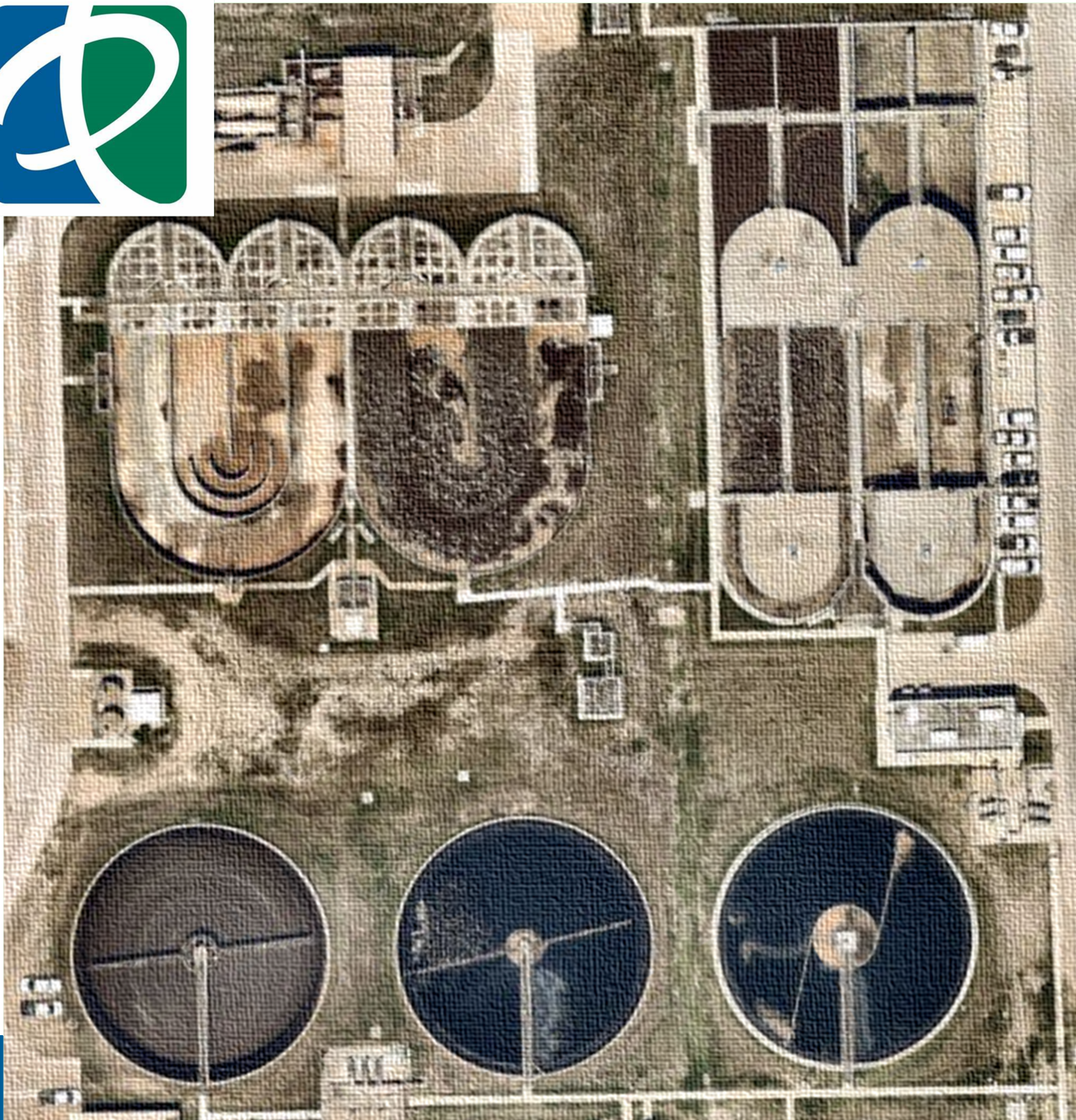

City of Pflugerville Wastewater Master Plan

2025

stv

CITY OF PFLUGERVILLE
WASTEWATER MASTER PLAN

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TEXAS

July 2025

This report presents the results of the preliminary study of the existing conditions of the City of Pflugerville wastewater collection system and presents the development to be used in further Master Planning activities. This study is intended for planning purposes and does not include final design criteria and recommendations.

TBPELS Registration Number: F-204

July 21,2025
Bo Cao, PE
PE No.143796

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LIST OF ACRONYMS

Acronym	Definition
CCN	Certificate of Convenience and Necessity
CIP	Capital Improvement Plan
DWWF	Dry Weather Wastewater Flow
EPA	Environmental Protection Agency
EPS	Extended Period Simulation
ETJ	Extra-Territorial Jurisdiction
FEMA	Federal Emergency Management Agency
FLUM	Future Land Use Map
GIS	Geographic Information System
gpCd	gallon per Connection per day
gpcd	gallon per capita per day
gpm	gallons per minute
HGL	Hydraulic Grade Line
I/I	Inflow and Infiltration
LF	Linear Feet
MGD	Million Gallons per Day
MUD	Municipal Utility District
NOAA	National Oceanic and Atmospheric Administration
RDII	Rainfall-Derived Inflow and Infiltration
SSO	Sanitary Sewer Overflow
TCAD	Travis Central Appraisal District
TCEQ	Texas Commission on Environmental Quality
WWTP	Wastewater Treatment Plant
WCRWWTF	Wilbarger Creek Regional Wastewater Treatment Plant

EXECUTIVE SUMMARY

1.0 INTRODUCTION

The City of Pflugerville, amid rapid residential, commercial, and industrial growth, has developed a Wastewater Master Plan (WWMP) to guide the strategic expansion and management of its wastewater system through 2030, 2035, and ultimate buildout within the wastewater CCN boundary.

The WWMP aims to evaluate existing infrastructure, forecast future needs, and develop a phased Capital Improvement Plan (CIP) addressing both renewal and capacity. Key components include flow projections based on growth trends, hydraulic model development and calibration, system capacity assessment, and prioritized CIP development—all documented in a comprehensive report.

This plan provides a clear roadmap to ensure a reliable, efficient, and resilient wastewater system that meets the City's long-term service demands.

2.0 GROWTH PROJECTIONS

Growth projections are a critical part of the master planning process, as the amount and location of future development drive the need for new infrastructure. In coordination with the City, STV developed growth projections to estimate wastewater connections and equivalent populations for the 2025, 2030, 2035, and Buildout planning periods, with Buildout anticipated around the year 2068. These equivalent population estimates account for both residential and non-residential connections. The projections focus on new development only and do not consider redevelopment in areas that are already developed.

Table ES-1. Wastewater Service Area Growth Projections

Planning Period	Wastewater Service Area Connections	Total WW Service Area Equivalent Population (1)	Annual Growth Rate
2025	23,430	66,776	-
2030	34,130	97,270	7.8%
2035	47,903	136,524	7.0%
Buildout (2068)	103,449	294,830	-

(1) Based on 2.85 people per connection as City suggested.

3.0 WASTEWATER FLOW PROJECTIONS

STV developed wastewater flow projections for the City of Pflugerville for the 2025, 2030, 2035, and Buildout planning periods. Historical flow data and flow meter data was analyzed to identify trends and establish design criteria for projecting average day flows. Based on this analysis, STV recommended a design flow of 250 gallons per connection per day. **Table ES-2** provides a summary of the wastewater flow projections for each planning year included in this study.

Table ES-2. Wastewater Flow Projections

Basin	Average Daily Flow (MGD)			
	2025	2030	2035	Buildout (2068)
Central	3.32	4.33	5.27	7.48
Wilbarger	2.39	3.90	4.86	7.12
Cottonwood West	0.15	0.31	1.33	5.04
Cottonwood East	0.00	0.00	0.51	6.16
Total	**5.86**	**8.53**	**11.98**	**25.80**

4.0 WASTEWATER MODEL NETWORK UPDATE

STV received the previously calibrated hydraulic model of the City of Pflugerville's wastewater collection system from the City. Originally developed and calibrated in 2018 using InfoWorks ICM, this model served as the foundation for subsequent updates. To ensure accuracy, STV gathered and reviewed relevant system data to account for infrastructure improvements completed since 2018 and incorporated those changes into the model network.

5.0 WASTEWATER MODEL CALIBRATION

Model calibration is the process of adjusting parameters within the InfoWorks ICM hydraulic wastewater model so that the simulated flow behavior closely reflects actual flow conditions observed during a flow monitoring period. A well-calibrated model forms the foundation for reliable future scenario analyses. STV used flow monitoring and rainfall data collected by RJN Group, Inc.at 17 locations to calibrate the Dry Weather Wastewater Flow (DWWF). However, no suitable wet weather events were captured during the flow monitoring period. As a result, wet weather calibration could not be completed. Instead, RTK unit hydrograph parameters from a previous calibrated model were applied, under the assumption that rainfall-derived inflow and infiltration (RDII) characteristics have remained relatively unchanged over the past six years. Since no wet weather calibration was performed, the results may not accurately represent the current system conditions.

To represent RDII behavior in areas developed after 2018—primarily located within the Wilbarger Basin—RTK unit hydrograph parameters were selected based on the lowest observed RDII response within the same basin. This approach assumes that newer developments in the Wilbarger Basin exhibit similar or lower RDII characteristics compared to the historically monitored areas. An updated wastewater model calibration is recommended following capture of wet weather events during a future flow monitoring period.

6.0 WASTEWATER SYSTEM ANALYSIS

STV used the dry weather calibrated hydraulic model to perform a detailed analysis of both existing and future conditions within the City of Pflugerville's wastewater system. In developing system improvement recommendations, STV considered regulatory requirements established by the Texas Commission on Environmental Quality (TCEQ), which governs the design and operation of public wastewater systems. To evaluate the impact of RDII on the existing system, a 5-year, 6-hour design storm was developed by subconsultant AEM and was imported to the model for analysis. In areas of future development where the pipe layout has not yet been planned, a base flow rate of 750 gallons per day per acre—per the City's design manual—was used to estimate RDII.

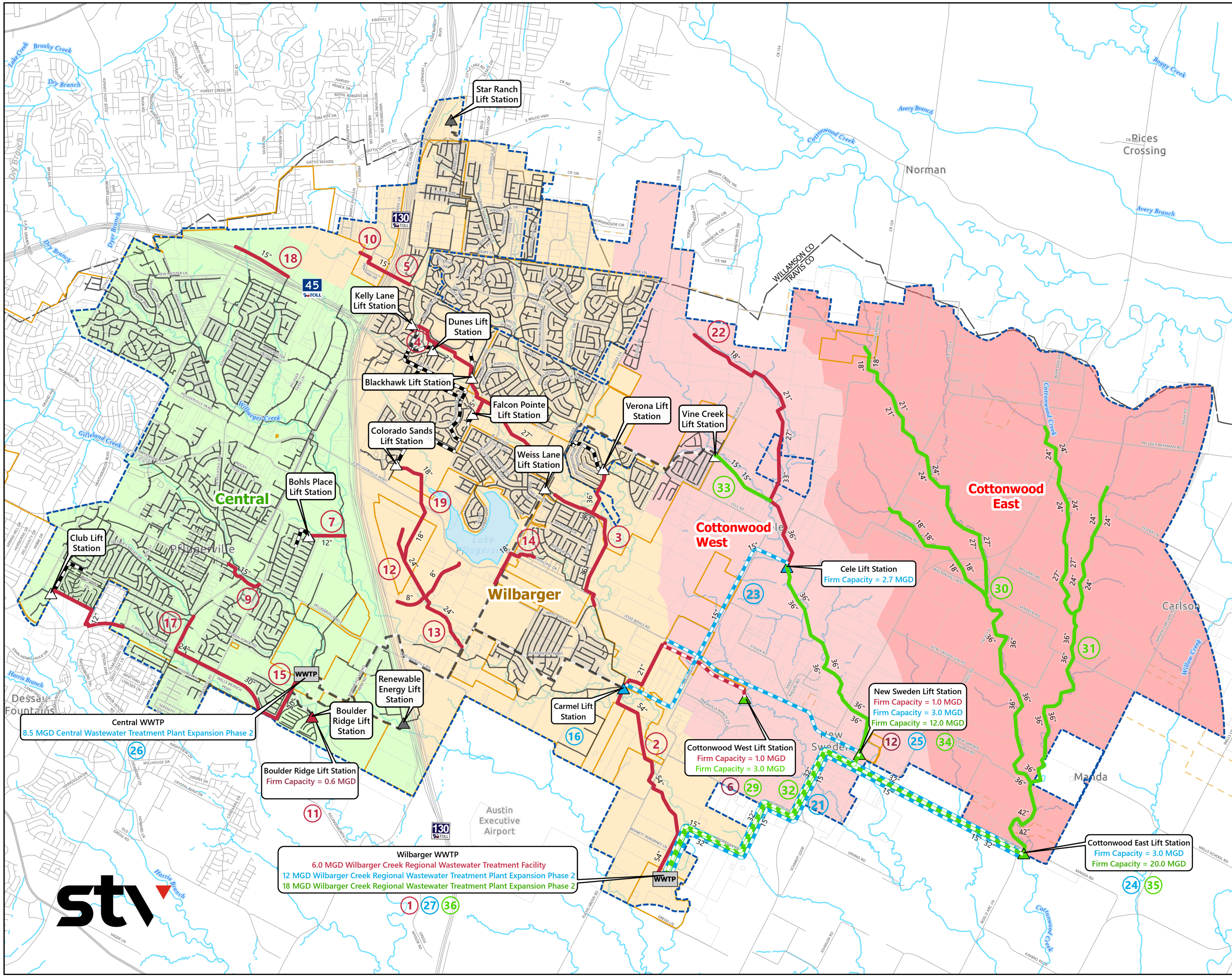
For this study, STV applied a design criterion that the hydraulic grade line (HGL) should remain at least 3 feet below the manhole rim, and that no sanitary sewer overflows (SSOs) should occur under modeled conditions. An extended period simulation (EPS) was conducted for each planning year to evaluate the system's dynamic performance, including hourly flow fluctuations, pump operations, and wet well levels.

The modeling results provided critical insights used to identify and refine a range of system improvements. STV evaluated various alternatives to determine the most effective approach for managing future flows. Key considerations in developing the recommended improvements included enhancing system reliability, simplifying operations, accommodating peak wet weather flows, maintaining appropriate flow velocities, and minimizing surcharging and the risk of SSOs.

7.0 WASTEWATER SYSTEM CAPITAL IMPROVEMENT PLAN

Capital Improvement Plan (CIP) projects were identified for each planning period based on hydraulic modeling results and capacity recommendations developed by STV. The recommended improvements are illustrated in **Figure ES-1**. The locations of new wastewater lines and other improvements were approximated for the purposes of hydraulic modeling and analysis. Final alignments and site-specific details will be determined during the design phase. While the projects are generally intended to be constructed in the order presented, actual construction sequencing may shift depending on how development progresses across the service area.

Table ES-3 provides planning-level cost estimates for the City of Pflugerville's wastewater capital improvement plan. These estimates are presented in 2025 dollars and include allowances for engineering, surveying, and contingencies. Costs related to right-of-way acquisition are not included in these estimates.



