WATER SYSTEM MASTER PLAN

EXECUTIVE SUMMARY

City of Bryant, Arkansas

August 2024

I. Introduction

A. Purpose

This document presents a water distribution system master plan for the City of Bryant, Arkansas which is projected to meet water distribution, storage, and pumping requirements until the year 2050. The scope of review includes population and water demand projections for Bryant service area, evaluation of water quality, assessment of water distribution assets, calibrated hydraulic modeling of current and projected demands and improvements, and a Capital Improvements Plan for system upgrades needed to meet the water demands of Bryant to the year 2050.

B. Background

Bryant's Water Distribution Department operates the city-owned water system that serves the City of Bryant as well as wholesale customers within the Woodland Hills service area. Bryant currently purchases wholesale water from Central Arkansas Water (CAW) and is received from two metering stations, one direct feed and one capable of pumping 3,500 gallons per minute through a Bryant-owned booster pump station. The Bryant water system includes three storage tanks, one 2,000,000-gallon elevated storage tank and two 1,000,000-gallon ground storage tanks, and approximately 107 miles of distribution waterlines within two pressure zones.

C. Population and Demand Projections

Bryant has experienced significant growth since the 1980's. Its population has increased from 2,682 in 1980 to an estimated 22,235 in 2024. Between 2020 and 2050, Bryant's population is projected to increase to 36,889, marking a growth of 16,226 people (79%) from the recorded 2020 census population. Bryant's current system water demand is 2.6 million gallons per day (MGD) based on Average Daily Demand (ADD) and 4.1 MGD based on Max Day Demand (MDD). The projected demands are expected to increase to 4.3 MGD ADD and 6.6 MGD MDD by 2050. **Figure 1**: Population and Demand Projections shows the expected increase in population, ADD, and MDD through the planning period to 2050.

