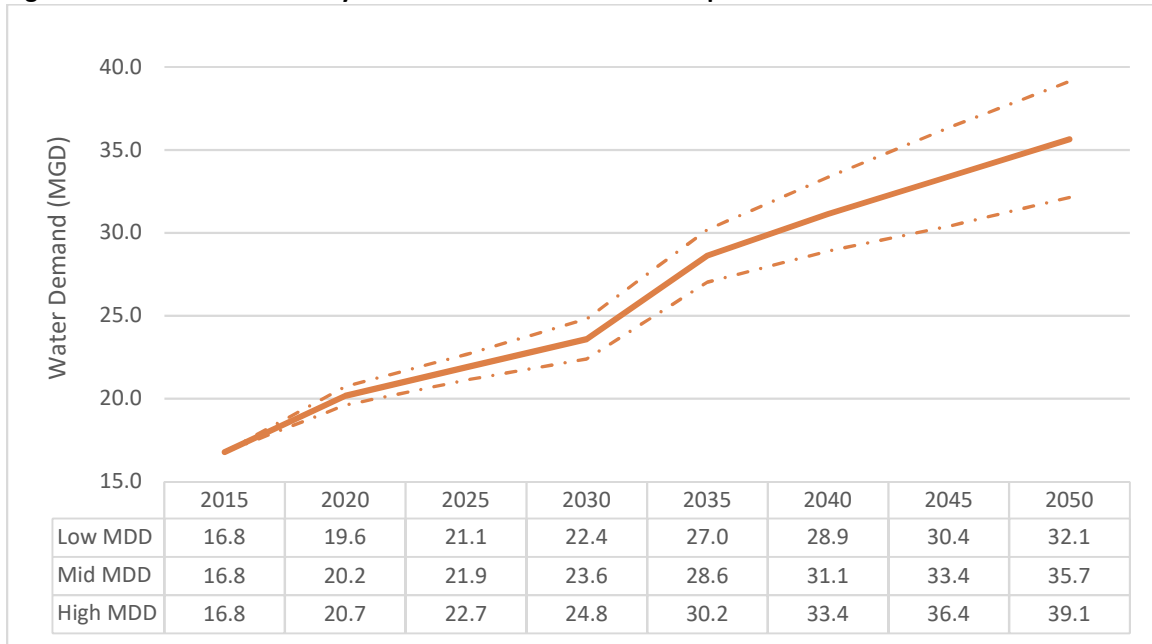
**Figure 3.6. Annual Average Day Water Demand Forecast by Provider**



An important water demand to plan for future water treatment capacity and water distribution system facilities is the maximum day water demand. Figure 3.7 presents maximum day water demand forecast envelope for all service providers, included the contractual cap for Walton

County. As seen in Figure 3.7, the maximum day water demand ranges from 32.1 MGD to 39.1 MGD, with the mid-level forecast at 35.7 MGD.

**Figure 3.7. Total Maximum Day Water Demand Forecast Envelope**

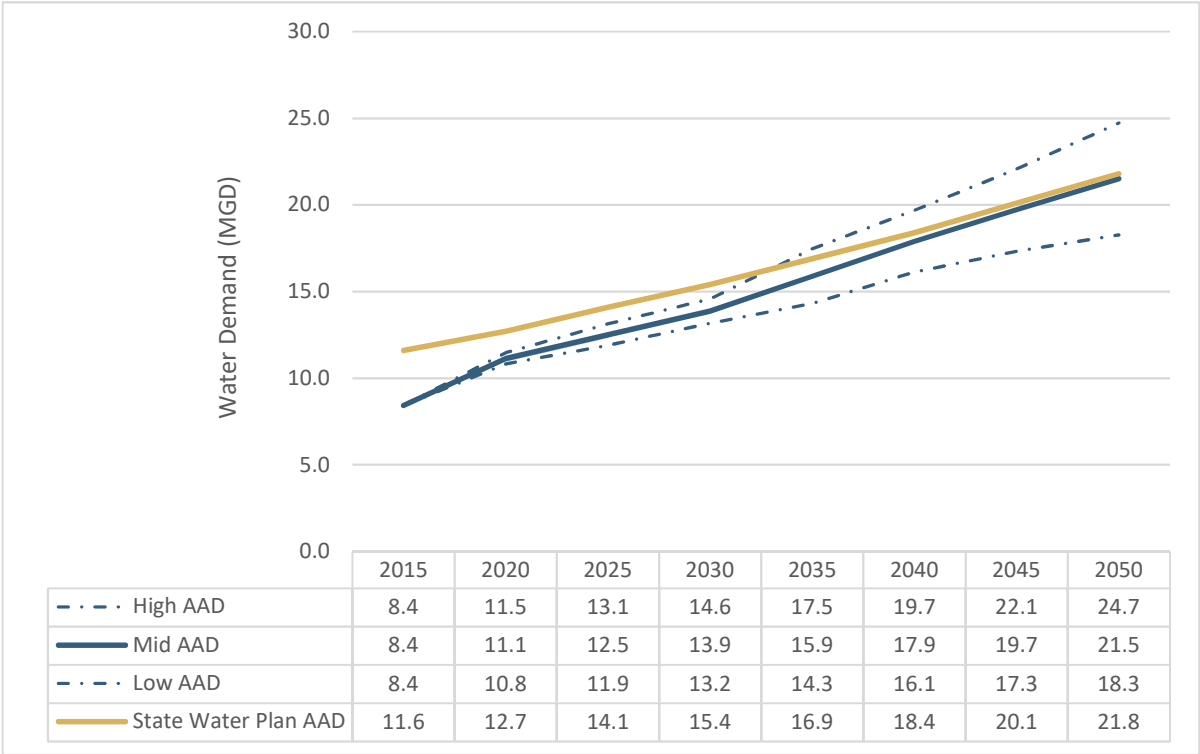


**Benchmarking Newton County’s Water Demand Forecasts**

The State of Georgia through the Georgia Environmental Protection Division (EPD) recently completed the first update to the State Water Plan. The State Water Plan creates water demand forecasts and assesses water supply and treatment capacity as well as water resources quality for each of the eight major river watersheds in the State. Newton County, primarily located in the Ocmulgee River basin with a small eastern section draining to the Oconee River basin, is a member of the State Water Plan’s Upper Ocmulgee Basin group. From the *Water and Wastewater Forecasting Technical Memorandum* dated, March 2017, the water demand forecasts are presented for Newton County. These forecasts are compared to the those independently developed in this Study in Figure 3.8. As seen in Figure 3.8, when compared to the annual average day demands generated within Newton County only (no wholesale customers), the forecasts are very similar, with the current Plan having a slightly lower forecast through the planning period. The State Water Plan did not include the water supplied to wholesale customers outside of Newton County, including Alcovy Shores, Jasper County and Walton County WSA.

When two independent studies with different methodologies result in such similar results, the confidence level of the forecasts increases. These forecasts are used for future tasks in the Strategic Plan including water supply and water treatment as well as the water distribution system evaluation.

Figure 3.8: Comparison of Water Demand Forecasts with State Water Plan Forecasts for Newton County





# Section 4. Water Supply and Treatment Capacity Evaluation

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Newton County Water Resources Department owns and operates the Cornish Creek Reservoir (also known as Lake Varner) and the Cornish Creek Water Treatment Plant (WTP). Newton County also operates the Williams Street WTP which is owned by the City of Covington and leased to Newton County. Through these facilities, Newton County Water Resources Department provides drinking water for distribution through the NCWSA and connected City systems (Covington, Porterdale, Oxford, Mansfield and Newborn) as well as three wholesale customers outside Newton County (Walton County, Jasper County and Alcovy Shores Water & Sewerage Authorities).

The Cornish Creek Reservoir is a pumped-storage reservoir with an estimated annual average day yield of 23 MGD. Although some water naturally flows into the reservoir from Cornish Creek, Little Cornish Creek and other small tributaries, most of the water is pumped from the nearby Alcovy River. Water withdrawn from the reservoir is treated at the Cornish Creek WTP. The Cornish Creek WTP is a conventional surface water treatment facility with 25 MGD current capacity, originally constructed in 1992. Water is treated and stored in clearwells from which the high service pumps deliver the water to the distribution system.