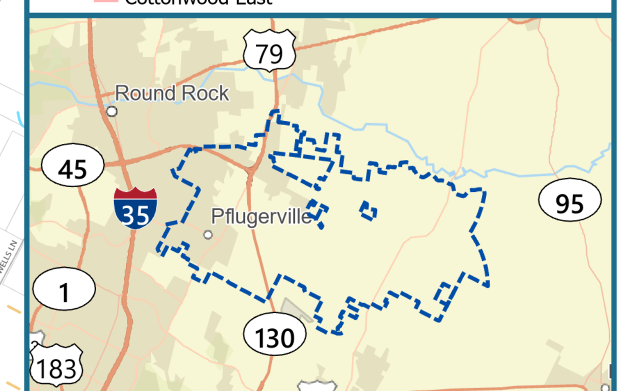


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FIGURE ES-1
CITY OF PFLUGERVILLE
WASTEWATER SYSTEM PHASED CAPITAL IMPROVEMENTS

Table ES-3. Wastewater System Capital Improvement Plan

ID No.	Timeframe	Project No.	Project Name	Project Cost	Timeframe Total
1	Ongoing	WW2001	6.0 MGD Wilbarger Creek Regional Wastewater Treatment Facility	$280,893,347	$410,875,469
2	Ongoing	WW2002	54-inch Wilbarger Wastewater Interceptor	$26,202,367	
3	Ongoing	WW2003	36-inch Sorento Wastewater Interceptor Phase 2	$15,703,458	
4	Ongoing	WW2201	27-inch Kelly Lane Wastewater Interceptor	$51,095,681	
5	Ongoing	WW2202	15-inch North Wilbarger Wastewater Interceptor	$2,633,892	
6	Ongoing	WW2302	Cottonwood West Force Main and Lift Station	$10,082,457	
7	Ongoing	WW2304	12-inch Bohls Place Wastewater Interceptor	$2,903,111	
8	Ongoing	WW2306	Rehabilitation of Wastewater Lines	$14,074,345	
9	Ongoing	WW2401	15-inch Gilleland Creek Wastewater Interceptor	$4,504,865	
10	Ongoing	WW2402	15-inch Northwest (NW) Wilbarger Wastewater Interceptor	$2,033,847	
11	Ongoing	WW2403	Boulder Ridge Lift Station Rehabilitation and Expansion	$1,714,000	
12	Ongoing	WW2503	New Sweden Lift Station and Force Main	$11,972,444	
13	Ongoing	WW2601	24-inch Colorado Sands Wastewater Interceptor (Lakeside Meadows)	$343,000	
14	Ongoing	WW2604	Water Treatment Plant Wastewater Line	$793,000	
15	2025-2030	WW2602	12-inch Club Wastewater Interceptor	$8,190,000	$56,510,259
16	2025-2030	WW2701	Carmel Lift Station Rehab and Improvements	$1,076,878	
17	2025-2030	WW2702	24-inch Central Wastewater Interceptor	$26,790,732	
18	2025-2030	WW2703	15-inch SH45 Wastewater Interceptor	$5,945,469	
19	2025-2030	WW2704	18-inch Colorado Sands Wastewater Interceptor	$8,581,180	

ID No.	Timeframe	Project No.	Project Name	Project Cost	Timeframe Total
20	2025-2030	WW2705	Rehabilitation of Wastewater Lines	$5,926,000	
21	2030-2035	WW3001	Wastewater Master Plan Update	$800,000	$228,094,857
22	2030-2035	WW3002	Upper New Sweden Wastewater Interceptor	$500,000	
23	2030-2035	WW3003	Cele Lift Station and Force Main	$500,000	
24	2030-2035	WW3004	Cottonwood East Lift Station and Force Main	$32,161,000	
25	2030-2035	WW3005	New Sweden Lift Station Expansion to 2.0 MGD	$1,419,000	
26	2030-2035	WW2101	Rehabilitation of Central Wastewater Treatment Plant	$22,382,857	
27	2030-2035	WW3006	Wilbarger Creek Regional Wastewater Treatment Plant Expansion Phase 2	$150,332,000	
28	2030-2035	WW3007	Rehabilitation of Wastewater Lines	$20,000,000	
29	2035-Buildout	WW3501	Cottonwood West Lift Station Expansion to 3.0 MGD	$1,534,000	$365,794,328
30	2035-Buildout	WW3502	Cottonwood East Wastewater Interceptor Phase 1	$62,716,328	
31	2035-Buildout	WW3503	Cottonwood East Wastewater Interceptor Phase 2	$54,293,000	
32	2035-Buildout	WW3504	36-inch Lower New Sweden Interceptor	$23,535,000	
33	2035-Buildout	WW3505	15-inch Vine Creek Interceptor	$4,923,000	
34	2035-Buildout	WW3506	New Sweden Lift Station Expansion to 12.0 MGD and Force Main	$45,997,000	
35	2035-Buildout	WW3507	Cottonwood East Lift Station and Force Main Expansion to 18 MGD	$73,086,000	
36	2035-Buildout	WW3510	Wilbarger Creek Regional Wastewater Treatment Plant Expansion Phase 3	$99,710,000	

1.0 INTRODUCTION

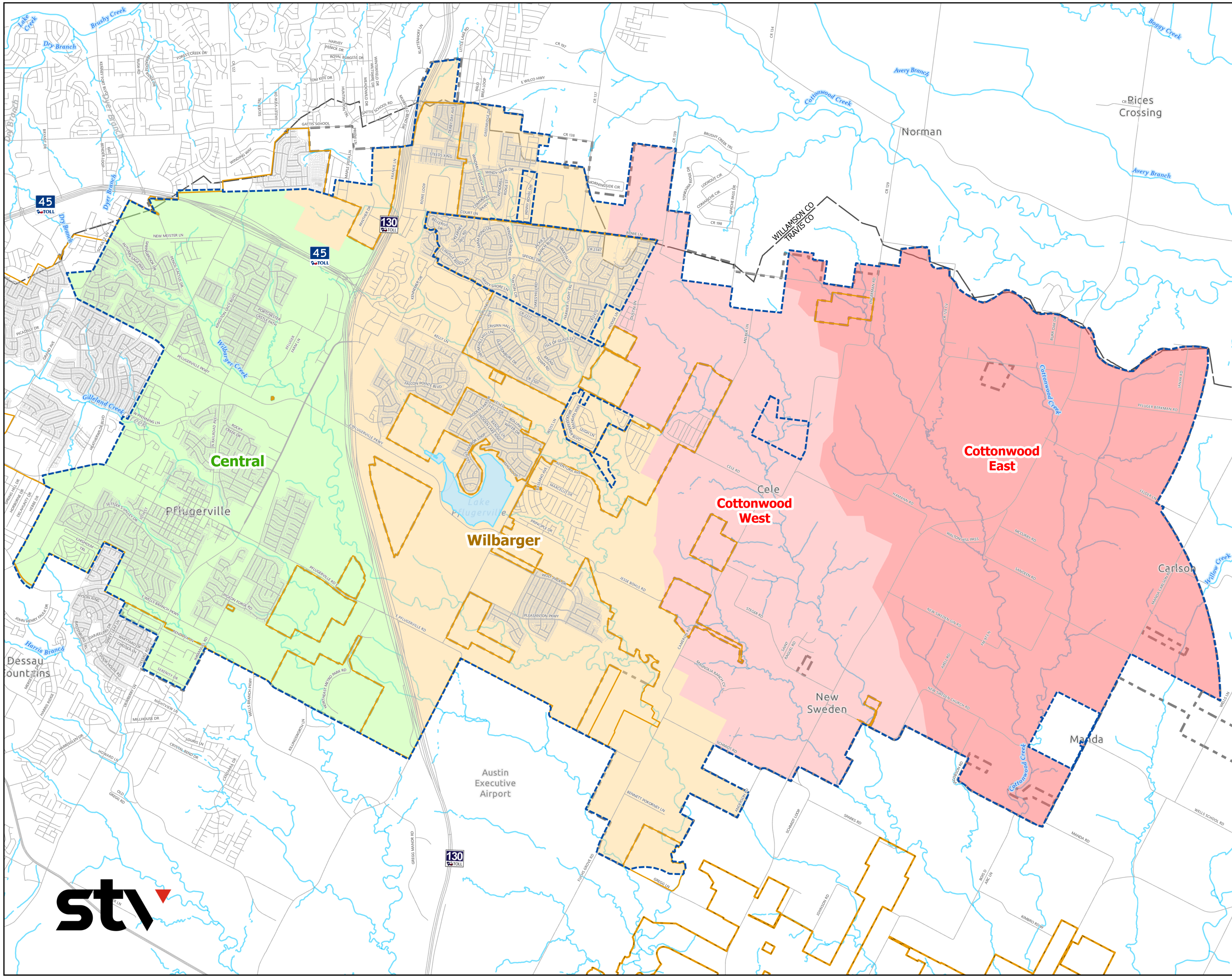
The City of Pflugerville (City)—one of Central Texas's fastest-growing communities—is experiencing rapid residential, commercial, and industrial development. To proactively address the impacts of this growth, the City has prepared a forward-thinking Wastewater Master Plan (WWMP). This plan serves as a strategic framework for guiding the expansion, optimization, and long-term management of the City's wastewater collection and treatment systems through three key planning horizons: 2030, 2035, and ultimate buildout within the City's Wastewater Certificate of Convenience and Necessity (CCN) boundary, as shown in **Figure 1-1**.

The primary goals of the WWMP are to assess the current condition and performance of the existing infrastructure and to develop a phased Capital Improvement Plan (CIP) that addresses both renewal and capacity needs. These recommendations will support informed decision-making regarding the planning, design, construction, and funding of future wastewater facilities to meet the City's evolving service demands.

The scope of the WWMP includes the following major components:

- Forecasting future wastewater flows based on projected population growth and land use trends.
- Developing and calibrating a dynamic wastewater system model
- Evaluating the existing system's capacity and operational performance
- Creating a prioritized and phased Capital Improvement Plan
- Documenting all findings and recommendations in a comprehensive master plan report

Collectively, these efforts provide a strategic roadmap to ensure Pflugerville's wastewater system remains reliable, efficient, and resilient, supporting the City's long-term sustainability and service objectives.



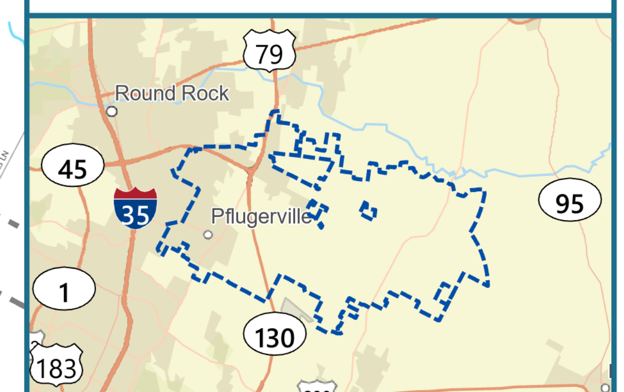


FIGURE 1-1

CITY OF PFLUGERVILLE

Wastewater Service Area

2.0 DATA SOURCES

The data utilized in the development of the Wastewater Master Plan, along with their respective sources, are summarized in **Table 2-1.**

Table 2-1: Data Sources

Name	Description	Source
Population Data	Population figures within the city limits and extraterritorial jurisdiction (ETJ)	City of Pflugerville Demographic Report [(1)]
WWTP Flow	Historical flow data from the Central Wastewater Treatment Plant (WWTP) covering the period from January 1993 to Dec 2024.	Spreadsheet provided by City
Wastewater Service Connections	Historical wastewater service connections covering the period from Dec 2002 to Dec 2024.	Spreadsheet provided by City
Aspire 2040 Comprehensive Plan Chapter 3: Land Use, Growth and Development	This chapter includes the Future Land Use Map (FLUM) (PDF) which provides guidance in determining the appropriateness of rezonings and is the foundation for many other master plans. (e.g., Transportation Master Plan, Water and Wastewater Master Plans, Parks, Recreation, and Open Space Master Plan) The Future Land Use Map (FLUM) within the Comprehensive Plan shall not constitute zoning regulations or establish zoning district boundaries.	City of Pflugerville Comprehensive Plan [(2)]
Pflugerville Development Activity	A list of developments currently planned in Pflugerville, with detailed information on each project's status and location	City of Pflugerville Development Activity [(3)]
Pflugerville Active Construction	A list of developments currently under construction in Pflugerville, with detailed information on each project's status and location	Pflugerville Active Construction [(4)]
City of Pflugerville Residential Units Completed by Year	City of Pflugerville Residential Units Completed by Year. Current Download is to October 31, 2024. (Hidden rows indicate projects for which all units have been built or for which duration between completed dwelling units is so long as to be essentially inactive)	City Of Pflugerville Open Data Portal [(5)]
Travis Central Appraisal District (TCAD) Parcels	Geographic data representing property parcels within the service area as assessed by the Travis Central Appraisal District (TCAD).	Provided by City
Land use Shape file	Future land use shapefile from Aspire 2040 with future land use categories labeled	Provided by City
City limit Shape file	The City of Pflugerville's incorporated limits.	City of Pflugerville Open Data Portal_City Limits [(6)]
Extra-Territorial Jurisdiction (ETJ) Shape file	Extra-Territorial Jurisdiction (ETJ) for the City of Pflugerville, TX.	City of Pflugerville Open Data Portal_ETC [(7)]
Pflugerville Wastewater CCN	City of Pflugerville's certificate of convenience and necessity for provision of wastewater services.	Public Utility Commission of Texas [(8)]

Name	Description	Source
Pflugerville Wastewater Force Main	Wastewater system force main for the City of Pflugerville, TX.	City Of Pflugerville Open Data Portal [5]
Pflugerville Wastewater Gravity Sewer Line	Wastewater system gravity sewer lines for the City of Pflugerville, TX.	City Of Pflugerville Open Data Portal [5]
Pflugerville Wastewater Lift Stations	Wastewater system lift stations for the City of Pflugerville, TX.	City Of Pflugerville Open Data Portal [5]
Pflugerville Wastewater Manhole	Wastewater system manholes for the City of Pflugerville, TX.	City Of Pflugerville Open Data Portal [5]

(1) https://experience.arcgis.com/experience/14a965b7728b4e14b962c5cf69d02f18?block_id=layout_733_block_5
(2) https://www.pflugervilletx.gov/241/Comprehensive-Plan
(3) https://pfgis.maps.arcgis.com/apps/MapSeries/index.html?appid=09fdb8b4af654ed9b38868314c5a2b3c
(4) https://pfgis.maps.arcgis.com/apps/MapSeries/index.html?appid=09fdb8b4af654ed9b38868314c5a2b3c
(5) https://dataportal-039dd-a0d3f-7bdd9-866f5-pfgis.opendata.arcgis.com/datasets/PfGIS::city-limits/about
(6) https://dataportal-039dd-a0d3f-7bdd9-866f5-pfgis.opendata.arcgis.com/datasets/PfGIS::extra-territorial-jurisdiction/about
(7) https://www.puc.texas.gov/industry/water/utilities/map.aspx

3.0 HISTORICAL DATA ANALYSIS

3.1 HISTORICAL POPULATION TRENDS

The City of Pflugerville has experienced significant population growth over the past decade, driven by regional development and an expanding urban footprint. According to the City of Pflugerville Demographic Report (**Figure 3-1**)**,** the annual population growth rate within the City limits and ETJ area averaged approximately 4.5% between 2013 and 2020, reflecting steady and rapid expansion. However, the population growth rate slowed during the pandemic from 2020 to 2022, averaging just 1.8%.

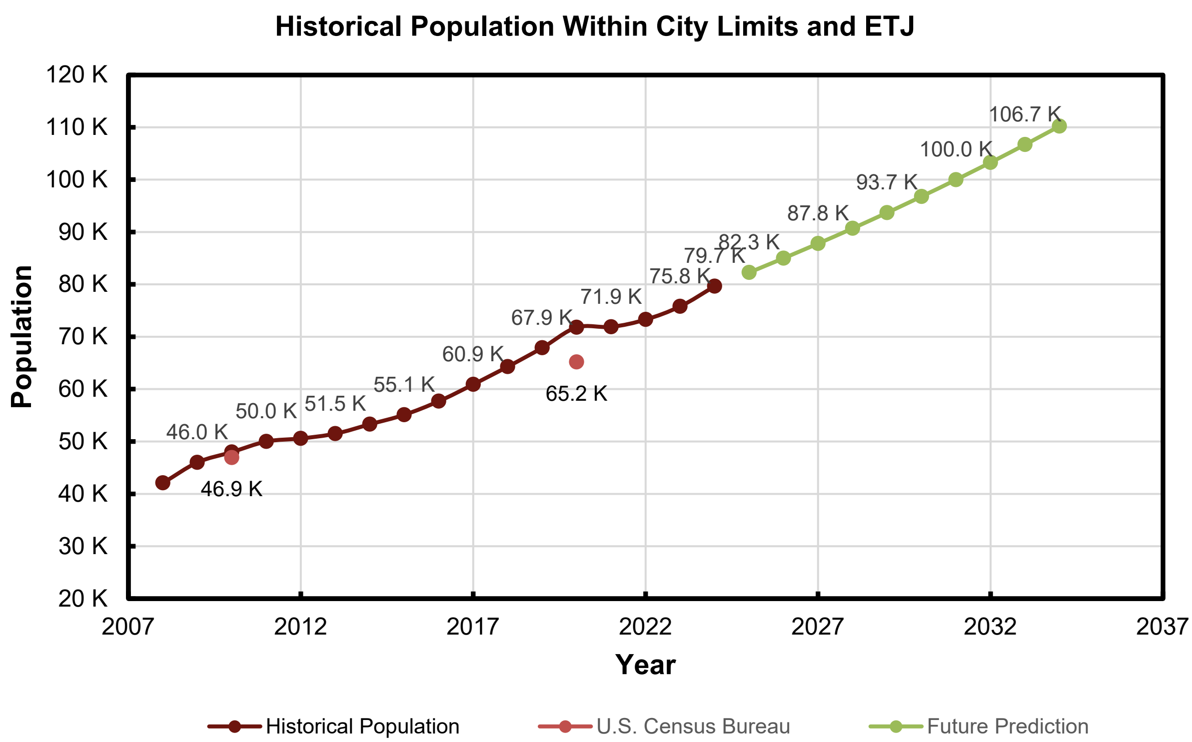


Figure 3-1. City of Pflugerville Historical Population within City Limits and ETJ

Data from the U.S. Census Bureau, further highlights this growth, reporting a population of 65,191 as of April 1, 2020. This marks a 37.2% increase since 2010, when the population was 46,936, corresponding to an average annual growth rate of 3.3 % over the decade. These historical trends provide a foundation for understanding current population dynamics and informing future growth projections. Considering these factors, an average annual growth rate of 3.3 % is anticipated within the City limits and ETJ area, aligning closely with the City Planning Group's projection of 3.0 % annual growth.

3.2 HISTORICAL WASTEWATER CONNECTIONS TRENDS

The City provided monthly wastewater service connection data from 2013 to 2023, which was analyzed by STV. **Table 3-1** summarizes the number of connections recorded in December of each year, reflecting the historical yearly wastewater service connections.

Prior to 2020, the City of Pflugerville experienced rapid development, with annual growth rates in wastewater connections averaging approximately 5.5%. However, after 2021, this growth rate declined significantly to around 2%, potentially due to broader economic factors limiting City developments, such as rising interest rates.