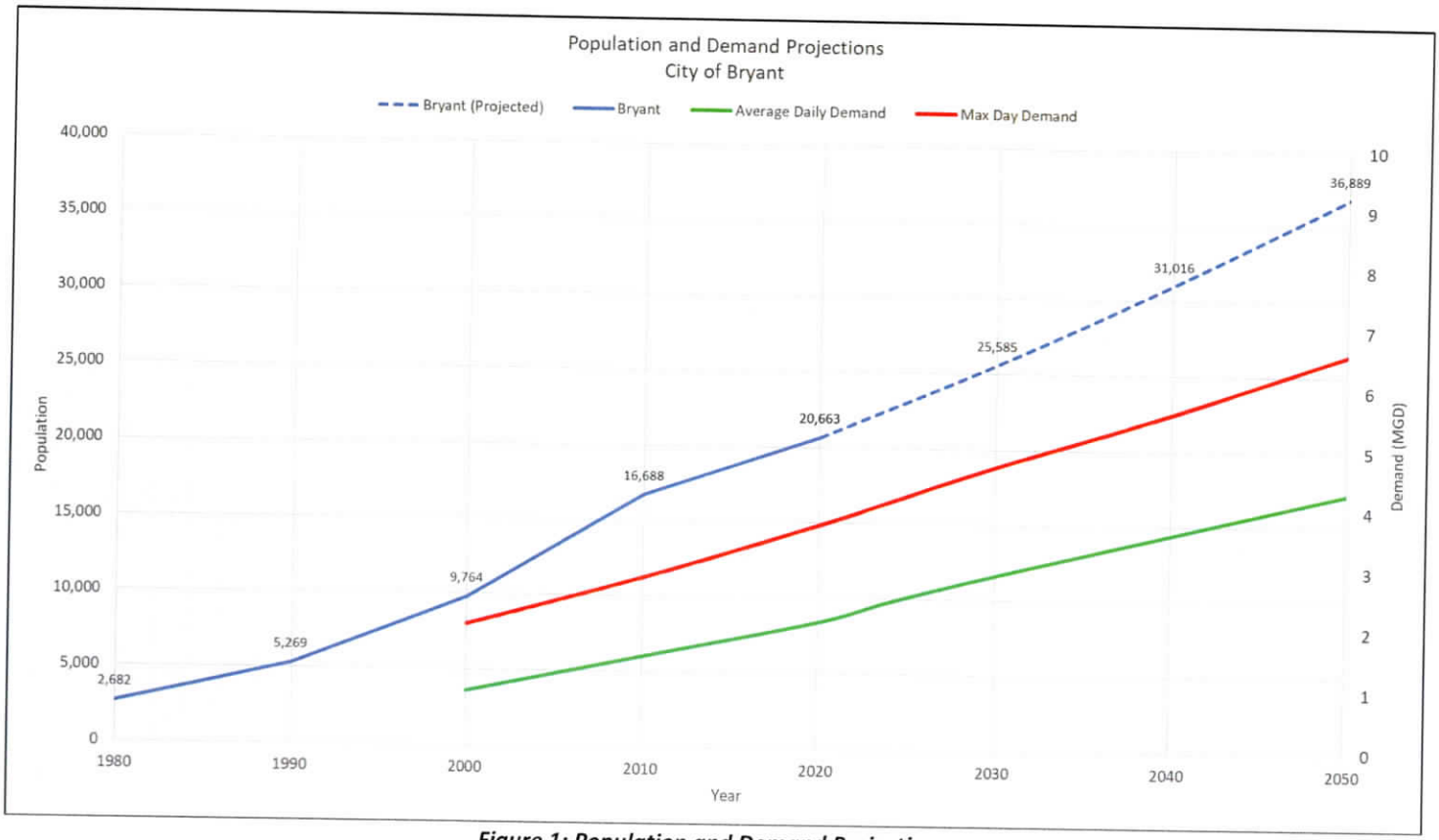


Figure 1: Population and Demand Projections

D. Hydraulic Modeling

To assess the existing infrastructure and determine the required improvements to meet the projected demands of Bryant, a hydraulic model was developed. The hydraulic model was created using a graphical spatial model, utilizing the city's provided GIS information on distribution and storage infrastructure as well as demands associated with meter location received from the Metron metering system. The resulting model shown **Figure 2**: Bryant Hydraulic Model simulated Bryant's water system and typical demands. Scaling water demands within the model based on future expected demands allowed for future improvements to be determined based on a design criterion including adequate service pressures, fire flow capabilities, and sufficient water capacity within the system for both average and maximum day demands.

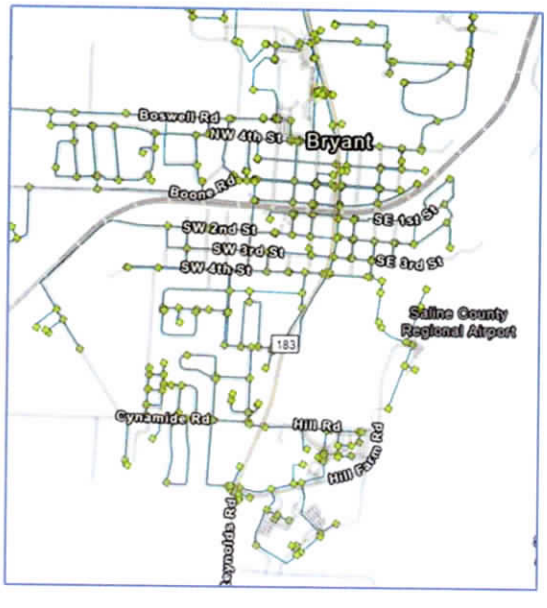


Figure 2: Bryant Hydraulic Model

E. Water Supply

Bryant currently purchases all of its water from CAW under a wholesale water purchase agreement. Bryant can receive up to 4.0 MGD under this agreement. As evidence of the demand projections, the current 4.0 MGD allotment will not be sufficient for projected demands. Saline Regional Public Water Authority (SRPWA) is an anticipated future supply of water for the City of Bryant, of which Bryant's minimum allocation is proposed to be 2.0 MGD.

Scenarios including individual and combined water supply from CAW and SRPWA were evaluated, and improvements were provided based on those scenarios. Once the design of the SRPWA connection is established, an update to the Master Plan further clarifying the future needed improvements based on the capacity and location of the SRPWA connection may be required.

F. System Improvements

The system improvements were evaluated based on hydraulic modeling of average and maximum day demands for the current system, and the system demands in years 2030, 2040, and 2050. Based on these scenarios, improvements were developed and separated in near-term, mid-term, and long-term improvements. Near-term improvements are improvements that are most needed to meet the needs of the system within 0 – 10 years. Mid-term improvements look at improvements that will be needed to meet system demands in the 10 – 20 year range. Long-term improvements look at improvements needed to meet the 20+ year range of demands and are based on service to customers, reliability, and fire flow demands. The improvement timeframe recommendations can change based on new construction, street projects, and other system changes that may require improvements to become a higher priority.