When the Cornish Creek WTP was originally initiated, an agreement was made between Newton County WRD and the Walton County Water Department. Through this agreement, the Walton County contributes to a portion of the project cost and is then eligible to obtain 25 percent of the production capacity of the Cornish Creek WTP. As part of the agreement, the Walton County has the option to participate in future upgrades to the Cornish Creek WTP to access to 25 percent of the capacity of the project; to date Walton County has participated in each upgrade. Walton County recently completed a new reservoir with the partnership of Oconee County. The Hard Labor Creek Reservoir, a pump-storage reservoir located in Walton County and obtaining water from the Apalachee River, has an estimated yield of 41.8 MGD.

Newton County WRD also operates the William Street WTP on an as needed basis; it is owned by the City of Covington and leased for operational to Newton County WRD. Most water is supplied by Cornish Creek WTP; however, during high demand periods, the Williams Street WTP is also used. The Williams Street WTP is also supplied by the Alcovy River, via a separate pump station located adjacent to the Cornish Creek Reservoir pump station. Water is pumped from the Alcovy River to City Pond for temporary storage prior to being treated, then treated water is pumped to the distribution system.

## Permits

Newton County's water withdrawal permits issued by the Georgia Environmental Protection Division (EPD) are shown Table 4.1 along with the withdrawal limits and permit numbers. The City of Covington's withdrawal permit for the Alcovy River to Williams Street WTP does not have

any limitations on withdrawal based on streamflow. There are separate permits to pump from the river to the Cornish Creek Reservoir and from the Cornish Creek Reservoir to the Cornish Creek WTP, as shown in Table 4.1. Newton County's Alcovy River permit has a minimum in-stream flow requirement that stipulates the County must allow 22 cubic feet per second (cfs) or the natural stream flow, whichever is less, to pass at all times. Typically, water withdrawal permits have a 24-hour maximum withdrawal limitation and monthly average limitation, however, for the withdrawal from the Alcovy River to fill the reservoir, there is also an annual average withdrawal limit of 23.0 MGD

**Table 4.1: Surface Water Withdrawal Permits for Newton County**

Surface Water Withdrawal Permit Holder	Surface Water Withdrawal Permit Number	Water Source	Permit Limit Maximum Day (MGD)	Permit Limit Monthly Average (MGD)
City of Covington (Williams Street WTP)	107-0410-03	Alcovy River	4.5	4.0
Newton County (fills Cornish Creek Reservoir)	107-0410-06	Alcovy River	35.0	35.0
Newton County (Cornish Creek WTP)	107-0410-04	Cornish Creek Reservoir	35.0	28.0

Since the Walton County is a partner with Newton County in the Cornish Creek project, it is important to understand their permitted capacities as well. EPD permitted capacities for the Walton County are shown in Table 4.2. The Hard Labor Creek Reservoir was recently completed through a joint partnership of Walton County and Oconee County. Walton County water supply allocation is 44.22 MGD of the maximum day capacity and 36.88 MGD of the monthly average capacity.

**Table 4.2: Surface Water Withdrawal Permits for Walton County**

Surface Water Withdrawal Permit Holder	Surface Water Withdrawal Permit Number	Source	Permit Limit Maximum Day (MGD)	Permit Limit Monthly Average (MGD)
Walton County Water Department	147-0307-03	Hard Labor Creek Reservoir	62.1	51.8
Walton County Water Department	147-0305-03	Apalachee River	60.0	60.0

## Water Supply Gap Analysis

To develop a water supply gap analysis, the water supply needs, as presented in Section 3, are compared to available water supplies. The difference in the two presents the gap, which may be positive (meaning available capacity) or negative (indicating a need for additional capacity).

Newton County's existing water supply includes Lake Varner and the withdrawal from the Alcovy River that supplies the Williams Street WTP. Since each of these water supply components are evaluated somewhat differently, discussion of each is presented below.

Water supply reservoirs are typically analyzed for a safe yield, which is the annual average day amount of water that can be supplied by a reservoir. The annual average day supply would be calculated by summing the total supply for the entire year and dividing by the number of days in the year. Various factors can impact the safe yield of a reservoir, but for this analysis the important aspect is that the safe yield is based on an annual average day withdrawal. Lake Varner is permitted based on a safe yield of 23 MGD, and the permit specifies an annual average day withdrawal limit of 23 MGD. Walton County has a contractual agreement with Newton County for 25% of the Cornish Creek WTP's capacity, or up to 6.0 MGD of water supply capacity.

The permit for the withdrawal on the Alcovy River that supplies the Williams Street WTP is for 4.0 MGD on a monthly average day basis. This permit does not have an additional limitation for annual average day; therefore, this 4.0 MGD supply can be compared to average annual day demands.

### Newton County Water Supply

Water supply is evaluated based on annual average day demands, with the forecasted future annual average day water demands as shown in Table 4.3. The Newton annual average day demands presented includes all water providers in Newton County, as well as Alcovy Shores and Jasper County; Walton County is not included in this total demand. Total water supply currently available for Newton County includes the Williams Street supply, which is 4.0 MGD, and the Cornish Creek Reservoir supply which is 23 MGD. However, after subtracting the amount committed to Walton County, the portion available for Newton County from the Cornish Creek Reservoir is 17 MGD. As seen in the Table 4.3, the currently available water supply sources satisfy annual average demands through 2050.

**Table 4.3: Newton County Water Supply Gap Analysis**

Year	Newton Annual Average Day Demand (MGD)	Williams Street Water Supply from Alcovy River (MGD)	Newton County Portion of Cornish Creek Water Supply (MGD)	Newton County Water Supply Gap (MGD)
2015	8.5	4.0	17.0	12.5
2020	11.3	4.0	17.0	9.7
2025	12.6	4.0	17.0	8.4
2030	14.0	4.0	17.0	7.0
2035	16.0	4.0	17.0	5.0
2040	18.1	4.0	17.0	2.9
2045	19.9	4.0	17.0	1.1
2050	21.7	4.0	17.0	(0.7)

Note: Newton Annual Average Day Demand includes water demands for Newton County and its Cities, as well as Alcovy Shores WSA and Jasper County WSA; Walton County is not included.

### Walton County Water Supply

Walton County currently purchases water from Newton County and from the City of Monroe. Walton County can obtain up to 6.0 MGD of water supply from Newton County's Cornish Creek facilities; Walton County currently purchases 1 MGD from Monroe but can purchase up to 3 MGD. Since the Hard Labor Creek reservoir was recently completed and does not currently have any associated treatment capacity, it is assumed that the Walton County will maximize use of its purchase agreements for water supply sources prior to using the new reservoir. As seen in Table 4.4, Walton County may have a small water supply need around years 2040 to 2045, but in the same timeframe, Newton County has excess water supply that could be used to meet these needs. Walton County has an allocated water supply capacity of 29.8 MGD of the Hard Labor Creek's total yield of 41.8 MGD. Water demands for Walton County were provided by their consultant, Precision Planning, Inc. in 2018.

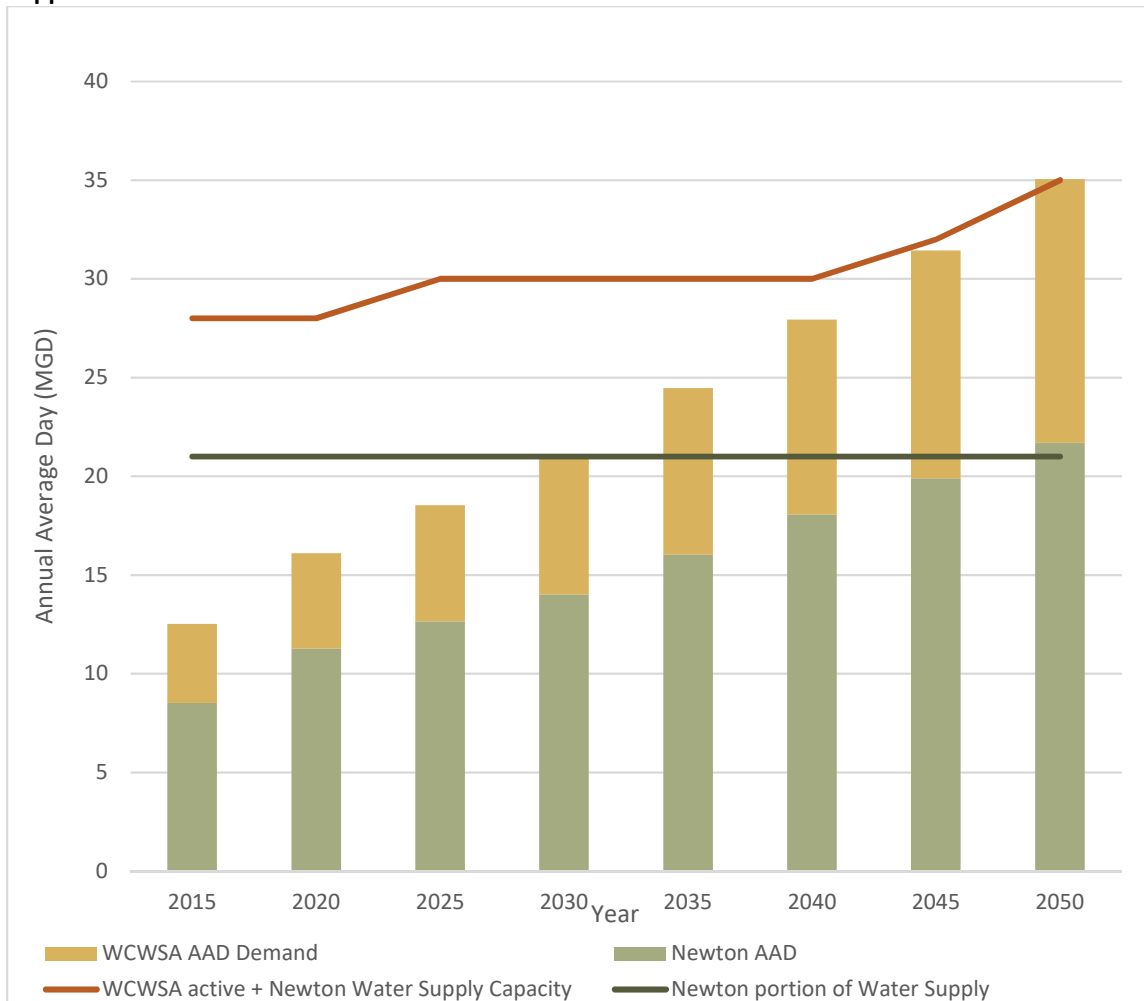
**Table 4.4: Walton County Water Supply Analysis**