Table 3-1: Historical Wastewater Service Connections and Equivalent Population

Year	Connections	Connections Growth per Year	Growth Rate
2013	15,522	-	-
2014	16,447	925	6.0%
2015	17,377	930	5.7%
2016	18,420	1,043	6.0%
2017	19,340	920	5.0%
2018	20,361	1,021	5.3%
2019	21,731	1,370	6.7%
2020	23,093	1,362	6.3%
2021	23,377	284	1.2%
2022	24,076	699	3.0%
2023*	24,524	448	1.9%
Average	-	**875**	**4.70%**
Standard Deviation	-	**325**	**1.77 %**

*City migrated to a new ERP and is assessing how the new platform tracks service connections across the City's service area.

3.3 HISTORICAL WASTEWATER TREATMENT PLANT FLOW

Wastewater flows in a municipal collection system vary by time of day, wastewater discharge source, and weather conditions. Annual average day flow is defined as the arithmetic average of all daily flow determinations taken within a period of 12 consecutive months. Wastewater treatment is typically discussed in terms of annual average daily flow, while the collection system is designed to convey peak wastewater flows. To estimate future wastewater annual average day flow, historical wastewater flow data was analyzed to determine historical trends. Historical wastewater flow data was provided by the City for the Central WWTP from January of 2009 through December 2024. The annual average flow for the last 10 years is shown in **Figure 3-2**. Over the past eleven years, flows consistently increased from 2013 to 2021. Starting in 2022, while wastewater connections continued to grow, a 20 % decline in the average daily flow was observed. The observed decline in average daily wastewater flows may be attributed to several factors.

- The decommissioning of the Highland Park and Pflugerville Crossing lift stations, along with the installation of the new 30/24-inch Highland Park Interceptor and 42/36/33-inch SH 130 Interceptor, significantly decreased groundwater infiltration into the wastewater system according to City Engineer observations. These improvements minimized extraneous water entering the wet well, contributing to lower overall flows.

- Post-Pandemic Behavioral Changes. During the pandemic (2019–2021), widespread remote work led Pflugerville residents to spend more time at home, increasing residential wastewater generation. However, as pandemic restrictions eased in 2022, many residents returned to commuting to workplaces in Austin and surrounding areas. This shift reduced daytime water use in Pflugerville, contributing to the observed decline in local average daily flows.

- Drought Conditions in Central Texas (2022 Onward) and water conservation measures implemented by the City.

While rainfall does not always directly correlate with average daily wastewater flows, extreme wet years—such as 2021, which saw approximately 65 inches of rain—can lead to higher infiltration and inflow (I/I) in the system. The significant flow variance (~4 MGD) observed in 2021 suggests increased I/I during heavy rainfall. Conversely, the drought conditions beginning in 2022 and water conservation measures implemented by the City likely contributed to lower wastewater influent flow measurements.

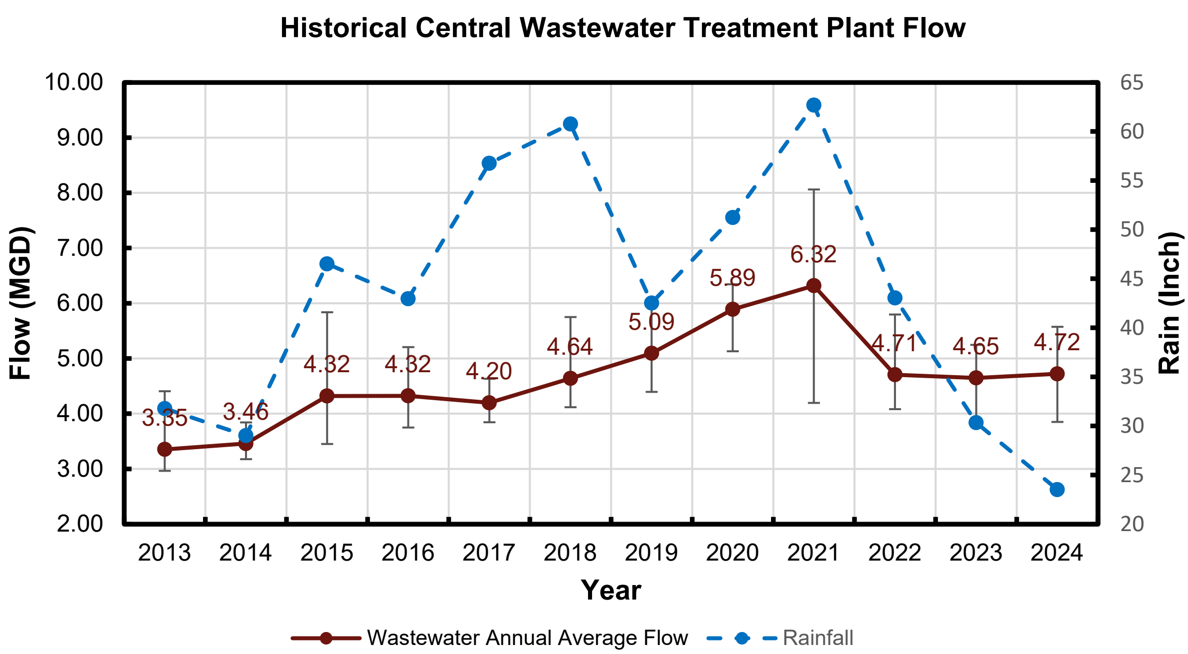


Figure 3-2: Historical Wastewater Flow Data

4.0 WASTEWATER FLOW PROJECTIONS

4.1 PROJECTION METHODOLOGY

In collaboration with the City's Planning Department and Water Utility Department, wastewater flow projections were developed for planning purposes for the 5-year (2030), 10-year (2035), and buildout periods. These projections include wastewater flows, equivalent population from both residential and non-residential connections. The growth projections exclude any redevelopment in areas that already have existing development and assuming that City's wastewater CCN will not change in the future. Projections through 2035 are based on current planned developments. Projections through buildout are based on future land use designated from Aspire 2040 Comprehensive Plan.

To project future wastewater flow, three parameters are essential: land use types for future developments, wastewater service connections per acre, and wastewater flow per connection. The land use types within the City of Pflugerville's wastewater CCN have been outlined in the City's 2040 Comprehensive Plan (**Figure 4-1**), which includes existing developed areas, planned future developments, and the final buildout. However, the wastewater service connections per acre by land use type and the wastewater flow per connection are yet to be determined.

4.1.1 Determine Wastewater Flow per Connection per Day

To determine the representative value of wastewater flow per connection, historical data from 2014 to 2024 for the WWTP's monthly average flow (MGD) and the total monthly wastewater connections were analyzed (**Appendix B**). The wastewater flow per connection, expressed in gallons per connection per day (gpCd), was calculated by dividing the average monthly flow by the total monthly wastewater connections.

To better reflect the recent reduction in wastewater flow, as discussed in Part 3.3, a weighted averaging method was adopted to determine the wastewater flow in gallon per connection per day (gpCd). The available flow data were divided into two distinct periods: the 8-year span from 2014 to 2021 and the 3-year span from 2022 to 2024. Rather than applying a simple average across all ten years—which would have placed disproportionate emphasis on the older, higher-flow data—equal weightings of 50% were assigned to each period. In this approach, each time frame was treated as an independent representation of system behavior. The average flow per connection was calculated separately for each period, and the final result was obtained by taking the mean of these two averages, giving equal influence on both. As shown in **Table 4-1**, the weighted average wastewater flow per connection is 218 gpCd, with a standard deviation of 35 gpCd. Statistically, this means there is a 68% probability that the actual flow falls within one standard deviation of the average (i.e., between 183 gpCd and 253 gpCd). To ensure a less conservative yet representative estimate, we rounded the upper bound (253 gpCd) to the nearest 10, resulting in 250 gpCd. This value captures the expected variability in wastewater flows, as it reflects the range where the majority (68%) of data points are likely to occur. Based on the equivalent population assumption of 2.85 people per connection provided by City, the corresponding wastewater flow is 88 gallons per capita per day. This value aligns with the range specified by the TCEQ Chapter 217, Figure: 30 TAC §217.32(a)(3), which states that residential daily wastewater flow typically falls between 75 and 100 gallons per person.

Table 4-1. Wastewater Flow Per Connection with Unit Gallon Per Connection Per Day

Median	Weighted Average	Standard Deviation	Minimum	Maximum
225	218	35	161	345

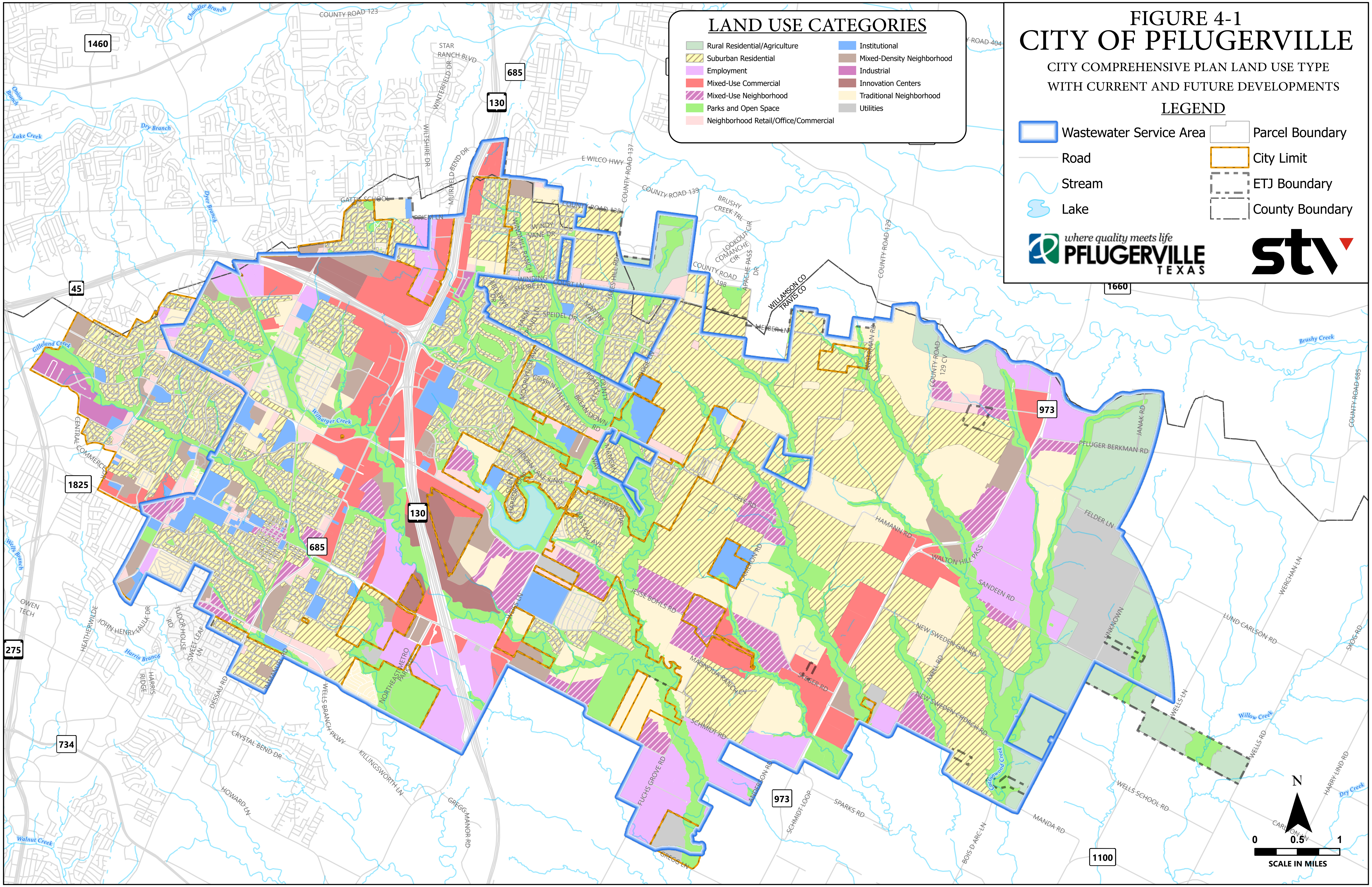


FIGURE 4-1
CITY OF PFLUGERVILLE
CITY COMPREHENSIVE PLAN LAND USE TYPE
WITH CURRENT AND FUTURE DEVELOPMENTS
LEGEND
Wastewater Service Area
Parcel Boundary
Road
City Limit
Stream
ETJ Boundary
Lake
County Boundary
where quality meets life
PFLUGERVILLE
TEXAS
LAND USE CATEGORIES
Rural Residential/Agriculture
Suburban Residential
Employment
Mixed-Use Commercial
Mixed-Use Neighborhood
Parks and Open Space
Neighborhood Retail/Office/Commercial
Institutional
Mixed-Density Neighborhood
Industrial
Innovation Centers
Traditional Neighborhood
Utilities
N
0
0.5
1
SCALE IN MILES
1460
685
130
45
1825
275
734
973
1660
1100
COUNTY ROAD 123
E WILCO HWY
COUNTY ROAD 139
WILLIAMSON CO
TRAVIS CO
PFLUGER BERKMAN RD
FELDER LN
WALTON HILL PASS
SANDEEN RD
NEW SWEDEN GIN RD
NEW SWEDEN CHURCH RD
JESSE BOHLS RD
MAGNOLIA RANCH CV
SCHMIDT RD
FUCHS GROVE RD
GREGG LN
WELLS BRANCH PKWY
KILLINGSWORTH LN
GREGG MANOR RD
CRYSTAL BEND DR
HOWARD LN
SCHMIDT LOOP
SPARKS RD
BOIS D ARC LN
MANDA RD
WELLS SCHOOL RD
LUND CARLSON RD
WELLS LN
Gilleland Creek
Wilbarger Creek
Brushy Creek
Willow Creek
Dry Creek
Walnut Creek
Harris Branch
Dry Branch
Lake Creek

Table 4-2 also compares the estimated average daily wastewater flow per connection for neighboring municipalities. Pflugerville's value of 250 gallons per connection per day falls within the mid-range of the values observed across Central Texas, suggesting it is a reasonable and representative estimate.

Table 4-2. Wastewater Flow Per Connection for Neighboring Municipalities

Municipalities	Gallon Per Connection Per Day	Source
City of Hutto	280	2022 Wastewater Master Plan
City of Round Rock	280	Round Rock Utility Criteria Manual
City of Manor	200	City of Manor 2024 Wastewater Master Plan
City of Austin	245	Austin Utilities Criteria Manual
City of Pflugerville	250	Current Master Plan

4.1.2 Determine Connections per Acre for Each Land Use Type

To determine the representative value of connections per acre for each land use type, the following process was followed, incorporating current developed areas (**Figure 4-1**), the number of existing connections, and flow metering data provided by RJN. The process adhered to two key criteria:

1. **Total Connections:**

   Starting with the connections per acre for each land use type suggested by City Aspire 2040 Comprehensive Plan and City's Unified Development Code (UDC) as a reference, the total number of connections for the existing developed areas was calculated to align with the 2023 connection count of 24,524, allowing for a variance of up to 1,226 connections (5% of the total). This was accomplished by merging the existing developed parcels with land use data from the City's Aspire 2040 Comprehensive Plan and assigning land use categories to each developed area. The connections per acre by land use type, were then applied to determine the total connections for the existing developed areas.

2. **Gallons per Connection per Day (gpCd):**

   The average daily flow data from the eight flow meter basins, provided by RJN, was used to calculate the gpCd for each basin. By analyzing the number of connections within each flow meter basin, the corresponding gpCd was determined by dividing the average daily flow by the number of connections in each basin. The goal was for the calculated gpCd to fall within the 95% probability range of 161 to 345 gpCd from the analysis in part 4.1.1.

If the calculated connections per acre by land use did not satisfy both criteria, the values were adjusted. This involved recalculating the total current connections and the gpCd values until both fell within the acceptable ranges. The final connections per acre by land use type, after adjustments, are summarized in **Table 4-3**.

Table 4-3. Connections/Acre by Land Use Types

Land Use Category	Connections/Acre
Rural Residential/Agriculture	0.5
Suburban Residential	3
Traditional Neighborhood	5
Mixed-Density Neighborhood	10
Mixed-Use Neighborhood	3
Neighborhood Retail/Office/Commercial	3
Mixed-Use Commercial	5
Innovation Centers	3
Employment	3
Industrial	4
Institutional	1.5
Parks and Open Space	0
Utilities	0
Mixed Use (Zone CL5)	45
Mixed Use (Zone CL4)	37.5
Mixed Use (Zone CL3)	10

4.1.3 Determine Planned Future Developments within the Wastewater CCN

Growth projections from 2025 to 2035 were established by analyzing known developments data from Pflugerville Development Activity, Pflugerville Active Construction and City of Pflugerville Residential Units Completed by Year over the next 10 years as well as City Staff input. This included examining location, land use type, and area to project future wastewater flows within the City's wastewater CCN. **Figure 4-2** and **Figure 4-3** shows the planned developments in the 5-year and 10-year planning period, respectively. **Table 4-4** listed all the details of planned future developments.