Near Term Improvement costs are projected at $12,400,000, Mid Term Improvements at $8,700,000, and Long-Term Improvements at $8,300,000.

Near-term improvements consist of consolidating the south pressure zone via removal of the existing south tank and the installation of a new 1,500,000 gallon tank on the same elevation as the north pressure zone. This conversion would aid in increased pressures to areas within the south zone currently experiencing low pressure and low water flow issues. Other improvements included involve those needed to better connect the north and south areas of Bryant for this pressure zone conversion as well as needed connections to improve fire flow within the system.

Mid-term improvements consist of extensions required for connection and utilization of the SRPWA water supply, as well as fire flow and reliability improvements.

Long-term improvements consist of improvements needed to better connect the system to allow adequate water supply throughout the system to meet the projected increased system demands.

Below is the projected list of improvements needed as well as the expected capital cost.

CITY OF BRYANT WATER UTILITIES
WATER SYSTEM MASTER PLAN
CAPITAL IMPROVEMENT PLAN

Added to model
Exhibit Complet
Not in model

No.	Type	Description	Diameter	Length	Cost Estimate ($)	CAPITAL IMPROVEMENT PLAN			CIP Exhibit
						Near Term ($)	Mid Term ($)	Long Term ($)	
Water System Improvements - Distribution System - Near Term Improvements									
1	609 PZ Expansion	1,500,000 Gallon Tank @ N. Reynolds / High School	-	-	$ 9,000,000	$9,000,000			
2	609 PZ Expansion	12 inch extension Boon Road	12	5,000	$ 1,300,000	$1,300,000			
3	609 PZ Expansion	Springhill, I30 to Highway 5 N	16	2,100	$ 1,000,000	$1,000,000			
4	Improvement	Woodland Hills Metron Meter and Vault	-	-	$ 60,000	$60,000			
5	FF	Airport to Hill Road	8	900	$ 180,000	$180,000			
6	FF	Bryant Pkwy I30 to Johnswood	8	3,700	$ 740,000	$740,000			
7	FF	N Reynolds Road at Rogers Road Crossing	8	100	$ 40,000	$40,000			
8	ff/loop	Woody Dr to Steeplechase Cir	8	400	$ 80,000	$80,000			
Water System Improvements - Distribution System - Mid-Term Improvements									
9	SRPWA	SRWRPA Extension North tank to Hwy 5 Tank	18	10,000	$ 3,500,000		$3,500,000		
9A	SRPWA	Highway 5 at Springhill to Highway 5 Tank - SRPWA Connection	18	12,000	$ 4,000,000		$4,000,000		
10	SRPWA	Connect Services Before CAW Pump Station along I30	8	1,400	$ 192,000		$192,000		
11	Pump Station	Chlorination upgrades at CAW Booster Pump Station	-	-	Awaiting Pricing		Awaiting Pricing		
12	ff/loop	Forest Dr and Highway 5 N Interconnect	8	350	$ 52,500		$52,500		
13	FF/loop	Debswood to Carywood Dr	6	800	$ 150,000		$150,000		
14	FF/loop	Highway 5 Extension to Lowery Lane	8	2,000	$ 420,000		$420,000		
15	FF/loop	Sunset Meadows Extension	8	350	$ 100,000		$100,000		
16	FF/loop	Ward Dr Extension	6	1,200	$ 216,000		$216,000		
Water System Improvements - Distribution System - Long Term Improvements									
17	2050 Improvement	Hwy 5 Tank to I-30 Crossing	16	3,000	$ 1,600,000			$1,600,000	
18	2050 Improvement	I30 to South Tank	16	8,000	$ 3,000,000			$3,000,000	
19	CAW	Booster Pump Station to I 30 at Pikewood	16	11,000	$ 3,500,000			$3,500,000	
20	CAW	New 75 HP Goulds Pump	-	-	$ 200,000			$200,00	
21	SRPWA	SRPWA Extension for East End			$	-		$0	
				TOTALS	**$29,330,500.00**	**$12,400,000**	**$8,630,500**	**$8,300,000**	

* Cost estimates determined in July 2024 include construction costs, contingency, and other project costs for engineering, legal, environmental, etc.

Project No. 24005