Year	Walton County Annual Average Day Demand (MGD)	Walton County Portion of Cornish Creek Water Supply (MGD)	Walton County Water Supply from Monroe (MGD)	Walton County portion of Hard Labor Creek Water Supply Active (MGD)	Walton County Supply Gap (MGD)
2015	4.0	6.0	1.0		3.0
2020	4.8	6.0	1.0		2.2
2025	5.9	6.0	3.0		3.1
2030	7.1	6.0	3.0		1.9
2035	8.4	6.0	3.0		0.6
2040	9.9	6.0	3.0		(0.9)
2045	11.6	6.0	3.0	2.0	(0.6)
2050	13.4	6.0	3.0	5.0	0.7

Note: Walton County Annual Average Day demands provided by Precision Planning, Inc. in 2018.

As presented in Table 4.3 and 4.4, the water supply sources that Newton County and Walton County currently have in place are adequate to meet future demand projections to approximately 2050. Figure 4.1 presents the gap analysis graphically, with only 5 MGD of Walton County's Hard Labor Creek supply active in 2050. At that time, Walton County should have significant excess capacity, which Newton County may be able to negotiate share use.

**Figure 4.1: Water Supply Gap Analysis – Newton County and Walton County Demands and Active Supplies**



Notes: “Newton Portion of Water Supply” includes its portion of Cornish Creek reservoir as well as the 4.0 MGD withdrawal from the Alcovy River for Williams Street WTP. “Walton County active + Newton Water Supply Capacity” is a combination of Cornish Creek allocated capacity, City of Monroe purchases and activated Hard Labor Creek reservoir capacity (5 MGD of its 29.8 MGD total capacity in 2050).

## Water Treatment Gap Analysis

Water treatment plants must be able to supply the maximum demands that the system experience on any one day during the entire year. This demand is referred to as the maximum day demand. The Williams Street WTP is permitted to withdraw 4.5 MGD from the Alcovy River and City Pond on a peak day basis. The permitted capacity for water withdrawal to supply the Cornish Creek WTP is 35 MGD from Lake Varner on a peak day basis. These permitted limits must be considered when evaluating the sufficiency of treatment capacity to meet the future demands.

### Newton County Water Treatment

The Williams Street WTP is an aged plant and requires significant investment to keep in service. It is being evaluated to determine if the best economic decision is to replace it or to relocate that capacity to the Cornish Creek WTP. Initial indications suggest the best economic solution

would be to relocate the capacity to Cornish Creek. Based on the treatment gap evaluation, the Williams Street WTP is not necessary to meet the system demands in the near term and could be abandoned as early as 2020. Evaluation of hydraulic issues and the ability to maintain desired levels of service for all customer with the abandonment of the Williams Street WTP is being conducted separately. Recommendations from the hydraulic evaluation may indicate the need to keep the William Street WTP online longer, until other distribution system infrastructure improvements can be put in place.

For the water treatment gap analysis, several assumptions were made. First, the existing 4.5-MGD Williams Street WTP withdrawal permit would be modified so that water withdrawn from the Williams Street pump station would be pumped to the Cornish Creek WTP, either directly to the plant or through the reservoir. If that 4.5 MGD is placed in the reservoir, the amount of the withdrawal would not be included in the evaluation of safe yield of the reservoir, but as a direct feed to the Cornish Creek WTP. Secondly, since the Williams Street WTP withdrawal and treatment capacities are not currently involved with the agreement with the Walton County, when the Williams Street withdrawal permit is modified to pump to the Cornish Creek WTP, this additional capacity would not be added to the capacity agreement with the Walton County.

The Cornish Creek WTP is currently permitted for 25 MGD and can be upgraded to a capacity of 35 MGD. Based on the future water demand projections and the anticipated abandonment of the Williams Street WTP, the Cornish Creek WTP will need to be upgraded to 35 MGD by 2035, as shown in Table 4.5. If the Walton County continues to participate in the Cornish Creek WTP expansion, at 35 MGD, Newton County would have 26.25 MGD. Finally, around 2050 the Cornish Creek WTP would need to be upgraded again to add the capacity transferred from the Williams Street WTP. Newton County's maximum day demand, presented in Table 4.5 the demand for includes all Newton County and its cities, as well as Alcovy Shores and Jasper County; the Walton County is considered separately.

**Table 4.5 – Newton County Water Treatment Analysis**

Year	Newton Maximum Day Demand (MGD)	Cornish Creek WTP Capacity (MGD)	Williams Street WTP (MGD)	Newton Portion of Cornish Creek WTP (MGD)	Newton Water Treatment Gap (MGD)
2015	10.6	25	4.5	23.25	12.6
2020	14.1	25		18.75	4.7
2025	15.8	25		18.75	3.0
2030	17.5	25		18.75	1.3
2035	20.0	35		26.25	6.2
2040	22.5	35		26.25	3.7
2045	24.8	35		26.25	1.4
2050	27.1	39.5		30.75	3.7

Note: Newton Maximum Day Demand includes water demands for Newton County and its Cities, as well as Alcovy Shores and Jasper County WSA's; Walton County is not included.

### Walton County Water Treatment

For Walton County, it is assumed that the Cornish Creek and Monroe water supply sources are maximized first, and capacity from the Hard Labor Creek is later added. As shown in Table 4.6,

Walton County is forecast to have varying levels of water treatment needs in the near term; however, due to excess treatment capacity for Newton County, these shortfalls can be alleviated without premature upgrades to the Cornish Creek WTP. By the year 2050, Walton County will need approximately 18 MGD of its 44.22 MGD capacity at the Hard Labor Creek WTP. Walton County is forecast to have roughly 26 MGD to meet demands beyond 2050.