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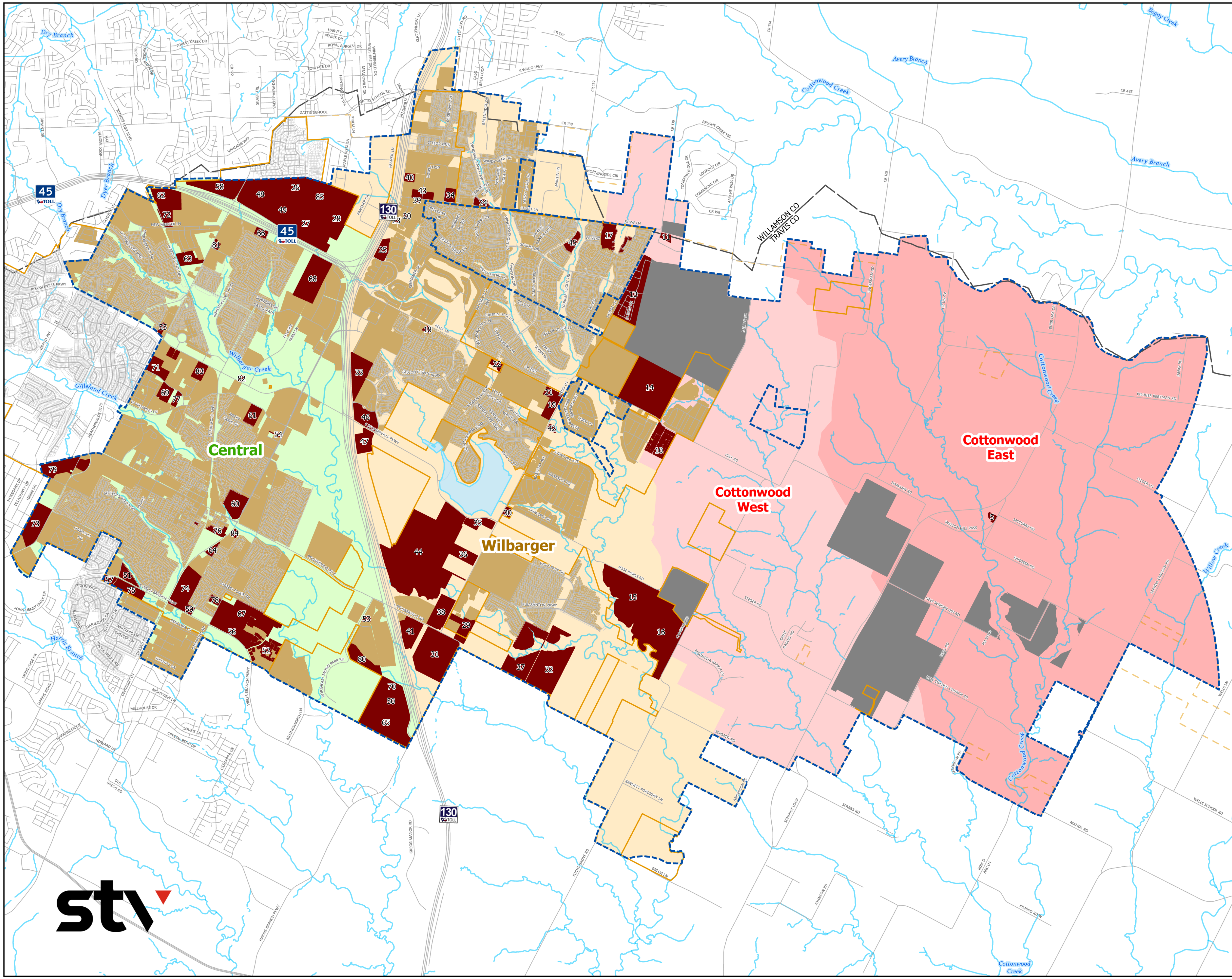
FIGURE 4-2

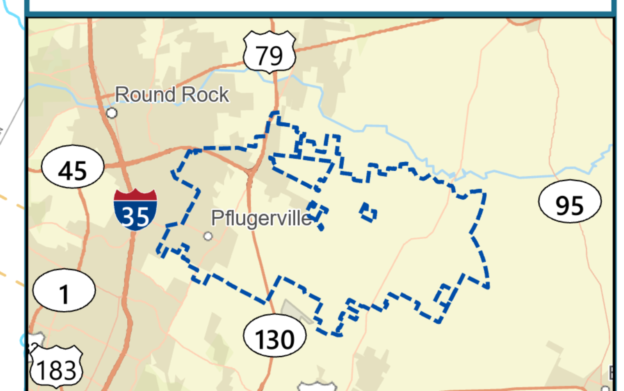
CITY OF PFLUGERVILLE

5 - YEAR DEVELOPMENT



LEGEND

- Wastewater Service Area
- ETJ Boundary
- County Boundary
- City Limit
- Road
- Stream
- Lake
- Existing Development
- Future Development
- 5-Year 100% Developed
- Central
- Wilbarger
- Cottonwood West
- Cottonwood East



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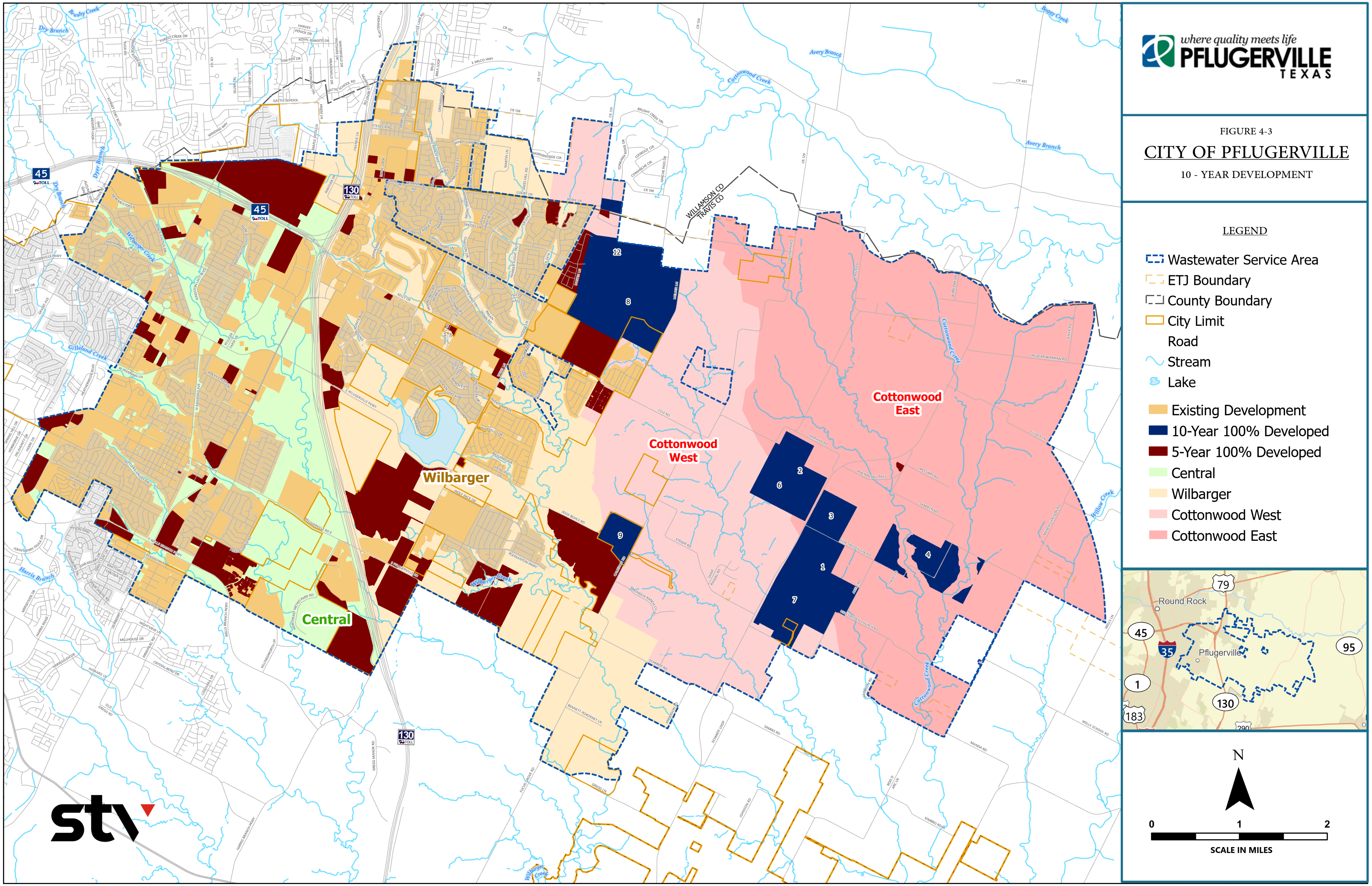


FIGURE 4-3

CITY OF PFLUGERVILLE

10 - YEAR DEVELOPMENT

Table 4-4. List of Future Developments.

ID	Development Name	Area (acres)	Status	Basin
1	New Sweden #1	193.4	Preliminary Plat	Cottonwood East
2	New Sweden #2	150.3	Preliminary Plat	Cottonwood East
3	New Sweden #2	118.4	Preliminary Plat	Cottonwood East
4	Olson Farms Subdivision	215.8	Preliminary Plat	Cottonwood East
5	Walton Hill Pass	3.0	Final Plat	Cottonwood East
6	New Sweden #2	155.5	Preliminary Plat	Cottonwood West
7	New Sweden #1	348.3	Preliminary Plat	Cottonwood West
8	Lakeside WCID #5	595.0	Preliminary Plat	Cottonwood West
9	Meadowlark Preserve	105.2	Preliminary Plat	Cottonwood West
10	Enclave at Cele	31.1	Construction	Cottonwood West
11	Rowe Ln Estates Sec 2 Lot 8 Repla	4.1	Final Plat	Cottonwood West
12	The Ridge at Blackhawk Ph 2(Black	157.4	Preliminary Plat	Cottonwood West
13	Ridge at Blackhawk	73.1	Construction	Cottonwood West
14	Grove at Blackhawk	149.6	Final Plat	Cottonwood West
15	Camel	136.9	Construction	Wilbarger
16	Carmel East	139.4	Final Plat	Wilbarger
17	Blackhawk	26.2	Construction	Wilbarger
18	Kelly Retail Center	2.6	Final Plat	Wilbarger
19	Weiss Kelly Subdivision	17.4	Preliminary Plat	Wilbarger
20	Layth Auto Service	0.5	Final Plat	Wilbarger
21	Heritage Lakes Skilled Nursing	4.4	Final Plat	Wilbarger
22	Kelly Retail Center	5.8	Final Plat	Wilbarger
23	1702 Dalshank St Parking Lot	0.5	Final Plat	Wilbarger
24	Rowe Lane Retail Center	6.1	Final Plat	Wilbarger
25	Pflugerville US TX 5747	13.2	Final Plat	Wilbarger
26	Deck & Wilke Tract 2	33.8	Final Plat	Wilbarger
27	Wilke Lane Timmerman East Tract 1	66.2	Preliminary Plat	Central/Wilbarger
28	Chisholm Station	81.4	Preliminary Plat	Central/Wilbarger
29	Pecan Estates	22.5	Preliminary Plat	Wilbarger
30	Weiss Ln Service Station	4.7	Final Plat	Wilbarger
31	Pecan & Cameron	104.5	Final Plat	Wilbarger
32	Murchison Tract Ph 1	95.9	Final Plat	Wilbarger
33	Northpointe East Tract Ph 1	37.9	Final Plat	Wilbarger
34	Mixed-Density Neighborhood	14.3	Construction	Wilbarger
35	Tacara at Weiss Ranch	14.6	Construction	Wilbarger
36	Weiss Ln Multi-Use	19.7	Final Plat	Wilbarger
37	Cameron 96/Urbana	70.1	Final Plat	Wilbarger
38	Lakeside Meadows Industrial Ph 2	33.8	Final Plat	Wilbarger

ID	Development Name	Area (acres)	Status	Basin
39	6966 Commercial Park Additon	0.5	Final Plat	Wilbarger
40	United Fleet Management	5.0	Final Plat	Wilbarger
41	Pecan Street Subdivision	29.8	Final Plat	Wilbarger
42	Pflugerville Industrial Park	2.5	Final Plat	Wilbarger
43	Rowe Loop Commercial	5.0	Final Plat	Wilbarger
44	Lakeside Meadows	325.4	Preliminary Plat	Wilbarger
45	Jakes Hill Condominiums	9.6	Construction	Wilbarger
46	BSW Hospital Expansion	26.4	Construction	Wilbarger
47	HEB	22.1	Construction	Wilbarger
48	Heatherwilde & SH45	74.9	Preliminary Plat	Central
49	Deck & Wilke Tract 1	50.5	Final Plat	Central
50	Scannell Pflugerville	43.1	Preliminary Plat	Central
51	BASIS Ph 2	11.3	Construction	Central
52	Lisso	25.7	Construction	Central
53	Residence Inn	2.3	Final Plat	Central
54	Pollo Rico	1.1	Final Plat	Central
55	Way of Life Church New Sanctuary	3.2	Final Plat	Central
56	Wells Branch and Immanuel Rd	22.9	Preliminary Plat	Central
57	Wells Branch Retail Center	5.8	Final Plat	Central
58	Pflugerville Commons PUD	44.0	Preliminary Plat	Central
59	Olympic Retail Center	4.0	Preliminary Plat	Central
60	Downtown East	29.6	Preliminary Plat	Central
61	Pfennig Place	14.6	Preliminary Plat	Central
62	Pflugerville Business Park	35.7	Final Plat	Central
63	The Pfarm	15.7	Final Plat	Central
64	Wuthrich Hill Farms Lot 1 Blk A R	4.6	Final Plat	Central
65	15000 Cameron Road	87.4	Preliminary Plat	Central
66	Victory Church Phase II	5.8	Construction	Central
67	Lisso Ph 5	77.2	Final Plat	Central
68	Lifestyle Communities	63.8	Final Plat	Central
69	901 Black Locust Drive East	12.3	Final Plat	Central
70	Impact Way Phase IV	17.4	Final Plat	Central
71	Parkway Bible Church Playground a	23.0	Final Plat	Central
72	SkyBox Phase 2	12.7	Construction	Central
73	Heatherwilde Multi-Family	42.2	Final Plat	Central
74	Wuthrich Hills Farms (w/ Olympic	48.5	Construction	Central
75	Village at Wells Branch	18.3	Construction	Central
76	Townhomes of Old Town East	7.2	Construction	Central
77	Paradise Cove Condos	4.6	Final Plat	Central
78	Mountain Creek Ranch Condominiums	5.0	Final Plat	Central

ID	Development Name	Area (acres)	Status	Basin
79	The Commons at Heatherwilde	35.4	Construction	Central
80	EVS Metals	24.4	Construction	Central
81	Crux Climbing Center	3.0	Construction	Central
82	Medical Office	1.4	Construction	Central
83	Kuempel Townhomes	11.4	Construction	Central
84	Dessau Creekside Mixed Use	2.3	Preliminary Plat	Central
85	Wilke Lane Timmerman East Tract 2	56.2	Preliminary Plat	Wilbarger

4.1.4 Determine Buildout Developments within the Wastewater CCN

All future growth through buildout was assumed to take place on those parcels within the wastewater CCN which are not identified in the existing developed and 5-year and 10-year developments. These parcels were categorized according to the City's Aspire Pflugerville 2040 Comprehensive Plan. **Figure 4-4** shows the parcels identified to develop in buildout planning period.

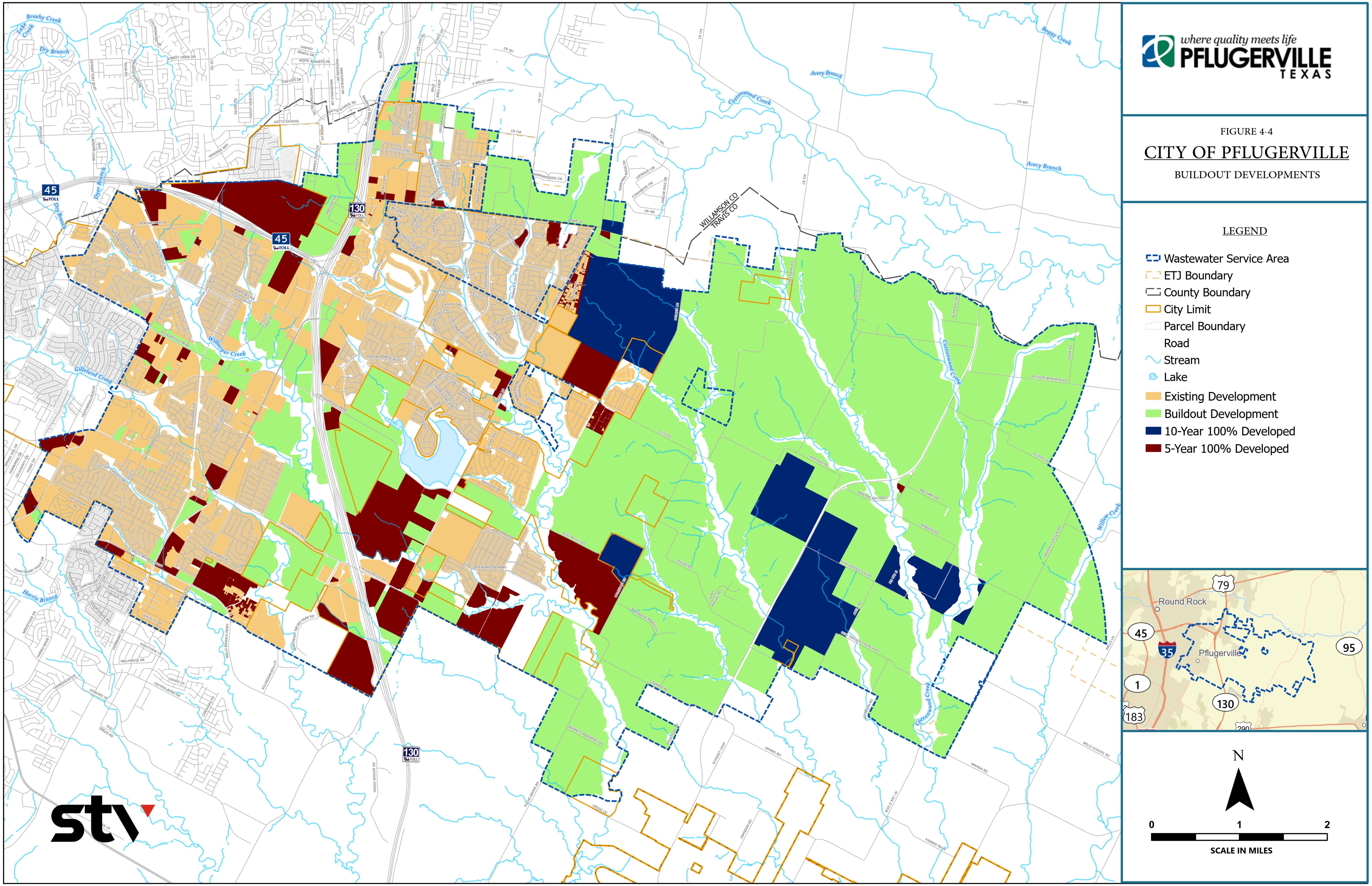


FIGURE 4-4

CITY OF PFLUGERVILLE

BUILDOUT DEVELOPMENTS

4.1.5 Determine the Development Completed Percentage within the Wastewater CCN

In coordination with the City, the development percentage for the planned developments identified in Section 4.1.3 and the buildout developments in Section 4.1.4 was determined based on each development's status (Preliminary Plat, Final Plat, or Construction) and its location within specific basins, as summarized in **Table 4-5**.

Table 4-5. Future Development Percentages

Basin	Planning Year	Developments	2030	2035	Buildout
Central, Wilbarger	2025-2030	Planned Future Developments with Preliminary Plat, Final Plat/Construction Status	100%		
	2030 - 2035	30 % of Buildout Developments		100%	
	2035 - Buildout	70 % of Buildout Developments			100%
Cottonwood West, Cottonwood East	2025-2030	Planned Future Developments with Final Plat/Construction Status	100%		
	2030 - 2035	Planned Future Developments with Preliminary Plat Status		100%	
	2035 - Buildout	Buildout Developments			100%

4.2 WASTEWATER CONNECTIONS PROJECTIONS

The total number of connections for all developed parcels was calculated for each planning period, considering factors such as acreage, development percentage, land use type, and the density values provided in **Table 4-6**. The equivalent population was then determined using the City's assumption of 2.85 people per connection. The growth projections do not include redevelopment in any areas that have existing development.

Table 4-6. Wastewater Service Area Connections Growth Projections

Planning Period	Wastewater Service Area Connections	Total WW Service Area Equivalent Population	Annual Growth Rate
2025	23,430	66,776	-
2030	34,130	97,270	7.8%
2035	47,902	136,522	7.0%
Buildout	103,204	294,133	-

Between 2025 and 2030, the annual growth rate for wastewater connections is projected to be 7.8%, adding 10,700 new connections. Between 2025 to 2035, the annual growth rate is anticipated to be 7.0%, resulting in an additional 13,772 connections. From 2035 to buildout, the number of connections is projected to increase from 47,902 to 103,204. Since no detailed development plans are available for this period, growth rates cannot be directly estimated. Therefore, an average population growth rate of 3.3% will be applied. Once 75% of the wastewater CCN is developed, the growth rate is assumed to decline to approximately 1.6%, reflecting the nearing buildout condition. Based on these assumptions, and assuming the wastewater CCN boundary remains unchanged, the system is anticipated to reach full buildout by 2068.

4.3 WASTEWATER FLOW PROJECTIONS

The development of projected wastewater flows for the 5-year (2030), 10-year (2035), and buildout periods, the gallon per connection (gpCd) in part 4.1.1 was used to calculate the average daily flow for each basin. The wastewater average daily flow projections for the 2030, 2035, and buildout planning periods are presented by wastewater basin in **Table 4-7**.

The Central basin, which currently has the largest share of connections and wastewater flow, will see steady but moderate growth over time. Its average daily flow is projected to increase from 3.32 MGD in 2025 to 7.53 MGD at buildout in 2068. However, the annual growth rate will decline from 5.7% (2025–2030) to 1.1 % (beyond 2035), reflecting a shift toward a more stabilized development pattern as the basin nears its capacity.

The Wilbarger basin also exhibits strong growth, with flows increasing from 2.38 MGD in 2025 to 7.07 MGD by buildout. This growth is driven by a robust annual rate of 10.0% between 2025 and 2030, which slows to 1.2% (beyond 2035). The declining growth trajectory indicates that Wilbarger basin, while initially expanding rapidly, will eventually follow a similar stabilization trend as Central basin.

The Cottonwood West basin and Cottonwood East basin stands out for its exponential growth. Starting with just 603 connections and a daily flow of 0.15 MGD in 2025, Cottonwood West basin will expand dramatically to 20,168 connections and an average daily flow of 5.04 MGD by buildout. The basin's growth is fueled by an annual rate of 15.3% (2025–2030), which further increased to 34.1% (2030-2035). Starting with 0 connections in 2025, Cottonwood East basin will expand dramatically to 24,629 connections and an average daily flow of 6.16 MGD by buildout. This rapid development highlights the importance of the Cottonwood West and Cottonwood East basins as pivotal areas for future urban growth.

The total wastewater connections across all basins are expected to increase from 23,430 in 2025 to 103,204 by 2068, with equivalent population rising from 66,776 to 294,133 by 2068. The average daily flow will grow from 5.86 MGD to 25.80 MGD, representing an annual system-wide growth rate of 2.4% from 2025 to 2068.

Table 4-7. Wastewater Projected Flow by Basin

Basin	Wastewater CCN Connections	Total WW Service Area Equivalent Population	Average Daily Flow (MGD)	Annual Growth Rate
2025				
Central	13,296	37,894	3.32	-
Wilbarger	9,531	27,163	2.38	-
Cottonwood West	603	1,718	0.15	-
Cottonwood East	0	0	0.00	-
Total	**23,430[1]**	**66,776**	**5.86**	**-**
2030				
Central	17,533	49,968	4.38	5.7%
Wilbarger	15,361	43,780	3.84	10.0%
Cottonwood West	1,227	3,497	0.31	15.3%
Cottonwood East	9	26	0.00	-
Total	**34,130**	**97,270**	**8.53**	**7.8%**
2035				
Central	21,314	60,745	5.33	4.0%
Wilbarger	19,234	54,817	4.81	4.6%
Cottonwood West	5,312	15,138	1.33	34.1%
Cottonwood East	2,043	5,822	0.51	195.7%
Total	**47,902**	**136,522**	**11.98**	**7.0%**
Buildout				
Central	30,138	85,892	7.53	1.1%
Wilbarger	28,270	80,570	7.07	1.2%
Cottonwood West	20,168	57,478	5.04	4.1%
Cottonwood East	24,629	70,193	6.16	7.8%
Total	**103,204**	**294,133**	**25.80**	**2.4%[2]**

[1]: Calculated existing connections using Table 4-3.

[2]: Average annual growth rate calculated based on the buildout year 2068.

This highlights the need for phased and strategic infrastructure investments. The rapid developments of Cottonwood West basin and Cottonwood East basin will require prioritization of resources to support new growth, while the more stable growth in Central basin and Wilbarger basin presents opportunities for optimizing and upgrading existing systems. Balancing growth dynamics across basins and ensuring equitable infrastructure development will be critical for managing the city's long-term wastewater needs effectively.

5.0 WASTEWATER MODEL DEVELOPMENT

5.1 EXISTING WASTEWATER COLLECTION SYSTEM

The City of Pflugerville's wastewater system is comprised of an integrated collection system across three wastewater basins that includes gravity pipelines, lift stations, force mains, and wastewater treatment. The layout and extent of the current wastewater infrastructure are illustrated in **Figure 5-1**.

5.1.1 Wastewater Collection System

The City of Pflugerville's existing wastewater collection system includes approximately 287 miles of gravity mains, interceptors and force mains. Pipe sizes within the system vary from 4 inches to 42 inches in diameter. A summary of total pipe length by diameter is provided in **Table 5-1**. The system is primarily made up of 8-inch pipes, which are typically used to serve residential areas, subdivisions, and smaller commercial developments. These smaller lines discharge into larger interceptor pipes that transport the flow downstream to the Central Wastewater Treatment Plant (WWTP).

Table 5-1. Wastewater Collection System Pipe Size Distribution

Pipe Diameter (Inches)	Length (LF)	Percentage
4	7,556	0.5%
6	111,590	7.4%
8	1,028,412	67.9%
10	70,398	4.7%
12	82,712	5.5%
15	28,803	1.9%
16	9,725	0.6%
18	35,923	2.4%
21	18,394	1.2%
24	72,623	4.8%
27	7,902	0.5%
30	1,619	0.1%
32	12,138	0.8%
33	6,364	0.4%
36	12,994	0.9%
42	6,561	0.4%
Total	**1,513,713**	**100.0%**

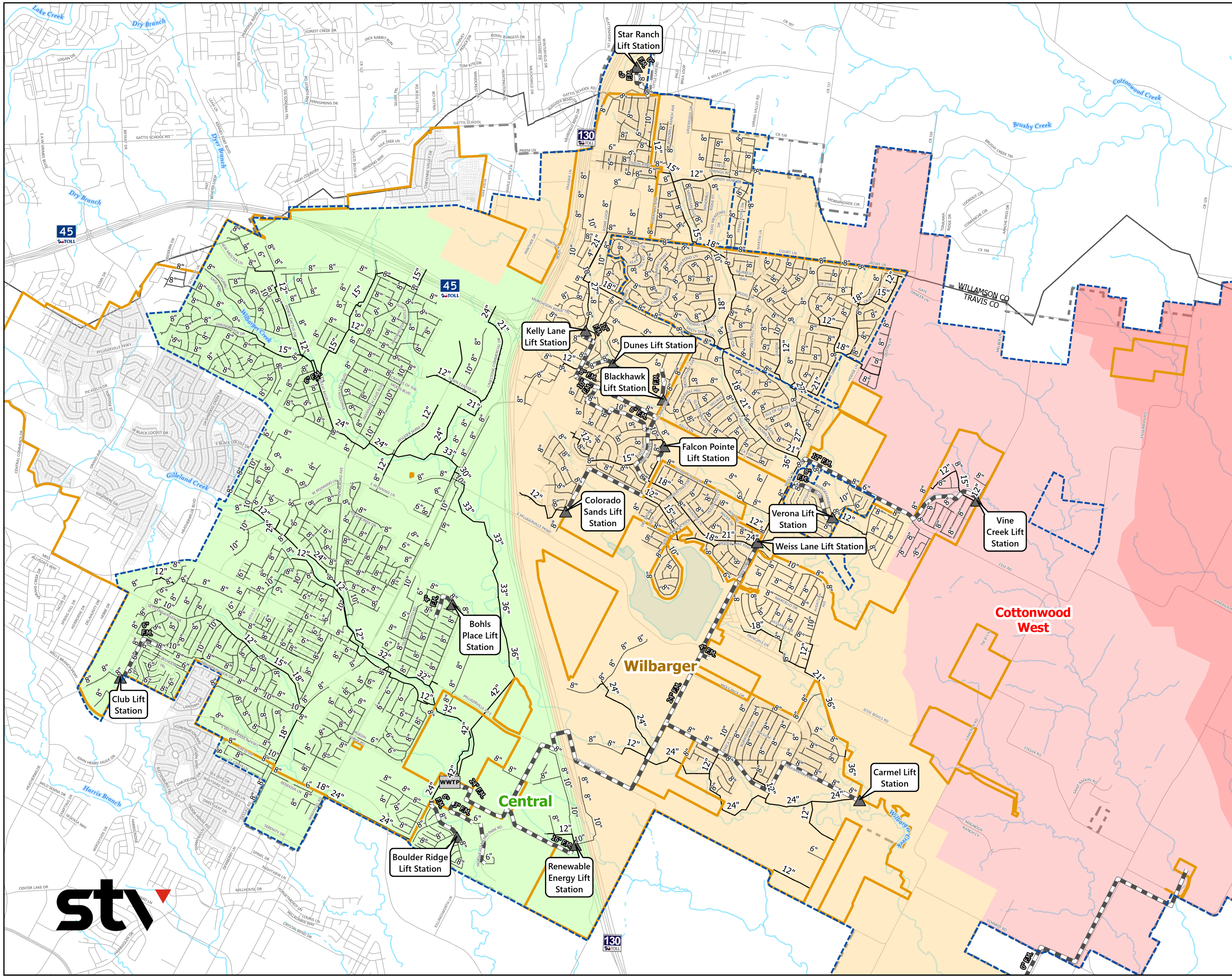


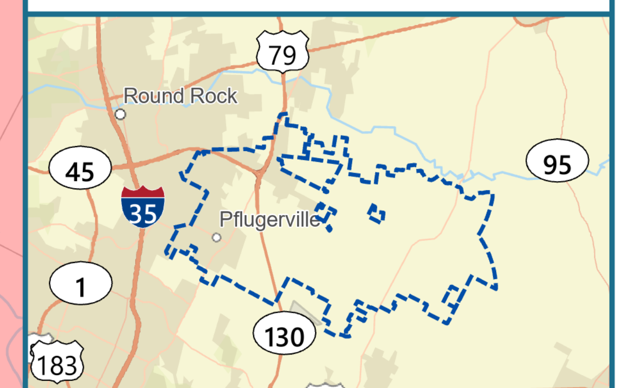
FIGURE 5-1

CITY OF PFLUGERVILLE

EXISTING WASTEWATER LINE

LEGEND

- Wastewater Service Area
- ETJ Boundary
- County Boundary
- City Limit
- Parcel Boundary
- Road
- Stream
- Lake
- Lift Station
- WWTP Wastewater Treatment Plant
- Force main
- 10" and Smaller Wastewater Line
- 12" and Larger Wastewater Line
- Central
- Wilbarger
- Cottonwood West
- Cottonwood East



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5.1.2 Lift Stations

The City of Pflugerville's wastewater collection system has incorporated lift stations for wastewater flow management across the three wastewater basins. Pflugerville currently owns and maintains 14 lift stations throughout the service area to facilitate the transfer of wastewater from the Wilbarger and Cottonwood Basins to the Central Basin for treatment. The lift stations range in total pumping capacity from 250 gallons per minute (gpm) to just under 6,000 gpm, designed to lift wastewater flow from point of origin to a location in the collection system where it can flow by gravity to the WWTP. **Table 5-2** provides a summary of each lift station, including the wet well capacity and the existing firm capacities. The firm pumping capacity is the regulatory required capacity of the lift station with the largest pump out-of-service.

Table 5-2. Existing Lift Stations

Lift Station	Wet Well Capacity (gallons)	Firm Capacity (MGD)
Blackhawk	3,384	0.18
Bohls Place	5,075	0.33
Boulder Ridge	11,469	0.33
Carmel	192,045	5.5
Club	8,272	0.72
Colorado Sands	7,056	2.36
Dunes	7,521	0.89
Falcon Pointe	9,401	0.48
Kelly Lane	79,903	2.52
Renewable Energy	13,613	2.36
Verona	18,507	1.06
Weiss Lane	165,240	8.83
Vine Creek	25,262	1.27
Star Ranch	1,213	0.38

5.1.3 Wastewater Treatment Plant

Pflugerville currently owns and operates one wastewater treatment facility—the Central Wastewater Treatment Plant (WWTP)—located on Sun Light Near Way in the Central Basin. The Central WWTP has an average daily permitted capacity of 7.25 million gallons per day (MGD) and a permitted 2-hour peak capacity of 24.92 MGD. A second treatment facility, the Wilbarger Creek Regional Wastewater Treatment Facility (WCRWWTF), is currently under construction in the Wilbarger Basin and scheduled to begin receiving wastewater flow in September 2026, with final completion of construction scheduled in May 2027. The WCRWWTF is designed for an average daily permitted capacity of 6.0 million gallons per day (MGD) and a permitted 2-hour peak capacity of 24.0 MGD.

5.2 ICM MODEL METHODOLOGY

5.2.1 Element Types

The model includes various types of elements for links, nodes, and surface areas—specifically, pipes, manholes, and subcatchments. During the GIS import process, these elements are initially categorized only as links, nodes, or polygons, without further differentiation. However, their behavior within the model varies significantly. The function of each element type is described below, and a snapshot of the model network is shown in **Figure 5-2**.

- **Nodes:** The manhole node is the most commonly used node type in the InfoWorks ICM model. It allows users to define shaft and chamber storage volumes, representing the actual storage capacity within a manhole. Manholes serve as the primary connection points for gravity sewer lines.

- **Outfalls** – Outfalls represent discharge points where flow exits the system. These nodes do not allow for storage and are typically used at locations where the City's sewer system discharges into wastewater treatment plants.

- **Storage Nodes** - These nodes enable users to define custom storage volumes by specifying level-versus-plan area relationships. Storage nodes are primarily used to model wet wells at lift stations.

- **Break Nodes** - Break nodes represent transitions in pipe characteristics—such as changes in gradient, diameter, or material—where no physical structure (e.g., manhole) exists. They are mainly used in pressurized systems like force mains to document these changes without adding storage.

- **Links** – Gravity pipes are the most common link type in the model, representing the majority of the collection system. Flow through these pipes is driven by gravity and calculated using Manning's equation.