**Table 4.6: Walton County Water Supply Analysis**

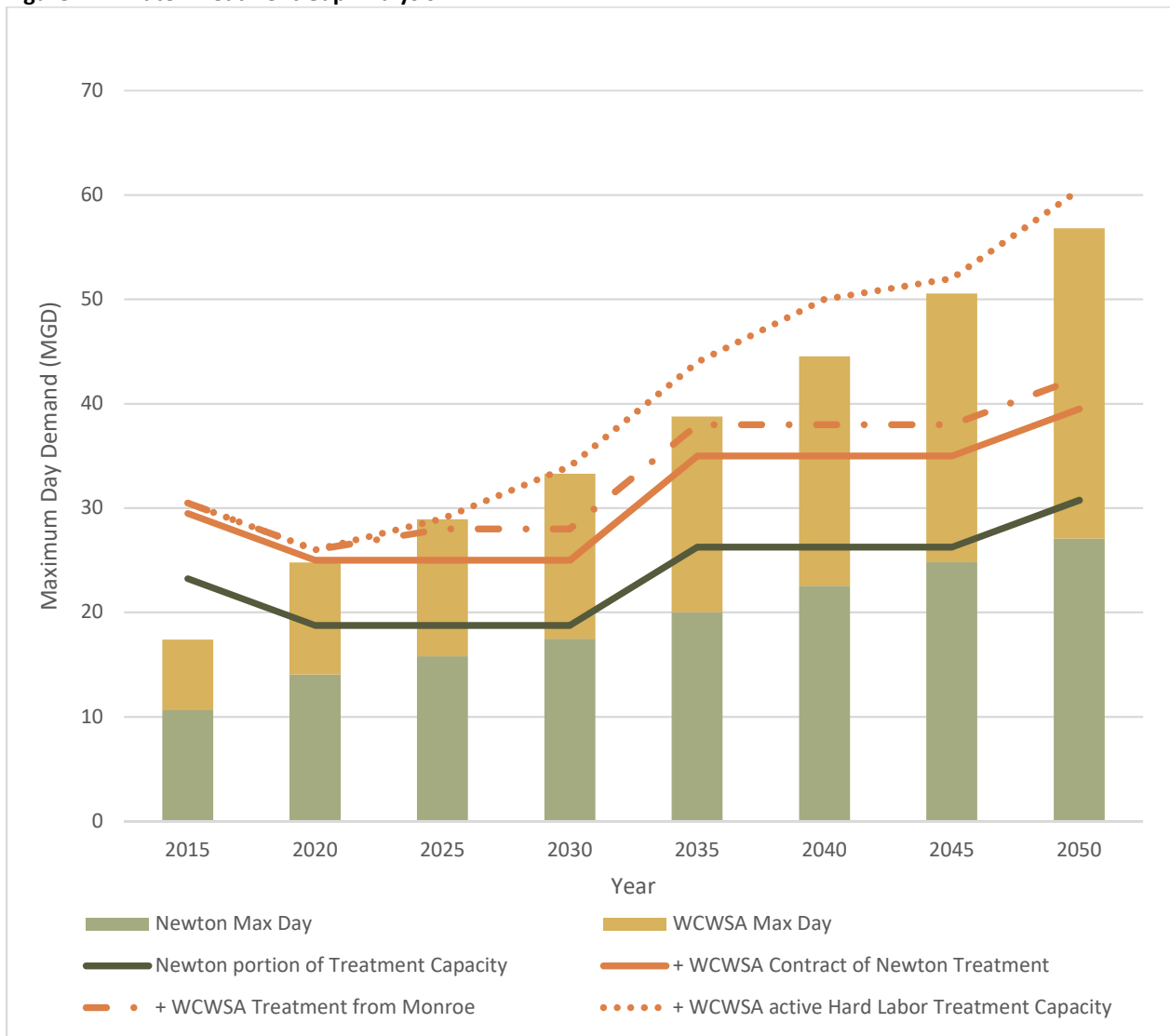
Year	Walton County Maximum Day Demand (MGD)	Walton County Portion of Cornish Creek WTP (MGD)	Walton County Treated Water from Monroe (MGD)	Walton County Portion of Hard Labor Creek WTP (MGD)	Walton County Water Treatment Gap (MGD)
2015	6.8	6.25	1.0		0.5
2020	10.7	6.25	1.0		(3.8)
2025	13.1	6.25	3.0	1.0	(2.9)
2030	15.8	6.25	3.0	6.0	(0.6)
2035	18.8	6.25	3.0	6.0	(1.0)
2040	22.0	6.25	3.0	12.0	1.8
2045	25.8	6.25	3.0	14.0	0.00
2050	29.8	6.25	3.0	18.0	0.00

Note: Walton County maximum day demands provided by Precision Planning, Inc.

The shared water treatment needs of Newton and Walton County is complex. Walton County has more near-term needs; whereas, Newton County has ample treatment capacity through 2050. The Newton County and Walton County peak day demands and permitted treatment capacities from Tables 4.5 and 4.6 are shown graphically in Figure 4.2.

By maximizing existing water sources, Walton County may need an additional 1 MGD of water from the Hard Labor Creek project by 2025 and 6 MGD by 2030. By 2040 and beyond, Walton County is forecast to need significant water supply from the Hard Labor Creek. However, a WTP is not necessarily required at Hard Labor Creek to take advantage of the additional supply; other options, such as pumping raw water to an expanded Cornish Creek WTP may be a cost-effective alternative. Larger treatment plants reap the benefits of economy of scale and are often less expensive to operate than two smaller plants. All options should be carefully considered to ensure the most cost-efficient and feasible alternatives are implemented.

Figure 4.2: Water Treatment Gap Analysis



Based on this analysis, Newton County has adequate water supply and has the ability to construct adequate water treatment capacity to 2050 and possibly beyond. Walton County has adequate water supply capacity for well beyond 2050 but is in need of additional water treatment capacity in the near-term. Both Newton County and Walton County have worked together to provide water to customers for many years in a mutually beneficial arrangement; continuing that cooperation and collaboration allows both utilities to have adequate water supply and treatment through the planning horizon and beyond.



# Section 5. Wastewater Flow Forecasts

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The NCWSA and the Cities of Covington, Oxford, Porterdale and Mansfield have sewer systems. The City of Covington and NCWSA each operate a wastewater treatment facility, Covington and Yellow River Water Reclamation Facility (WRF), respectively. Treated effluent from both plants is land applied at their jointly owned and operated land application facility. The City of Porterdale, where the NCWSA Yellow River WRF is located, conveys wastewater for treatment at the Yellow River WRF. A portion of the City of Oxford’s wastewater is conveyed to Yellow River WRF through NCWSA’s sewer mains and the remainder to the Covington WRF for treatment. The City of Mansfield has an independent sewer system that conveys wastewater to a lagoon system for treatment. The permitted capacity of each treatment facility is presented in Table 5.1.

**Table 5.1: Permitted Wastewater Treatment Capacity**

Facility	Maximum Month Average Day Flow (MGD)
Covington WRF	5.6
NCWSA Yellow River WRF	3.2
Covington – NCWSA LAS	8.8
Mansfield WPCP	0.6

NCWSA’s service area is further broken into sewer sheds, the majority of the service area is in the Yellow River basin with the eastern-most portion of the County located in the Little River basin (which is in the Oconee River basin).

## Wastewater Metrics

Based on the discharge monitoring reports (DMRs) maintained at the Covington and NCWSA facilities for calendar years 2015, 2016 and 2017 as well as billing data information, metrics for wastewater generation were developed to forecast future flows. These metrics include flow statistics, sewer population estimates, inflow and infiltration estimates and per capita generation rates. These metrics are discussed below.

**Flow Rates.** Daily wastewater influent flow rates for both treatment facilities were reviewed for the period January 2015 to December 2017. From this data, the annual average day flow (AAD) and maximum month average day flow (MMADF) were calculated. The AAD flow is the amount of flow a facility receives on average over the course of the year. The MMAD flow is the average daily flow for the month with the highest volume of flow, which is also the metric used to permit treatment facilities. The peaking factor of the MMAD to AAD flow ratio is calculated to provide a way to estimate the future MMAD flow rates. Table 5.2 provides a summary of the wastewater flow rates and peaking factors, along with annual rainfall.