- **Pressurized Lines** – This category includes force mains and siphons, which operate under pressure. Unlike gravity pipes, flow in these links is typically calculated using the Hazen-Williams equation due to their pressurized conditions.

- **Pumps** – Pumps are modeled as zero-length links that create a head-discharge relationship between two nodes. They include additional parameters such as pump curves and are essential for representing lift stations and force mains in the hydraulic model.

- **Subcatchments** – Subcatchments define the hydraulic loading to the system, incorporating data such as population, diurnal flow patterns, and rainfall response. They are crucial to the model as they generate inflow and determine how that flow enters the sewer network.

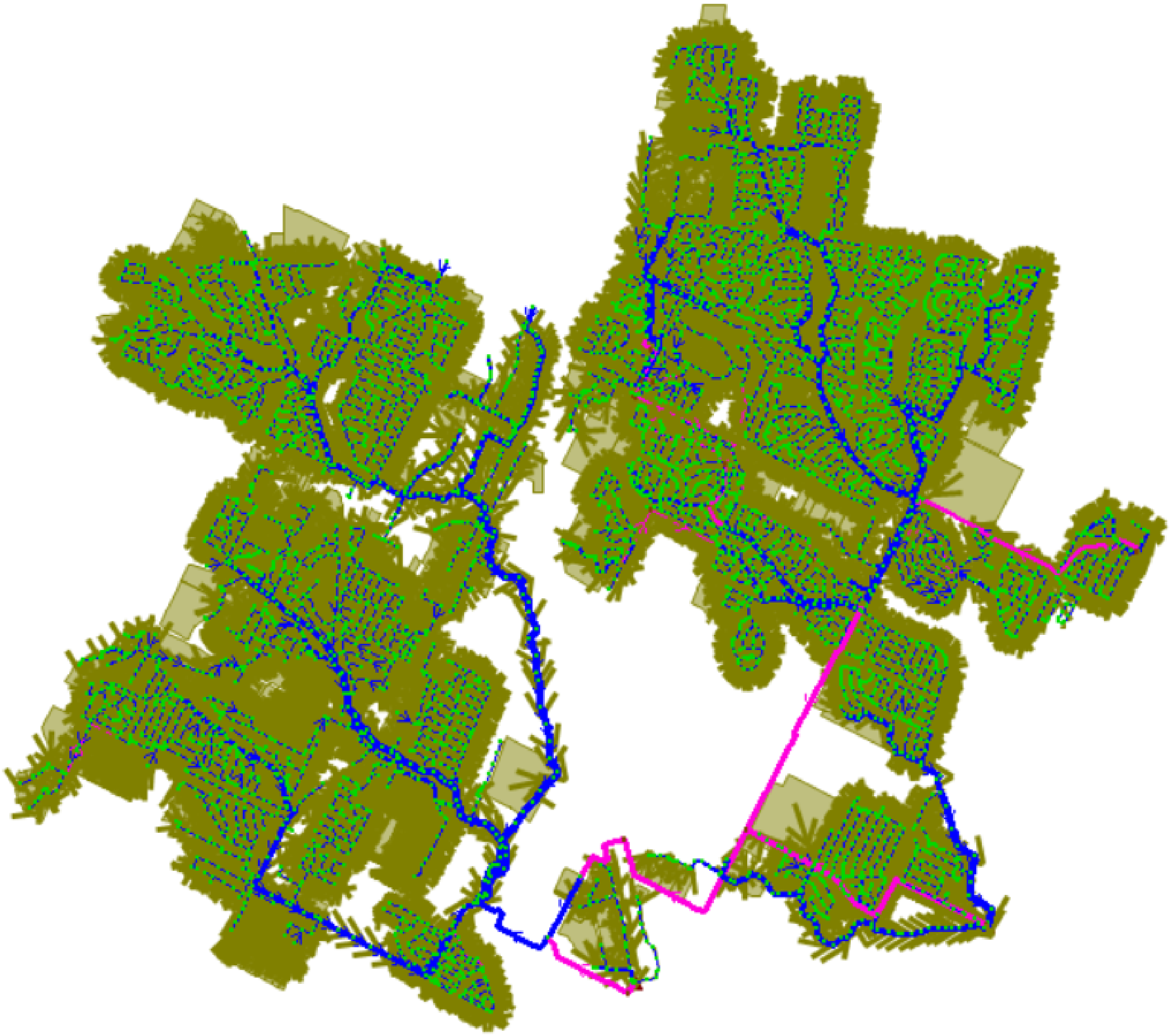


Figure 5-2. InfoWorks ICM Model Network Display

5.2.2 Data Flagging

InfoWorks ICM supports data flagging for all model elements, enabling clear documentation of data sources and helping to establish confidence levels in the modeled information. During model development and calibration, all data fields were flagged to indicate their origin. The data flagging scheme used in this project is summarized in **Table 5-3**.

Table 5-3. Data Flagging

Flag ID	Color	Description
#D	Blue	System Default
24G	Light Blue	2025 Updated GIS Data
GIS	Green	Previous Model imported GIS Data
INF	Brown	2025 Updated Inferred Data
INT	Orange	Previous Model Inferred Data

5.2.3 Network Development and Verification

Once the infrastructure was imported into the model, the physical and spatial data was verified and edited as necessary. For the model to accurately represent the collection system, the modeled network must be properly connected, links should have correct invert elevation data, manholes should have correct rim elevations, and special elements such as outfalls, lift stations, wet wells, and pumps should have the correct data assigned.

5.2.3.1 Topology

Network topology refers to the connectivity between elements in a system, specifically the physical and spatial relationships between nodes. In InfoWorks ICM, a node represents the start or end point of a line. When two lines share a common node, they are considered connected, forming proper topology. Accurate topology is essential for ensuring correct pipe connectivity, flow direction, and flow allocation. After importing the model's links and nodes, network connectivity was established using the following topological tools:

- **Upstream/Downstream Network Trace** – This tool generates a flow path from any selected node or link to the upstream or downstream limits of the network. It is used to identify and resolve issues such as disconnected pipes or incorrect flow directions. For example, **Figure 5-3** illustrates the use of the Downstream Network Trace tool in the Central Basin. In this case, an upstream pipe link was selected, and all downstream links were highlighted in red, confirming that flow from the selected pipe ultimately reaches the Central Wastewater Treatment Plant (WWTP).

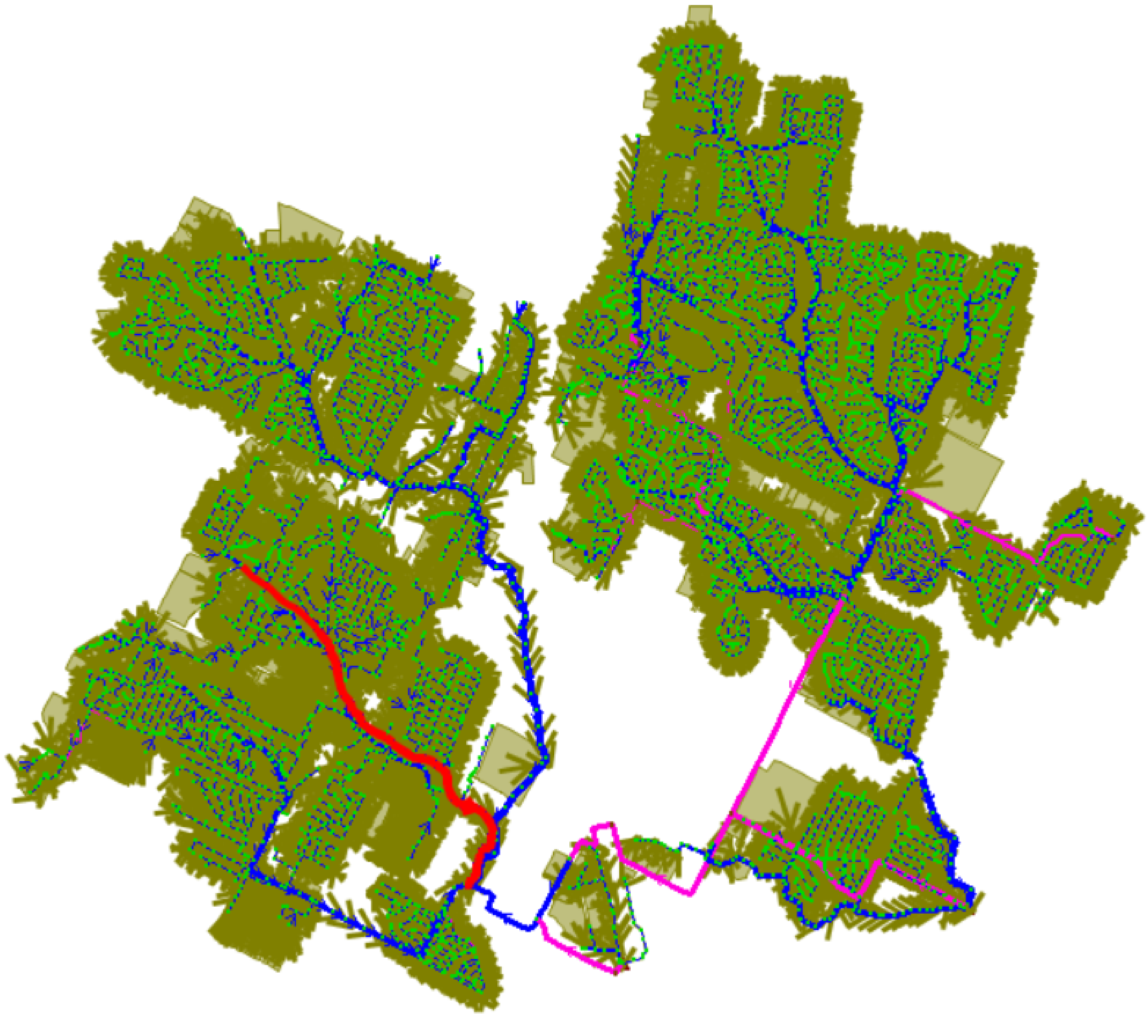


Figure 5-3. InfoWorks ICM Downstream Network Trace

- **Connectivity Trace** –This tool scans the model to identify all physically disconnected sub-networks, helping to verify that the model represents a fully connected system. It is particularly useful for detecting isolated elements or unintentional breaks in the network**. Figure 5-4** provides an example of the Connectivity Trace tool used to isolate the Central Basin within the model.

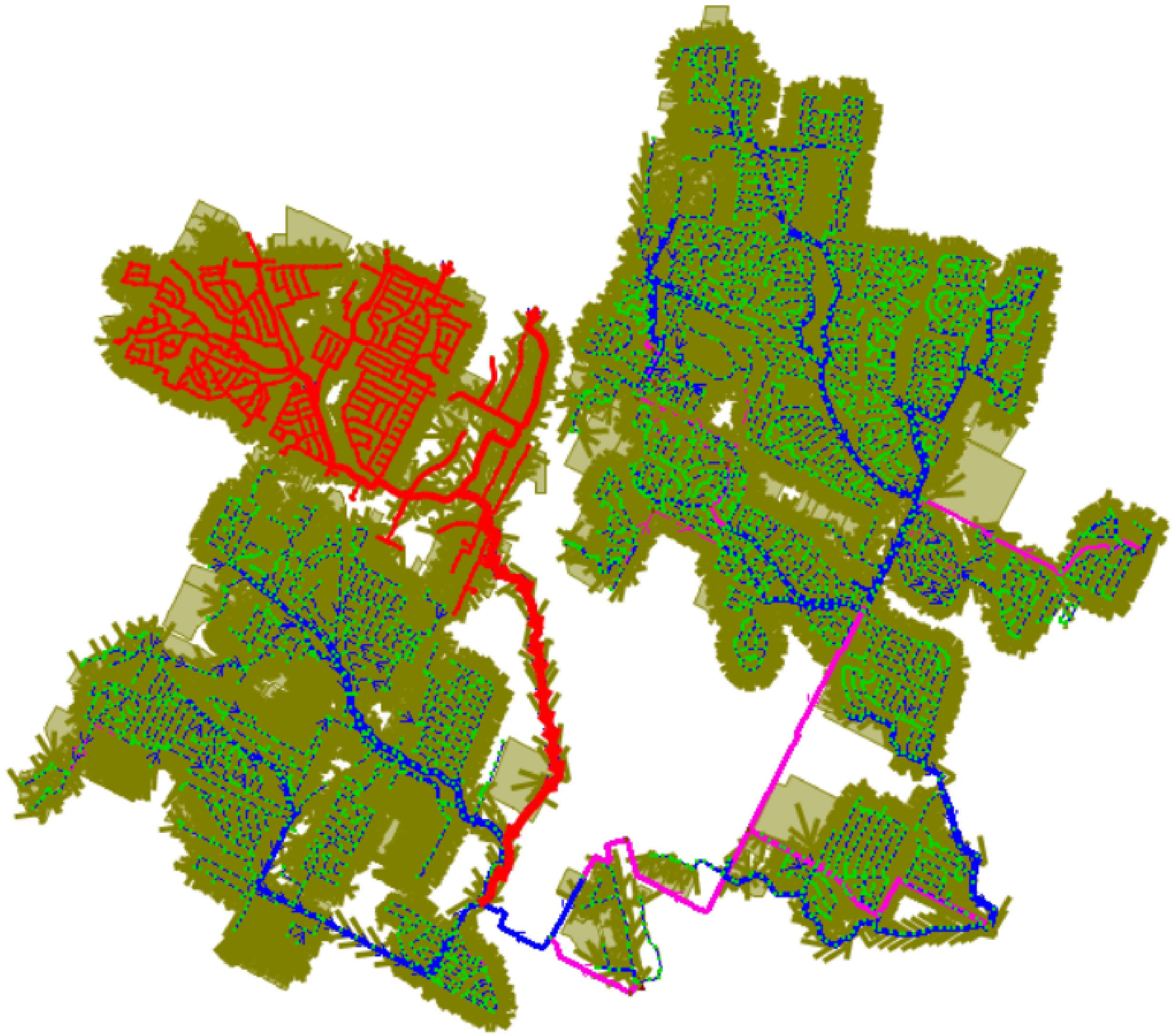


Figure 5-4. InfoWorks ICM Connectivity Trace

- **Long Selection Tool** – This tool selects a continuous section of pipes and nodes without branches and generates a profile view of the selected segment. The profile view is useful for verifying data accuracy, which is discussed in a later section. Additionally, the Long Selection Tool helps identify issues such as duplicate nodes or links that disrupt what should be a continuous pipe run. **Figure 5-5** illustrates the use of this tool to profile an interceptor located upstream of the Central Wastewater Treatment Plant (WWTP).

Once network connectivity was established, the physical attributes in the model, such as pipe inverts and diameters, were verified.

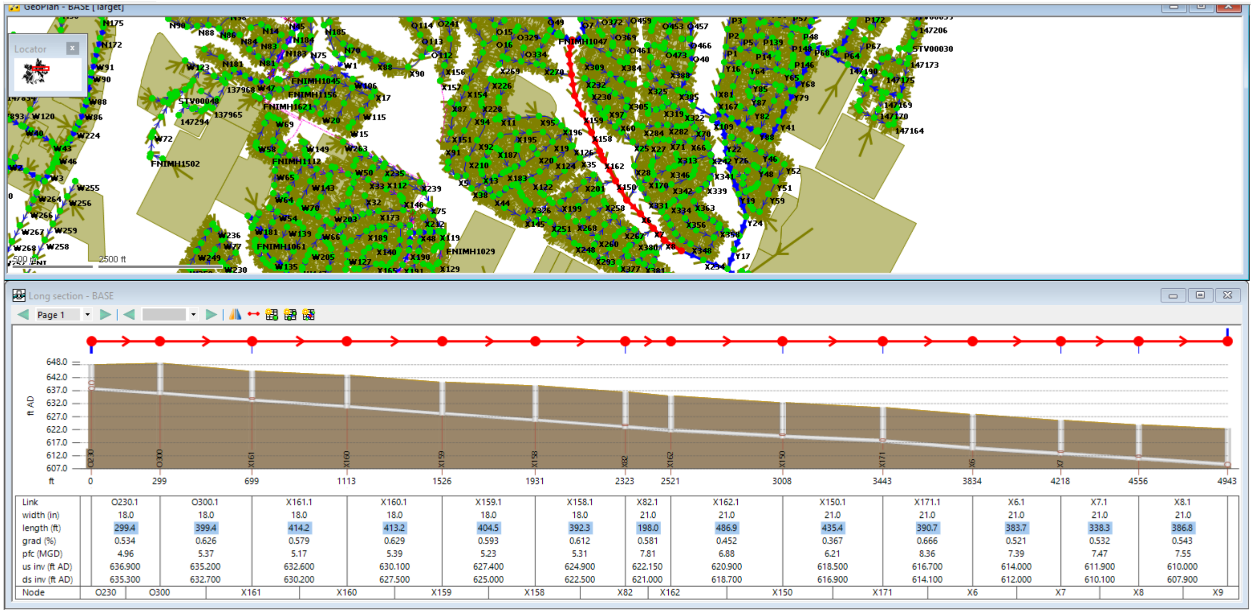


Figure 5-5: InfoWorks ICM Long Selection Tool and Profile

5.2.3.2 Data Inference

While the majority of the data used in the model was sourced from GIS, some gaps were present. Common issues included manholes missing ground elevation data and pipes missing invert elevations. These gaps needed to be resolved to ensure proper model functionality. When as-built information was unavailable, missing data was inferred using surrounding information. For pipes or manholes lacking invert data, the InfoWorks inference tool was used to perform straight-line interpolation between upstream and downstream invert elevations. In cases where manhole ground elevations were missing, 2-foot contour data was used to estimate the elevation. This data is not considered as reliable as information obtained directly from GIS, previous models, field surveys, or as-built drawings. However, it is deemed acceptable when no other data sources are available. **Figure 5-6** provides an example of how the inference tool was utilized in the model to estimate missing invert elevations.