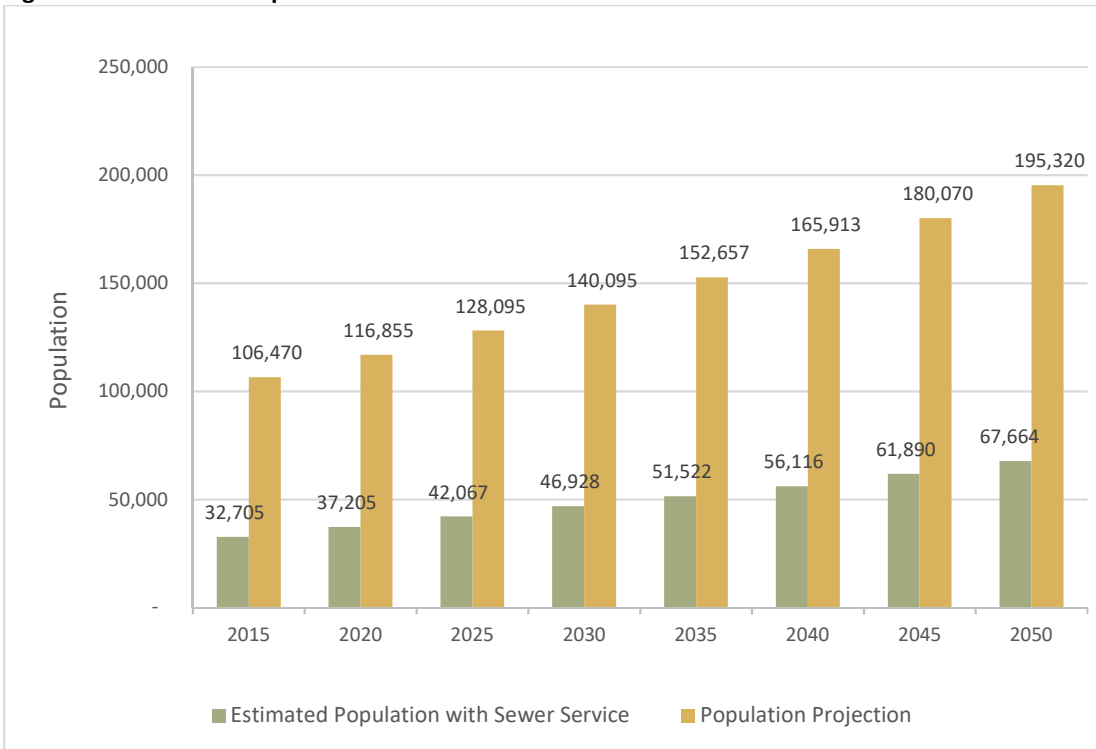
**Table 5.2: Flows to Treatment Facilities (MGD)**

Year	Covington WRF (MGD)		NCWSA Yellow River WRF (MGD)		Land Application System (MGD)		Total Rainfall
	AAD	MMAD	AAD	MMAD	AAD	MMAD	Inches
2015	2.22	3.29	2.08	2.92	4.17	5.25	74.0
2016	1.48	3.03	2.04	2.60	4.15	5.16	34.3
2017	2.11	2.59	2.04	2.19	4.16	4.61	62.4

Note: AAD = Annual Average Day; MMAD = Maximum Month Average Day

**Sewered Population Estimate.** The number of residential sewer customers is estimated based on the water billing data for year 2015. Multiplying the estimated number of residential customers wastewater service by the number of people per household (2.65 based on census data for Newton County), yields the estimated population with sewer service, as shown in Figure 5.1. Dividing the sewered population by the total population provides an estimate of people with sewer service, or percent served. Using the base year of 2015, approximately, 31% of people in Newton County have sewer service. Residents without sewer access use on-site septic tanks to manage wastewater.

**Figure 5.1. Estimated Population with Sewer Service**



**Wastewater Generation Rate.** For the base year of 2015, the combined population served by the Covington WRF and NCWSA’s Yellow River WRF is estimated to be 39,411. The flow received at these two facilities in 2015 averaged 4.3 MGD, resulting in a total per person wastewater generation rate of 132 gpcd.

**I/I Estimate.** Inflow and Infiltration (I/I) is common to all sewer systems and includes surface or groundwater that enters the sewer system, through a variety of means including broken or cracked pipes, illicit connections or improperly closed or missing manhole covers. To estimate the I/I in the NCWSA system, the total flows to the Yellow River WRF were compared to the sewer customer billing data provided by NCWSA. The estimated I/I is likely slightly inflated as the actual flows from Porterdale and Oxford that flow to Yellow River WRF were not available. With an estimated wastewater flow contribution from Porterdale included in the above calculation, the I/I percentage drops to 18%. It is likely that the typical I/I portion is in the 20% range for NCWSA. The billing data provided by the Cities was not comprehensive enough for I/I evaluations. As a result, and to be conservative in flow estimates, the I/I rate of 30% was applied to all sewer systems in Newton County.

**Table 5.3: Inflow/Infiltration Estimate**

NCWSA	2015	2016	2017	3-yr Average
Yellow River WRF Flow (MGD)	2.08	2.04	2.04	2.05
Billed Sewer (MGD)	1.40	1.50	1.46	1.45
Estimated I/I	0.68	0.54	0.58	0.60
% I/I	33%	26%	28%	29%

Based on this data, a residential per capita rate with I/I was estimated for use in projecting future wastewater flows. This rate is 63 gpcd without I/I and 81 gpcd with I/I.

The rain response is evident in graphs depicting flow to the Covington and Yellow River WRF along with daily rainfall, shown in Appendix A. During the wet year of 2015 and average year of 2017, the rain dependent I/I presents a consistent response. However, in the dry year of 2016, the response time is much longer, if at all due to a lower groundwater table.

## Forecasting Wastewater Flows

The wastewater flow forecasts combine the elements of land use, population forecasts and flow metrics to establish wastewater needs through 2050. The following tables and charts provide an overview of the forecast. Growth in the Eastern portion of the County, located in the Little River watershed, is expected to occur due to the large megasite development opportunities. To manage flow in this area, NCWSA is in the process of developing a new wastewater treatment facility; currently NCWSA services this area by means of pumping to its Yellow River WRF.

To forecast future flows, the residential per capita rate of 60 gpcd is applied to the future served population. The Commercial, Industrial and Institutional component is estimated based on land use and as a percentage of the residential flow rates. I/I is added to the residential and non-residential flow rates with a reduction from 30% in 2020 to 20% by 2050. Like the water demand forecasts, an uncertainty factor is also included in the wastewater flows to account for changes in the economy or the weather. Finally, a Commercial/Industrial reserve is established for each service area so that additional capacity is available to take advantage of economic development opportunities. The reserve is estimated based on a percentage of flow, ranging from 4% in 2020 to 15% in 2050. As seen in the summary Table 5.4, the total per capita rate is

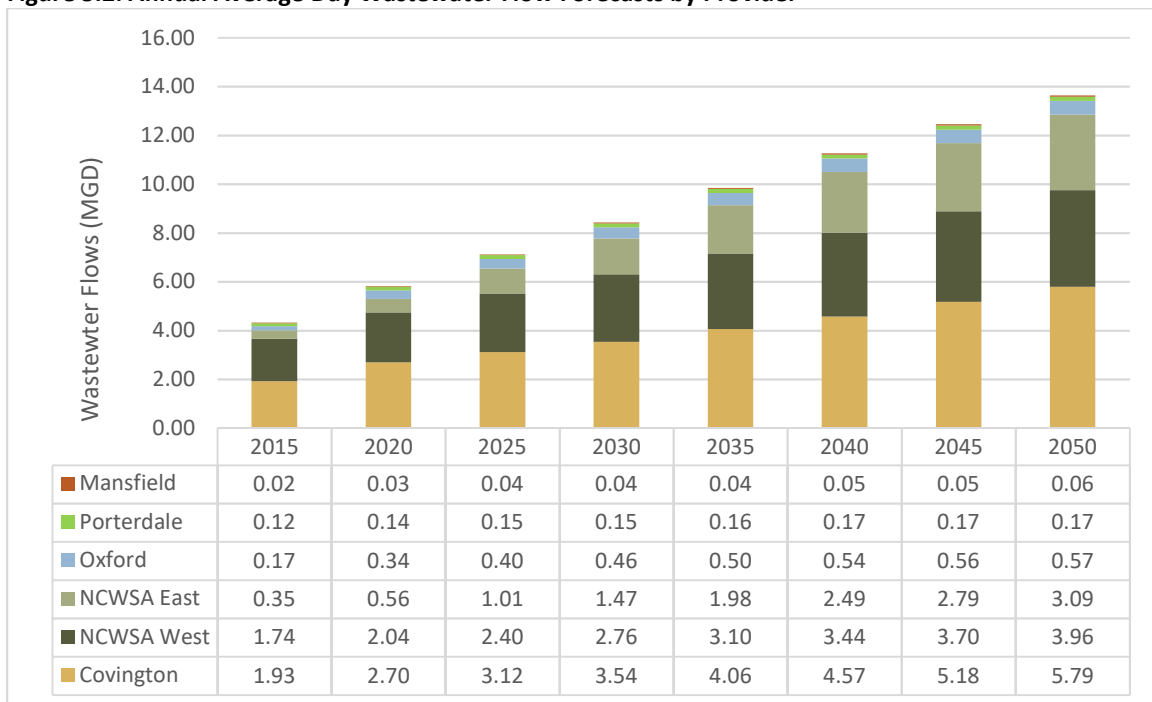
increasing as a result of the industrial reserve capacity as well as increases in overall non-residential wastewater.

**Table 5.4: Wastewater Flow Forecast Metrics**

	2015	2020	2030	2040	2050
Residential Per Capita Rate (gpcd)	62	60	60	60	60
Inflow/Infiltration	30%	30%	27%	24%	20%
Uncertainty Factor	-	4%	7%	10%	13%
Industrial Reserve (% of total demand)	-	5%	10%	15%	15%
Total Per Capita Rate (gpcd)	132	156	180	201	202

Figure 5.2 presents the wastewater flow forecast summary by provider.

**Figure 5.2: Annual Average Day Wastewater Flow Forecasts by Provider**



## Wastewater Treatment Capacity

The maximum month average daily flow is the flow rate used for permitting treatment facilities. For comparison to the treatment capacity at each of the treatment facilities, the average day demand that is conveyed to each facility was multiplied by the peaking factor to estimate the future MMAD flows.

For ease of evaluation, it is assumed that all flow generated in from the City of Oxford is treated at the Covington WRF, while in reality, a portion of Oxford’s wastewater is conveyed to NCWSA’s system and treated at the Yellow River WRF. Porterdale’s wastewater is conveyed to Yellow River WRF for treatment. Treated effluent from both the Covington and Yellow River WRF’s is land applied at their jointly owned Land Application System (LAS)

Currently, the flow generated in the Little River watershed, located in the Eastern most portion of the NCWSA's service area, is pumped to the Yellow River WRF for treatment. However, this area will be served by the new Little River WRF, which is planned to be operational by 2022. The Little River WRF will discharge reclaimed water to the Little River.

Table 5.5 presents the MMAD flow generated in each treatment facility's service area.

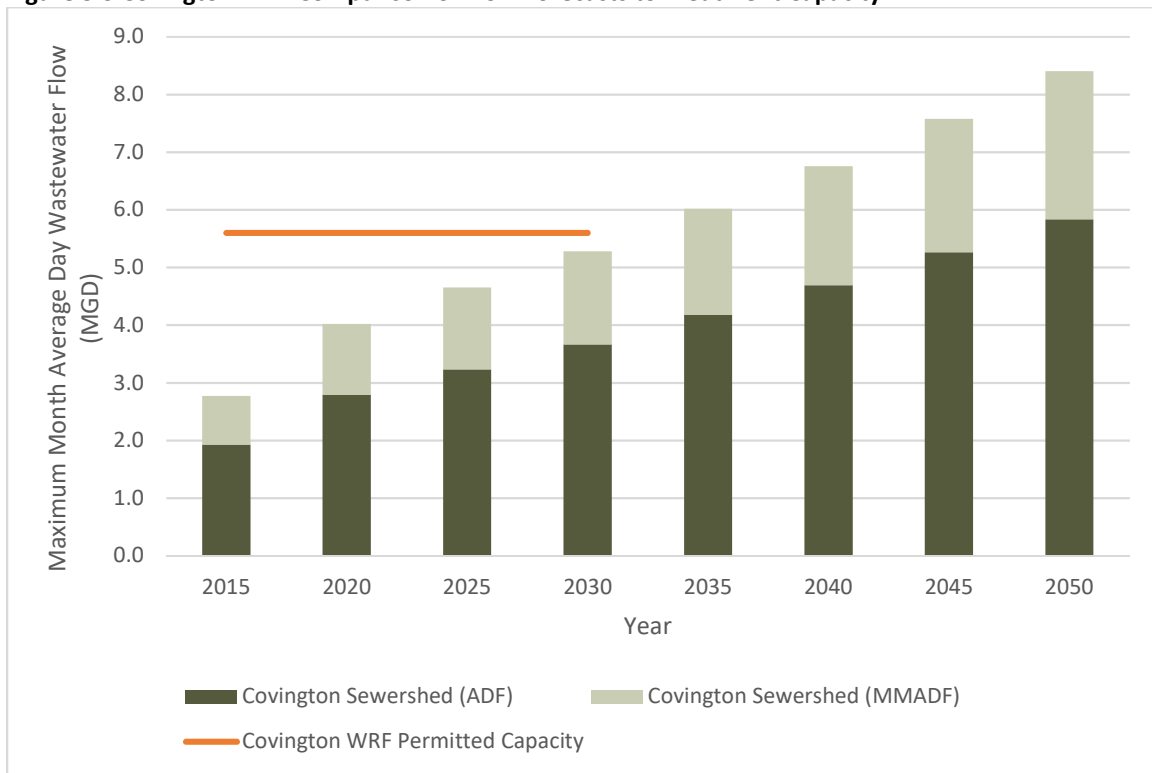
**Table 5.5: Flow Forecasts by Treatment Service Area**

Service Area	Maximum Month Average Day Flow Forecasts (MGD)							
	2015	2020	2025	2030	2035	2040	2045	2050
Covington WRF (Covington & Oxford)	2.8	4.0	4.6	5.3	6.0	6.8	7.6	8.4
Yellow River WRF (NCWSA West & Porterdale)	2.5	2.9	3.4	3.9	4.3	4.8	5.1	5.4
Little River WRF (NCWSA East)	0.4	0.7	1.2	1.8	2.4	3.0	3.4	3.7
Mansfield WPCP	0.03	0.04	0.05	0.06	0.06	0.07	0.07	0.08

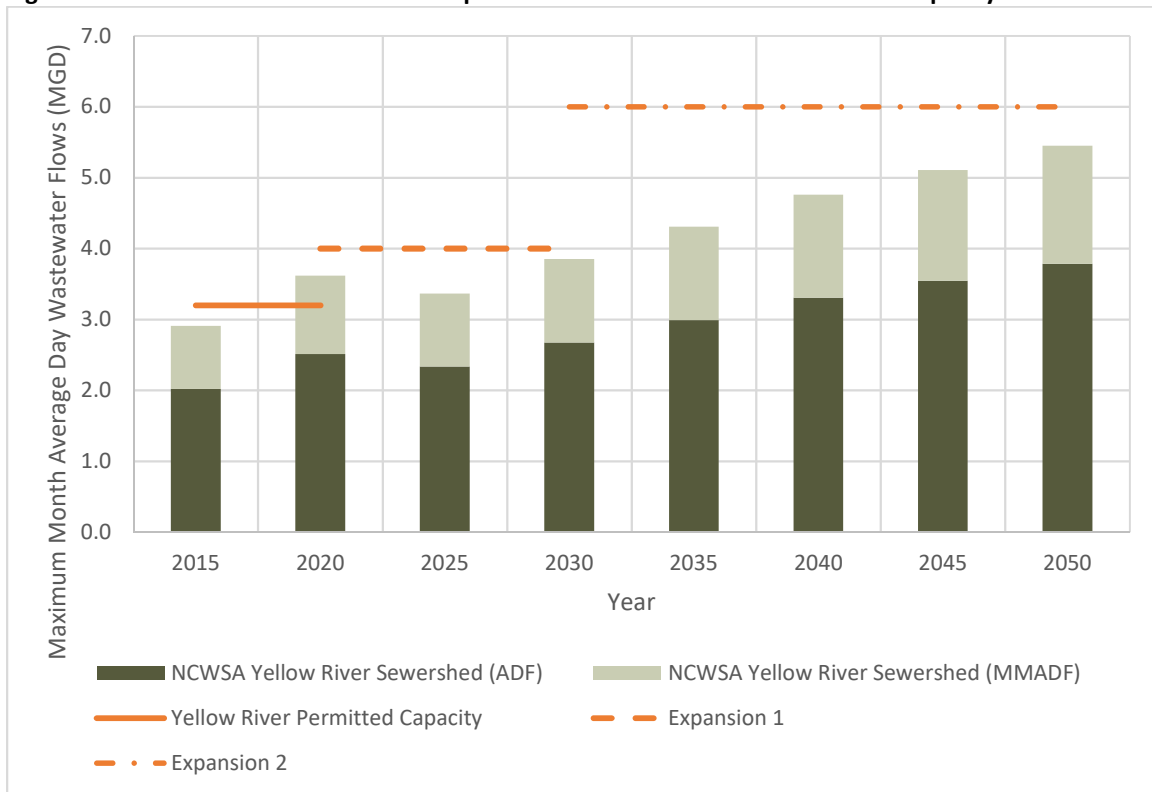
Notes: 1. LAS peaking factor is 1.25 while WRFs have a peaking factor of 1.44, 2. Currently, flows generated in the Little River WRF service area are pumped to Yellow River WRF for treatment; the Little River WRF is on-line in 2022.