The inference tool, in conjunction with as-built information, was used to update model element data to reflect the most accurate available conditions. Pipe inverts estimated using the inference tool were marked with the flag “INT,” while manhole rim elevations derived from ground contours were flagged as “INF.”

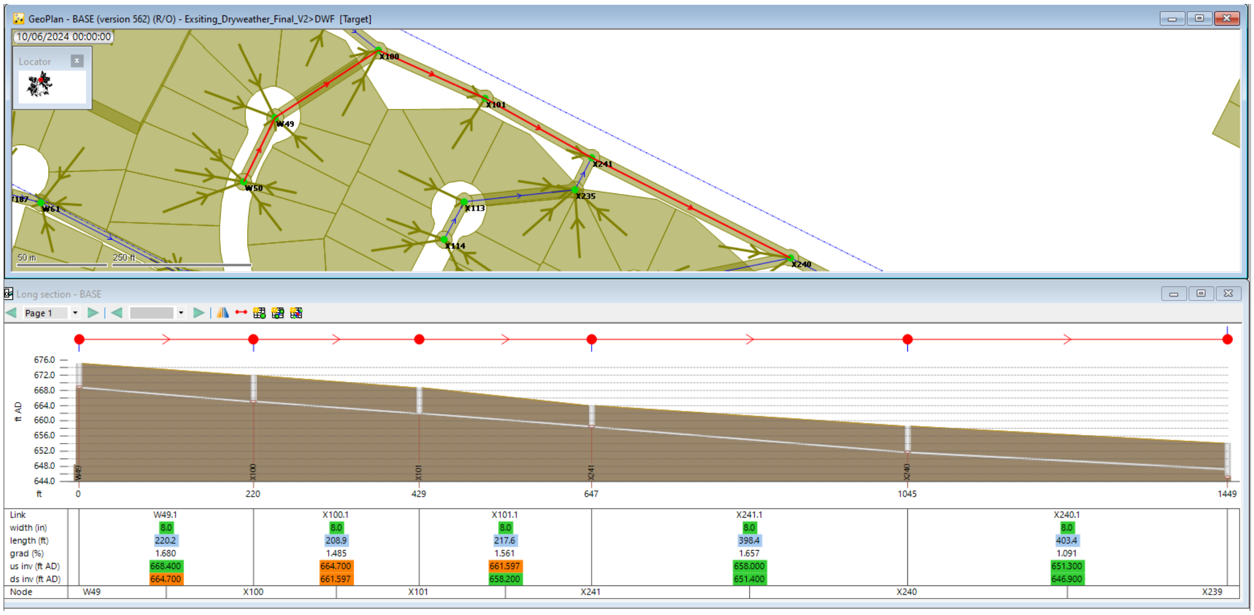


Figure 5-6: InfoWorks ICM Inference Tool

5.2.3.3 Network Pruning

Modeling a complete wastewater collection system can be particularly challenging for large, complex networks, especially when accurate data is lacking for small-diameter pipes (less than 8 inches). To address this issue in earlier efforts, the pruning tool was used to exclude pipes with insufficient information from the hydraulic model. This tool removes unmodelable pipes and compensates for their potential storage by increasing the shaft area of the immediate downstream manhole. This method allows for a representative model without requiring detailed data for every small-diameter pipe.

In the previously calibrated model, all pipes with diameters of 6 inches or less were pruned. However, in the 2025 model update, no pipes with diameters of 6 inches or less were identified.

5.2.3.4 Engineering Validation

Validation is the software process used to confirm that the modeled network can run successfully. The engineering validation step identifies errors within the model that must be corrected before proceeding. These errors may include missing data, inverts above ground level, or incorrect element types. Completing the engineering validation without errors is a prerequisite for executing an Extended Period Simulation (EPS) run. During model development, the engineering validation tool was used to identify and correct issues that were not addressed in earlier steps.

While the engineering validation tool is effective, it has limitations and may not detect certain types of errors. For example, it will not flag a pipe with a downstream invert elevation higher than the upstream invert—an error that may allow the model to run but does not realistically represent the collection system. Such issues were resolved using as-built information or site reports provided by the City or through straight-line interpolation when necessary.

To supplement the validation process, the long section tool was used for visual inspection of major collectors and interceptors. Discrepancies in pipe inverts or manhole elevations were corrected based on as-built drawings or, where as-builts were unavailable, engineering judgment.

5.2.4 Model Wastewater Generation

5.2.4.1 Dry Weather Wastewater Flows

In the InfoWorks ICM model, dry weather wastewater flow (DWWF) is generated using population data, land use assumptions, and time-varying diurnal flow patterns to reflect realistic wastewater generation across the day. The steps below outline the methodology used to calculate and assign DWWF in the model:

- **Define Subcatchments:** Subcatchments were delineated based on the land use classifications provided in the "Aspire 2040 Comprehensive Plan Chapter 3: Land Use, Growth and Development." Each parcel within the City of Pflugerville was assigned a land use type, along with the corresponding wastewater connection density per acre as specified in **Table 4-3**. A population estimate of 2.85 individuals per connection was applied. Each parcel was assigned population, a unique subcatchment ID and flow meter basin.

- **Wastewater Profile:** Wastewater generation fluctuates over the course of a day. A wastewater profile defines both the average gallons per capita per day (gpcd) and the daily variation in domestic wastewater production within each subcatchment. These daily variations can be further refined by applying separate patterns for weekdays and weekends. Examples of the residential diurnal patterns for weekday and weekend flows are shown on **Figure 5-7**, respectively. For each subcatchment, the average dry weather daily flow was calculated by multiplying the population by the gpcd value. This average dry weather daily flow was then adjusted using the assigned diurnal pattern to generate an hourly flow profile, capturing typical daily variations in wastewater production. A unique wastewater profile will be generated for each flow meter basin.

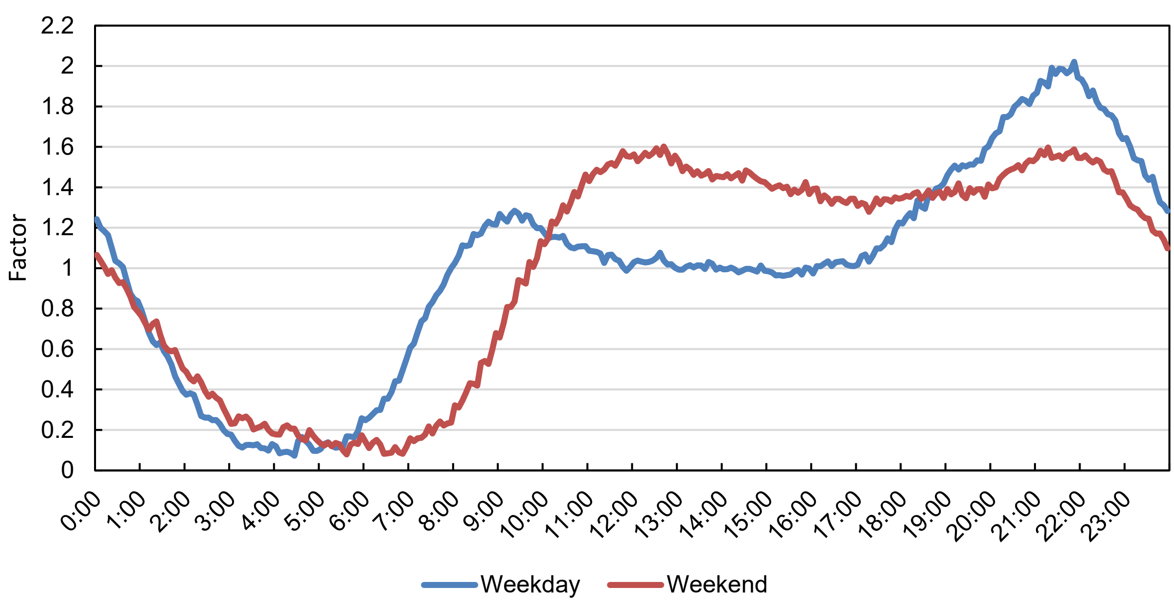


Figure 5-7. Typical Diurnal Flow Pattern

5.2.4.2 Wet Weather Wastewater Flows

The RTK hydrograph method was applied to simulate the rainfall-derived inflow and infiltration (RDII) entering the wastewater system during the monitored rainfall event. Originally developed by the U.S. Environmental Protection Agency (EPA), this method estimates RDII by using three synthetic hydrographs, each defined by a set of three parameters:

- R is the area under the graph representing the proportion of rainfall falling on the subcatchment (InfoWorks networks) or node (SWMM networks) that enters the sewer system
- T is the time from the onset of rainfall to the peak of the triangle
- K is the ratio of 'time to recession' to the ' time to peak' of the hydrograph

Three sets of RTK parameters can be defined, representing short-term, medium-term and long-term rainfall response. The three triangular graphs are combined to define the Unit Hydrograph (**Figure 5-8**).

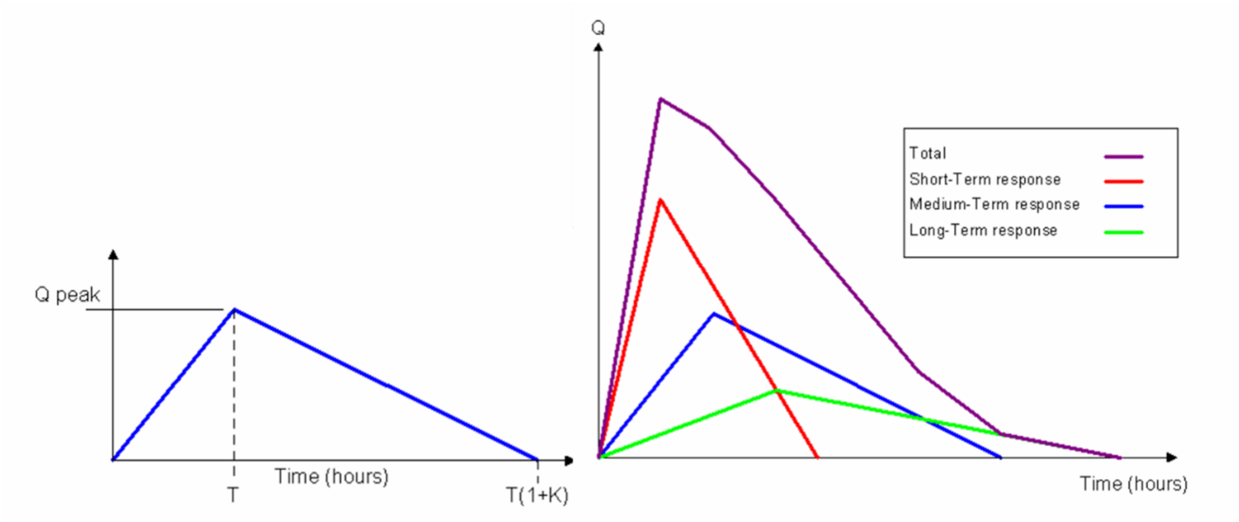


Figure 5-8. RTK Hydrograph (Left) and Unit Hydrograph (Right)

The RTK hydrograph is linked to a subcatchment by assigning the appropriate RTK Hydrograph ID in the Subcatchment RTK Hydrograph field within the Subcatchments Grid Window. During a simulation, the selected RTK Hydrograph is applied to the rainfall profile assigned to the subcatchment. The resulting hydrograph is then multiplied by the subcatchment's Contributing Area to calculate the RDII inflow entering the subcatchment's associated node. A unique RTK hydrograph will be generated for each flow meter basin.

5.3 2025 MODEL UPDATE

STV received the previously calibrated hydraulic model of the City of Pflugerville's wastewater collection system from the City. Originally calibrated in 2018 using InfoWorks ICM, the model served as the foundation for further updates. The main steps taken to update the 2018 hydraulic model are outlined in **Figure 5-9** and include:

- Data Collection:

- Model Development
- Model Calibration

Relevant system data was gathered and reviewed to reflect infrastructure improvements completed since 2018. These updates were incorporated into the model network. The updated model was then recalibrated using recent flow monitoring data to ensure it accurately represented current system conditions. Following the update and calibration process, the model was used to evaluate both existing and projected system performance. It also provided the analytical basis for identifying capacity improvement projects included in the City's Capital Improvement Plan (CIP).

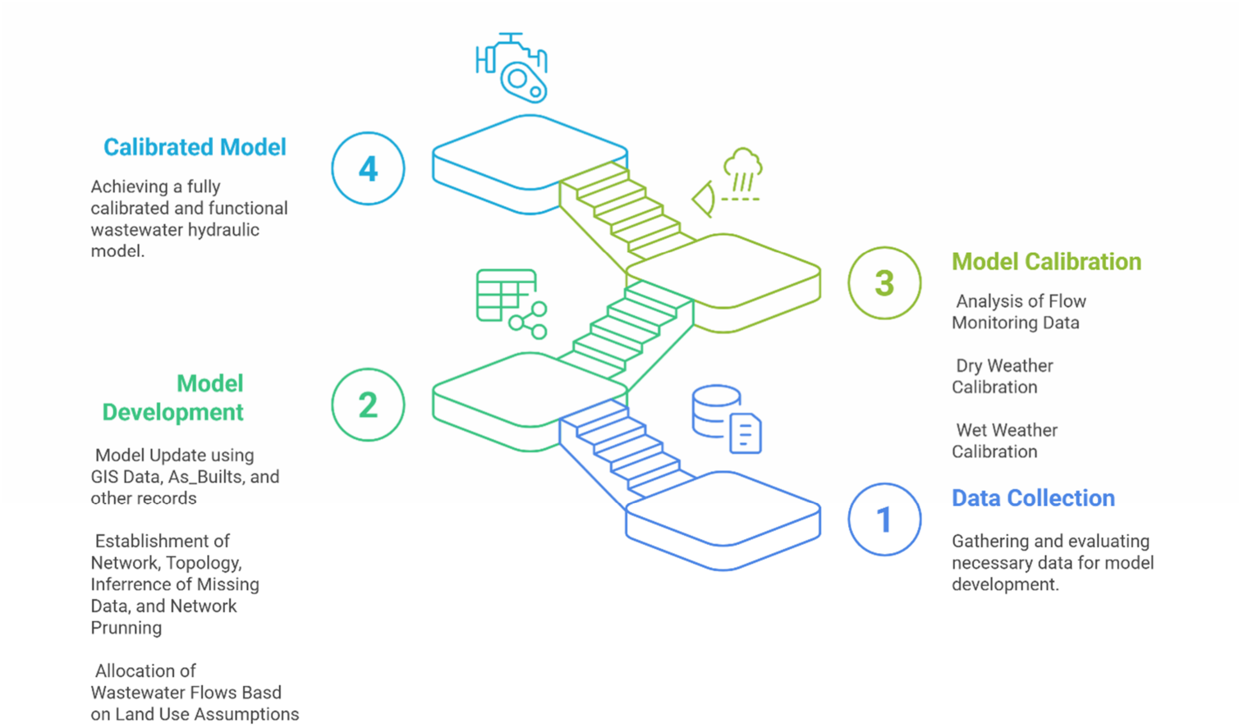


Figure 5-9. Model Development Process

5.3.1 Data Collection

5.3.1.1 GIS Data and As-Built Drawings and Other Records

The most recent GIS shapefiles for manholes, gravity mains, force mains, and lift stations were downloaded from the City of Pflugerville's Open Data Portal, as referenced in **Table 2-1**. Since the downloaded data did not include MUD GIS information, STV obtained the necessary MUD data directly from the City's GIS team. Additionally, the City provided the latest as-built documentation for lift stations.

In instances where data was incomplete or unclear, supplemental field investigations were conducted by the City, and corresponding reports were shared with STV for verification purposes.

5.3.1.2 Flow Monitoring

Flow monitoring plays a critical role in assessing the performance of a wastewater collection system. The data collected is used to analyze both dry and wet weather flows, evaluate the impact of rainfall on the system, and support the calibration of the hydraulic model.

As a subconsultant, RJN Group, Inc. (RJN) conducted flow and rainfall monitoring within the City's wastewater system. Data was gathered from 18 flow monitoring sites and 4 rain gauges over the period from September 20th, 2024, to October 18, 2024. **Figure 5-10** presents a schematic showing the flow monitoring locations and their respective positions within the collection system.