Comparing the expected flows generated in each basin to the capacity of the treatment facility provides insight as to when and where additional capacity may be required. A number of factors influence the timing of additional capacity, including economic vitality, population growth and industrial development. With this in mind, the charts presented in this section provide guidance; however, planning for capacity expansions should begin when average daily flows consistently exceed 70% to 80% of the plant's design capacity. Figures 5.3 through 5.5 present the maximum month average daily flow compared to the permitted and planned capacities for the Covington WRF, Yellow River WRF and the Little River WRF.

**Figure 5.3 Covington WRF Comparison of Flow Forecasts to Treatment Capacity**



**Figure 5.4 NCWSA Yellow River WRF Comparison of Flow Forecasts to Treatment Capacity**



Note: Flows from the NCWSA East service area are currently being pumped to the NCWSA Yellow River WRF; by 2022 that flow is anticipated to be treated at the Little River WRF, which results in a decrease in flows to the Yellow River WRF as shown in 2025.

As seen in Figure 5.3, the Covington WRF is expected to have adequate capacity through 2030 after which additional capacity may be necessary to meet the City's future needs. The NCWSA's Yellow River WRF has a planned expansion to 4.0 MGD that is expected to on-line by 2020. As seen in Figure 5.4, the Yellow River WRF may require additional capacity by 2030 to 6.0 MGD, which will be sufficient through the end of the planning period.

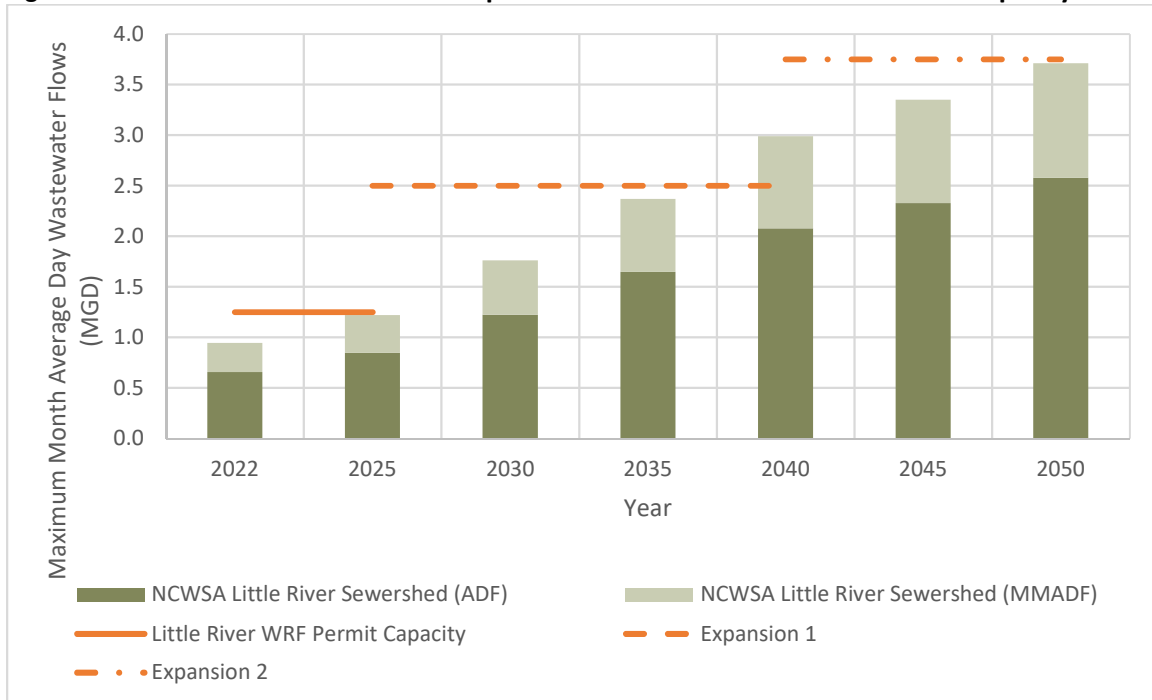
Treated effluent from the Covington WRF and the Yellow River WRF is conveyed to the LAS facility for land application. This facility has a current average day capacity of 8.8 MGD. Covington owns 5.6 MGD of the LAS capacity while NCWSA owns the remaining 3.2 MGD. NCWSA purchased an adjacent tract of land to develop an additional land application field to expand their discharge capacity by 1.23 MGD; NCWSA's future LAS capacity is 4.4 MGD. Based on average day flow forecasts for the Covington WRF sewershed, the Covington portion of the LAS should be sufficient through 2045 and 2050. At 2050, Covington's average day flows are forecast to 5.8 MGD, which is 0.2 MGD more than the available land application capacity. NCWSA's Yellow River WRF sewershed average day flow is forecast to be 3.8 MGD in 2050, which is below its total capacity at the LAS.

If the land application approach to effluent management is preferred long-term, additional land will be needed. An approach to maintain the LAS and expand capacity is to add drip irrigation to the buffer areas of the LAS. The previous study of the LAS, conducted by Carter & Sloope in 2012 as part of the City of Covington's Wastewater Master Plan, indicates that approximately 810 acres in buffer areas that could possibly be repurposed for drip irrigation, resulting in a 1-MGD increase in capacity.

An alternative approach is a stream discharge. The current regulatory climate encourages the return of reclaimed water to streams. The City of Covington and NCWSA received a wasteload allocation from EPD in 2007, which was extended in which the two utilities each would be allowed to discharge 4.4 MGD to the Yellow River.

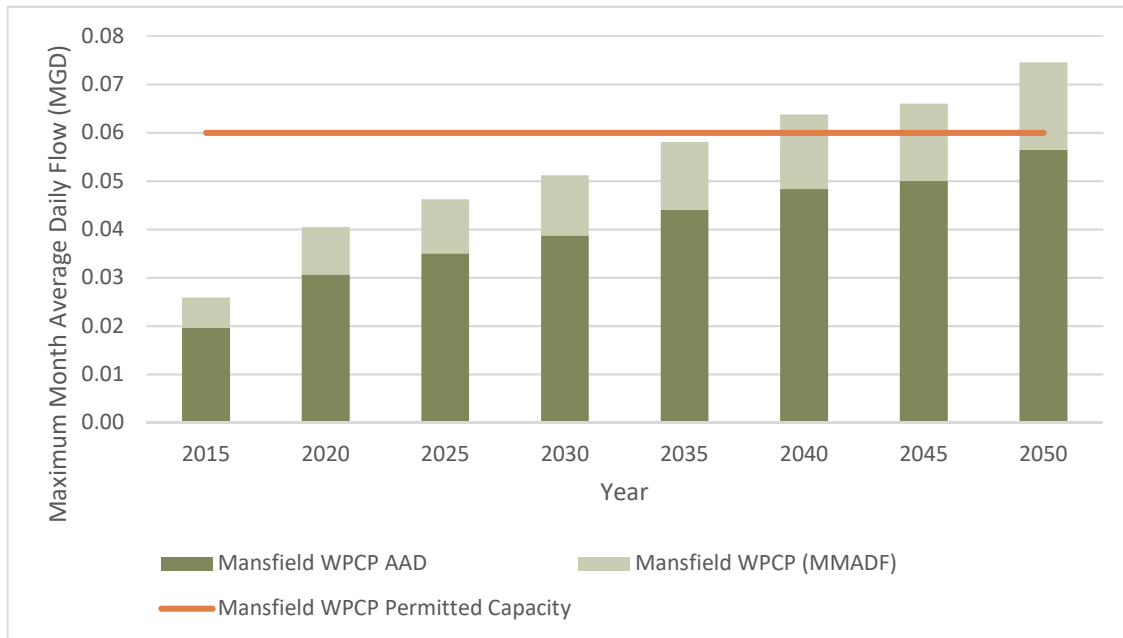
Currently, the area on the eastern-most portion of the County that is within the NCWSA's sewer service area has its wastewater conveyed to and treated by the Yellow River WRF. By 2022, the Little River WRF is expected to be in operation and the flow pumped to Yellow River WRF will be treated at this facility and discharged to the Little River. Figure 5.5 presents the projected wastewater flows for the Little River WRF sewershed compared to the treatment capacity. As seen in Figure 5.5, the initial treatment capacity of 1.25 MGD is expected to be nearly consumed by 2025. An increase in permitted treatment capacity to 2.5 MGD is recommended which will provide treatment through 2035 to 2040. A third expansion is recommended by 2040 to 3.75 MGD which will provide capacity through the planning period.

**Figure 5.5: NCWSA Little River WRF Comparison of Flow Forecasts to Treatment Capacity**



The City of Mansfield owns and operates a 0.06 MGD wastewater treatment facility with an aerated lagoon and surface water discharge to Pittman Branch, in the Oconee River Basin. The City provides service to customers within the City’s service area, which generally aligns with the City Limits. The projected wastewater flows for the City compared to the treatment capacity are shown in Figure 5.6. As seen in the Figure, additional capacity may be required by 2040 if the City expands its sewer collection system and allows additional connections to the system.

**Figure 5.6: Mansfield WPCP Comparison of Flow Forecasts to Treatment Capacity**





# Appendix A

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Figure A.1: 2015 Daily Wastewater Flows to WRFs and Recorded Rainfall

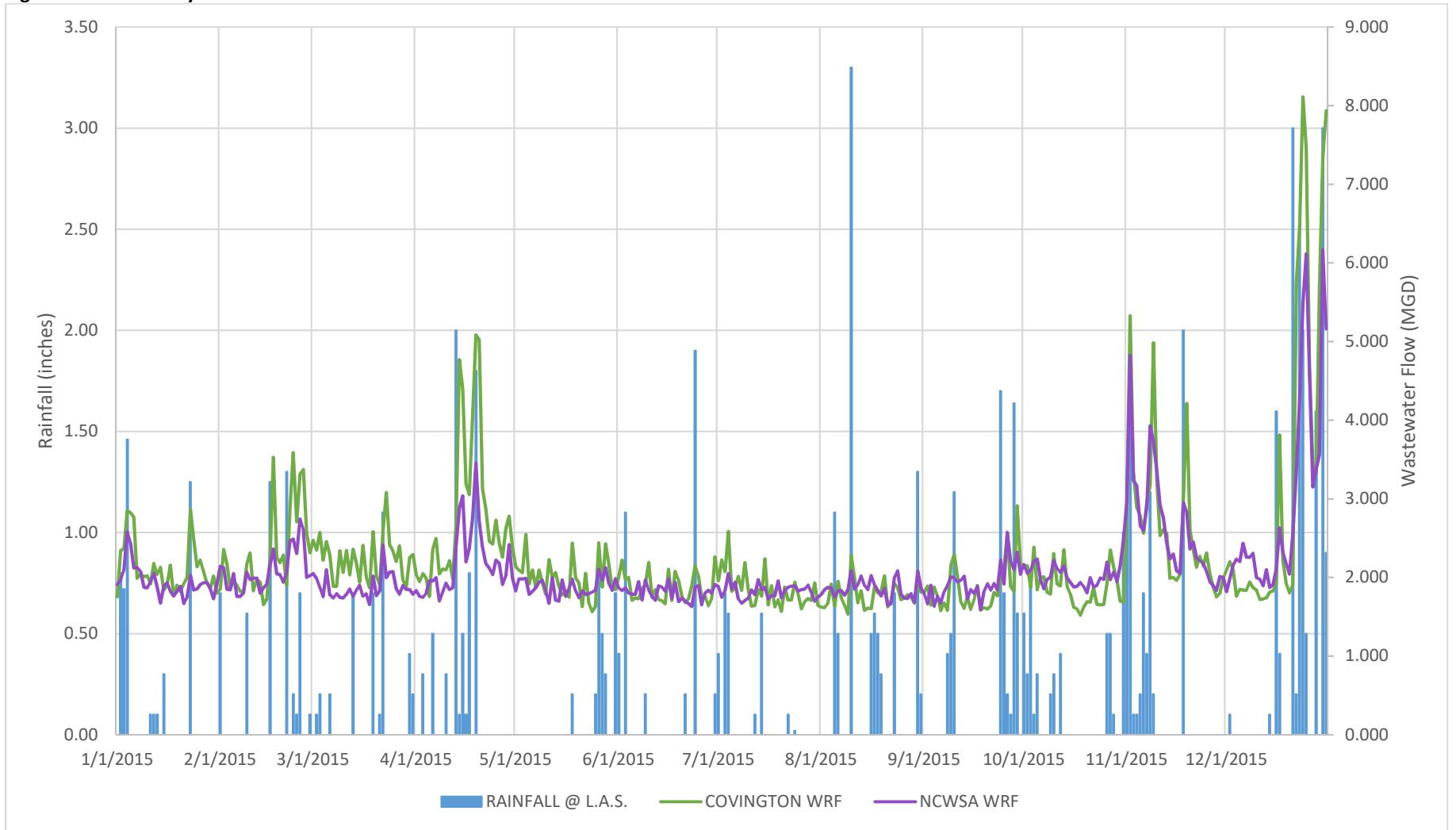


Figure A.2: 2016 Daily Wastewater Flows to WRFs and Recorded Rainfall

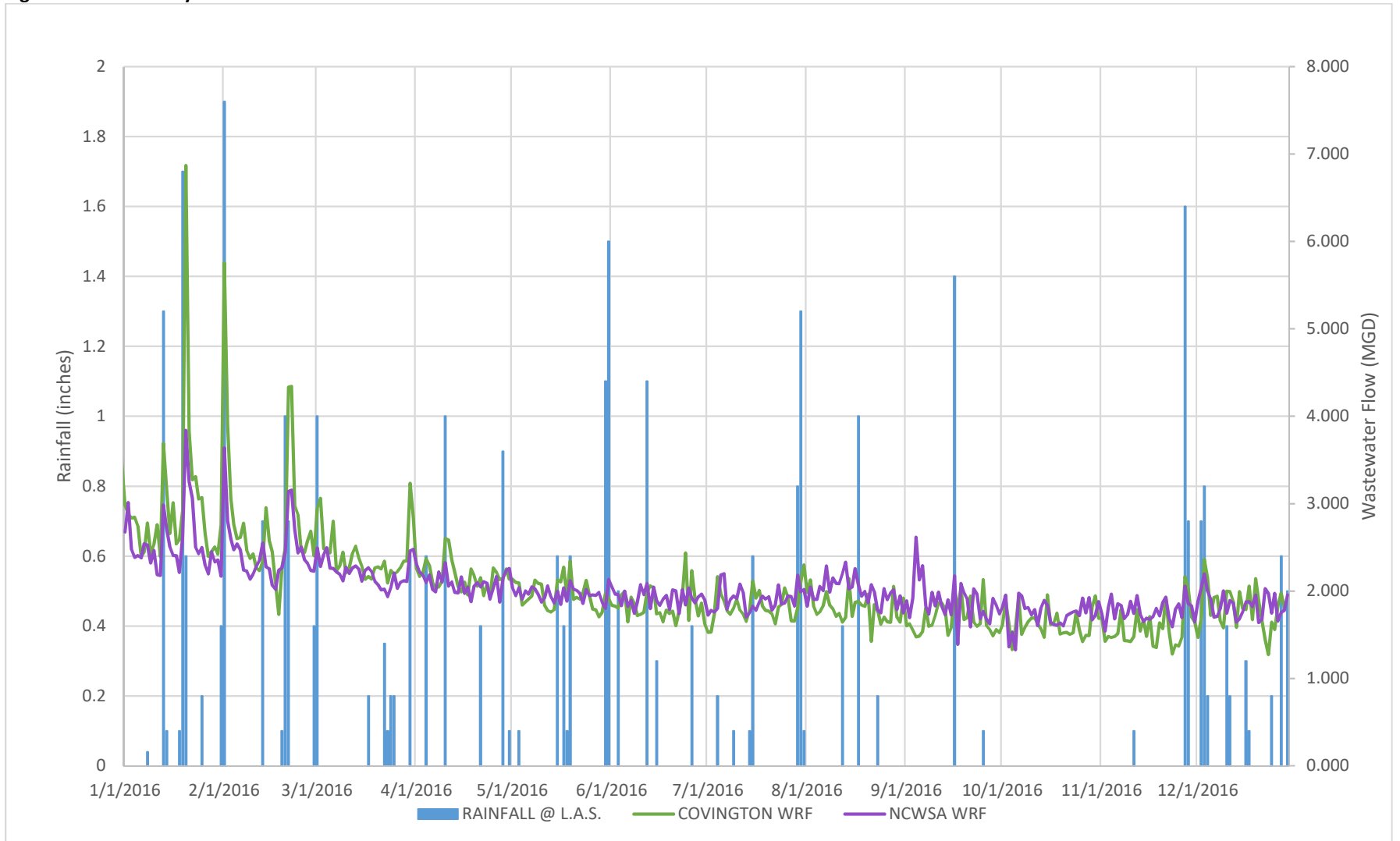


Figure A.3: 2017 Daily Wastewater Flows to WRFs and Recorded Rainfall