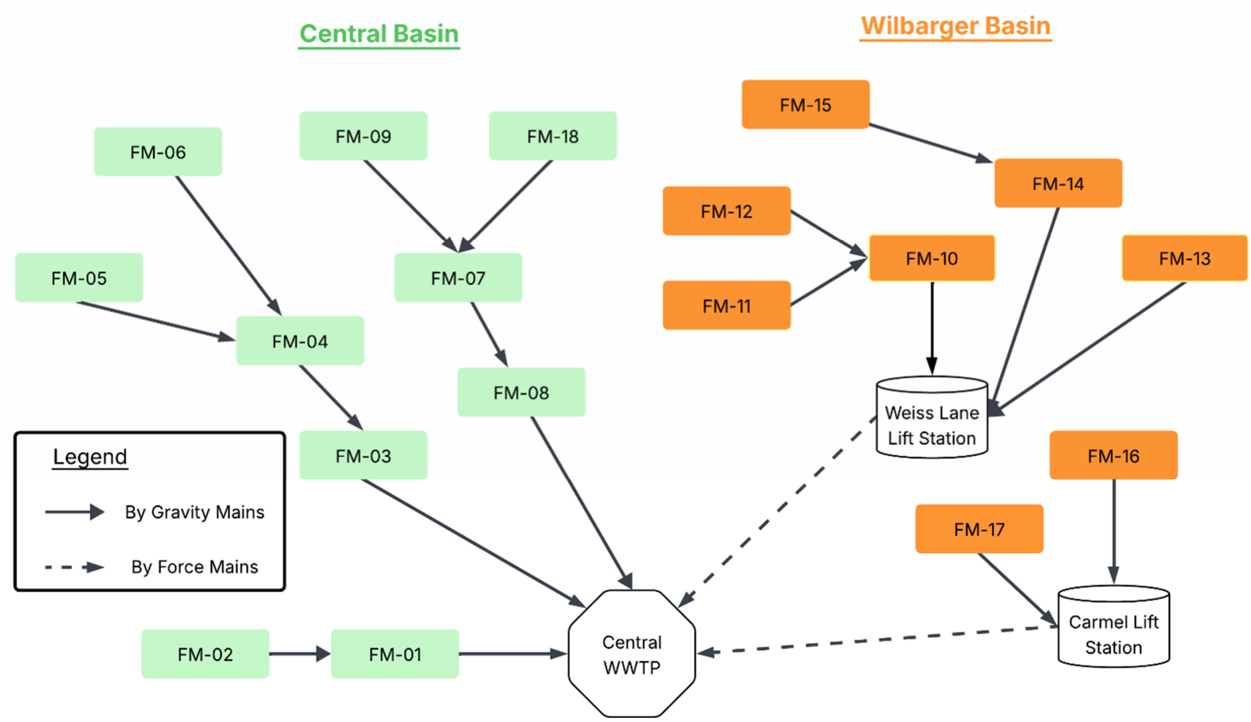


Figure 5-10. Flow Monitoring Schematic Diagram

5.3.1.3 Diurnal Pattern

Diurnal flow patterns were developed for each flow meter basin using observed flow data collected throughout the entire monitoring period. To ensure the patterns reflect typical baseflow conditions, days with rainfall and the two subsequent days following any rainfall events were excluded from the analysis. Additionally, holidays were removed from consideration, as they tend to produce atypical flow patterns that could distort the results.

To develop diurnal patterns from the flow meter data, the base flow—defined as the minimum observed flow—is first subtracted to isolate the variable component of the flow. The daily average flow is then calculated over the entire monitoring period. Flow data is averaged in five-minute intervals across all days to capture typical fluctuations over a 24-hour period. Weekday and weekend diurnal patterns are developed separately to account for differences in flow behavior. For each five-minute interval, the average flow is divided by the corresponding daily average to generate a diurnal pattern factor, representing the relative variation in flow throughout the day. With 17 flow meters deployed across the City, a distinct diurnal pattern was developed for each of the 17 corresponding flow meter basins.

5.3.2 Model Update

The 2025 update to the wastewater model included modifications and additions to the network elements including gravity mains, force mains, manholes, lift stations, and parcels. The updates to each of these components are discussed below.

5.3.2.1 Gravity mains and Manholes

In the previous model, manholes were initially imported using the City-assigned unique identifier "Feature_NU" (from the manhole shapefile) as the Node ID. Where available, ground elevation data ("Rim_Elev") was also imported. However, the updated shapefiles did not include the "Feature_NU" field for manholes added since 2018. As a result, the "UID" field was used as the Node ID for these newer manholes.

After importing the manholes, wastewater lines were brought into the model and connected to the corresponding manholes. Each line was assigned a model ID based on the upstream manhole ID, with a numeric suffix added for uniqueness. Similar to manholes, the "Asset ID" field in InfoWorks ICM was populated using the "Feature_NU" field from the gravity mains shapefile. Where "Feature_NU" was unavailable, the "UID" was used instead. For lines missing key invert data, values were either inferred or removed from the model, following the procedures described in Sections 5.2.3.2 and 5.2.3.3. If a line lacked an upstream or downstream manhole connection, a new manhole was generated and assigned a unique identifier following the format "STV#####".

5.3.2.2 Lift Stations

Since the previous model calibration in 2018, the wastewater collection system has undergone several lift station updates. The Vine Creek Lift Station was newly constructed and added to the system. Two lift stations—Highland Park and Pfluger Crossing—were decommissioned. The Club Lift Station received a significant upgrade, with its firm capacity increasing from 0.29 MGD to 0.72 MGD. All these updates have been incorporated into the hydraulic model.

5.3.2.3 Subcatchments

In the previous model calibration conducted in 2018, two types of subcatchments are defined:

Type 1: Parcel-based subcatchments. These subcatchments represent TCAD parcels and were assigned wastewater profiles to generate Dry Weather Wastewater Flow (DWWF), as described in Part 5.2.4.1.

Type 2: RDII-based subcatchments. These subcatchments were delineated using a 15-foot buffer around manholes and a 10-foot buffer along pipelines to represent areas contributing to Rain-Derived Inflow and Infiltration (RDII). Unlike Type 1 subcatchments, they were not assigned population or wastewater profiles. Instead, RTK unit hydrographs for each flow meter basin were applied to simulate RDII effects. These subcatchments are labeled with the prefix "RDIIxxxx."

The model has been updated to include:

- newly added parcels have been incorporated into the model as new subcatchments. For existing subcatchments, population data has been updated based on the analysis presented in Part 4.
- Additional Type 2 subcatchments around newly identified pipelines and manholes to better represent RDII contributions.

Each parcel was spatially linked to the upstream manhole of the wastewater line it drains into, accurately representing real-world conditions where customer laterals and rainfall runoff enter the sewer system.

6.0 WASTEWATER MODEL CALIBRATION

Model calibration is the process of adjusting parameters within the InfoWorks ICM hydraulic wastewater model to ensure that simulated flow patterns closely match those observed during the flow monitoring period. A well-calibrated model is essential, as it provides the foundation for all future modeling scenarios. Calibration relies heavily on flow monitoring and rainfall data to determine per-capita flow rates and Rainfall-Derived Inflow and Infiltration (RDII) parameters.

One limitation of using recorded flow and rainfall data is the assumption that each flow monitoring basin is homogeneous. While population may be unevenly distributed within a basin—with some manholes serving areas of higher population density—the model assumes a uniform per-capita wastewater production rate and diurnal flow pattern for all individuals in the basin. Similarly, although manholes within a basin may serve areas with varying drainage characteristics and contribute different volumes of inflow and infiltration (I/I), the model applies a single set of I/I parameters across the entire basin.

Efforts are made to assign population and drainage areas accurately to individual manholes; however, the model cannot detect localized sources of a typical wastewater production or uncharacteristic I/I. These anomalies must be identified through targeted field investigations and should not be expected to emerge solely from model results.

6.1 DRY WEATHER CALIBRATION

The first step in the model calibration process involved selecting a dry weather period from the flow monitoring data to calibrate base flow conditions. Dry weather periods were identified as times when the system was minimally impacted by RDII and flows primarily reflected per-connection contributions based on the city's population and employment levels. The dry weather week selected for calibration was October 7th to October 14th, 2024, for all flow meters. Diurnal flow patterns were assigned to each flow monitoring basin in the model, based on observed flow data collected throughout the monitoring period.

Model calibration for dry weather is an iterative process, carried out for each flow meter site, and involves four steps:

1. Run the model for the seven-day dry weather calibration period, with the appropriate diurnal profile.

2. Compare the simulated model results (model hydrographs) with the field measured flow meter data (meter hydrographs) for depth, velocity and flow.

3. Evaluate the differences and theorize how the differences can be minimized. Check gpcd to get a closer match to the meter hydrograph:

4. Based on Step 3, modify the appropriate parameters, re-run the model and repeat Steps 2 through 4 until the model results closely match the flow meter data.

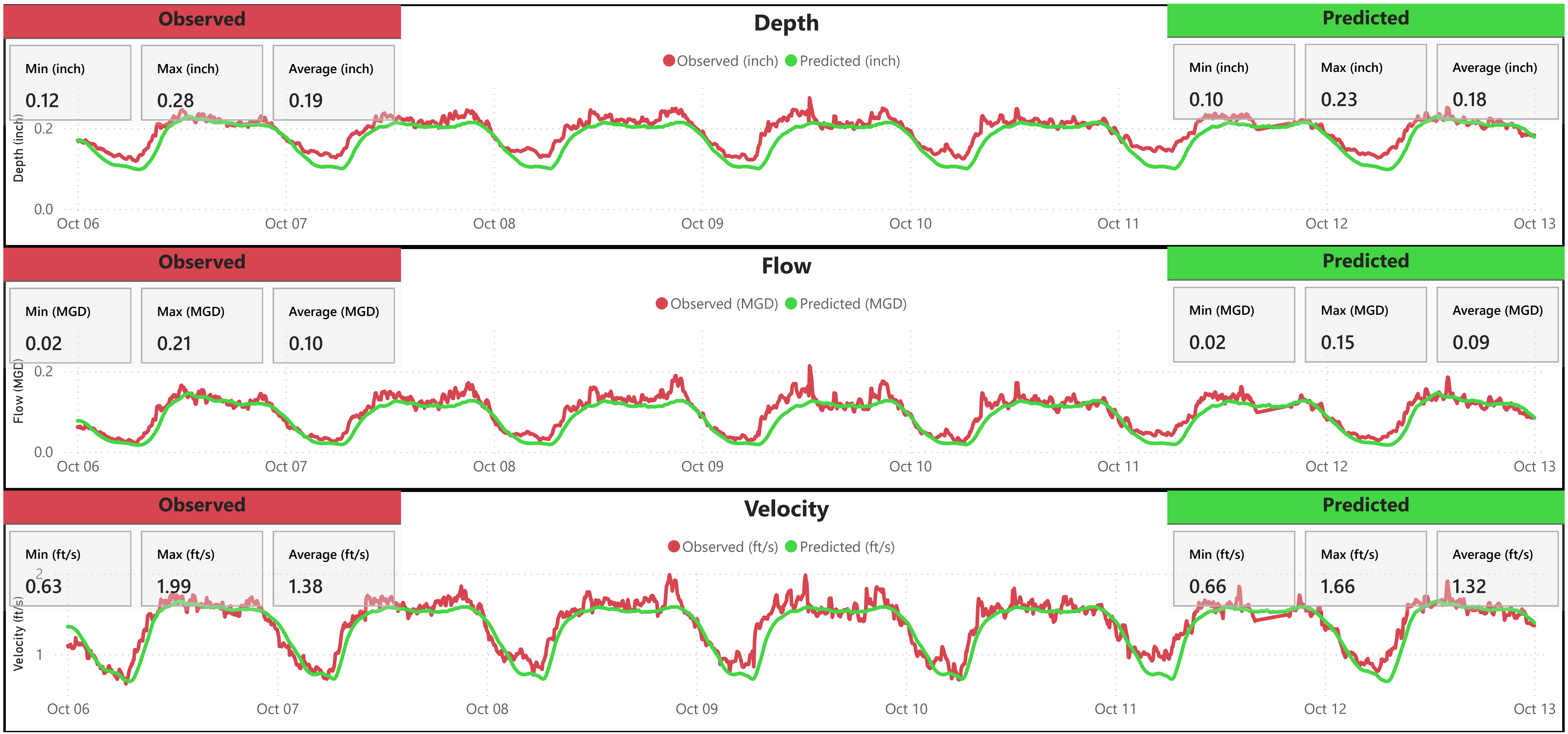
Table 6-1 presents the dry weather calibration results, showing the average recorded and modeled flows for each monitor over the full monitoring period. These results demonstrate a high level of confidence that the model accurately reflects system behavior under dry weather conditions. A sample dry weather calibration chart is shown in **Figure 6-1**, and the full set of charts for all monitoring locations is provided in **Appendix C**.

Table 6-1. Dry Weather Calibration Summary

Flow Meter	Link ID	Recorded Flow (MGD)	Modeled Flow (MGD)
PF-01	AZ53.1	0.69	0.71
PF-02	AY109.1	0.48	0.46
PF-03	BA15.1	0.71	0.71
PF-04	AP273.1	0.55	0.50
PF-05	AP48.1	0.10	0.09
PF-06	AP249.1	0.38	0.36
PF-07	V177.1	0.88	0.97
PF-08	143870.1	0.92	1.02
PF-09	V129.1	0.80	0.80
PF-10	AH240.1	0.81	0.70
PF-11	AH37.1	0.05	0.06
PF-12	AH30.1	0.36	0.32
PF-13	AH73.1	2.35	2.17
PF-14	Y8.1	1.26	1.15
PF-15	O104.1	0.30	0.28
PF-16	BC1.1	0.17	0.17
PF-17	BL3.1	0.17	0.15

Figure 6-1. Dry Weather Calibration Chart

Flow Meter-05



6.2 WET WEATHER CALIBRATION

Wet weather calibration involves adjusting model parameters to accurately simulate the wastewater system's response to rainfall events. Rainfall data from five rain gauges across the city, along with flow monitoring data, were analyzed to identify a suitable storm event for calibration. Selection criteria included: (1) absence of significant rainfall events immediately before or after the target storm, (2) consistent rainfall distribution across the study area, and (3) similarity in magnitude and duration to the design storm.

However, no suitable wet weather events were captured during the flow monitoring period. As a result, wet weather calibration could not be completed. Instead, RTK unit hydrograph parameters from previous calibrated model were applied, under the assumption that rainfall-derived inflow and infiltration (RDII) characteristics have remained relatively unchanged over the past six years.

To represent RDII behavior in areas developed after 2018—primarily located within the Wilbarger Basin—RTK unit hydrograph parameters were selected based on the lowest observed RDII response within the same basin. This approach assumes that newer developments in the Wilbarger Basin exhibit similar or lower RDII characteristics compared to the historically monitored areas.

7.0 WASTEWATER SYSTEM ANALYSIS

The next phase of the master planning process involved performing a hydraulic analysis of the City's wastewater collection system for both existing and future planning horizons. Utilizing the calibrated wastewater model along with updated population and flow projections, the system was evaluated for capacity constraints under 2025, 2030, 2035, and Buildout conditions. This section provides an overview of the methodology used to establish design criteria and to conduct hydraulic analyses and system evaluations for each planning period.

7.1 DESIGN CRITERIA

Establishing design criteria is a critical step in guiding the identification of potential Capital Improvement Plan (CIP) projects. The following sections outline the design criteria applied in the hydraulic analysis, system evaluation, and the determination of capacity-related CIP needs.

7.1.1 Design Storm

A key element of any wastewater master plan is understanding how the collection system performs during wet weather events. Inflow and infiltration (I/I) can cause hydraulic restrictions, potentially leading to system surcharging and sanitary sewer overflows. To evaluate system capacity consistently, a standardized rainfall event—known as the design storm—must be selected as the basis for analysis. Regulatory agencies such as the EPA and the Texas Commission on Environmental Quality (TCEQ) permit regulated entities to choose an appropriate design storm, provided it represents typical regional rainfall patterns while remaining conservative enough to identify system vulnerabilities. However, the design storm should not be so conservative that it unrealistically overstates system deficiencies. The size of the design storm directly influences the scope and cost of the Capital Improvement Plan (CIP), as larger storms produce greater inflow volumes and reveal more system limitations. Therefore, selecting a design storm involves balancing realism and conservatism—ensuring it is substantial enough to stress the system and identify hydraulic limitations without overstating risks based on rare or extreme events.

AEM developed the design storm and detail was illustrated in **Appendix D**. Design storms are characterized primarily by their duration and return period. Duration refers to the total length of time over which rainfall occurs, ranging from as little as 30 minutes to several days. The return period represents the statistical likelihood of a storm of a given magnitude occurring in any given year. For example, a storm with a five-year return period has a 20% chance of occurring in any given year. Precipitation depths for specific duration and return frequency events were obtained from NOAA Atlas 14. These depths represent the annual maxima series for the center of Pflugerville. **Table 7-1** represents tabular rainfall depths for the 6- and 24-hour durations, with the 2- and 5-year return.

Table 7-1. Precipitation Frequency Depth (in) for the 6- and 24-hour Storm Duration in Pflugerville

Duration	Return Frequency	
	2-year Depth (in)	5-year Depth (in)
6-HR	3.10	4.06
24-HR	4.04	5.31

STV recommended using a 5-year, 6-hour design storm with a total rainfall depth of 4.06 inches for wastewater system planning in the City of Pflugerville. Based on NOAA Atlas 14, the official depth for a 5-year, 6-hour storm event in Pflugerville is 4.06 inches, as shown in **Table 7-1**.

For this study, the first quartile distribution was selected as the most conservative scenario, with 39% of the rainfall occurring within the first 1.5 hours with a 6-hour storm duration. The 50th percentile event is defined as the event where 50% of storms are more intense than the median and 50% are less intense. Within this quartile, the 50th percentile temporal distribution was used to represent a typical yet conservative rainfall pattern. The resulting hyetograph for the 5-year, 6-hour design storm—developed according to NOAA Atlas 14—is shown in **Figure 7-1**. This storm has a total rainfall depth of 4.06 inches and a peak intensity of 2.05 inches per hour and was used to evaluate the capacity and performance of the wastewater collection system.

7.1.2 Capacity Improvement Triggers

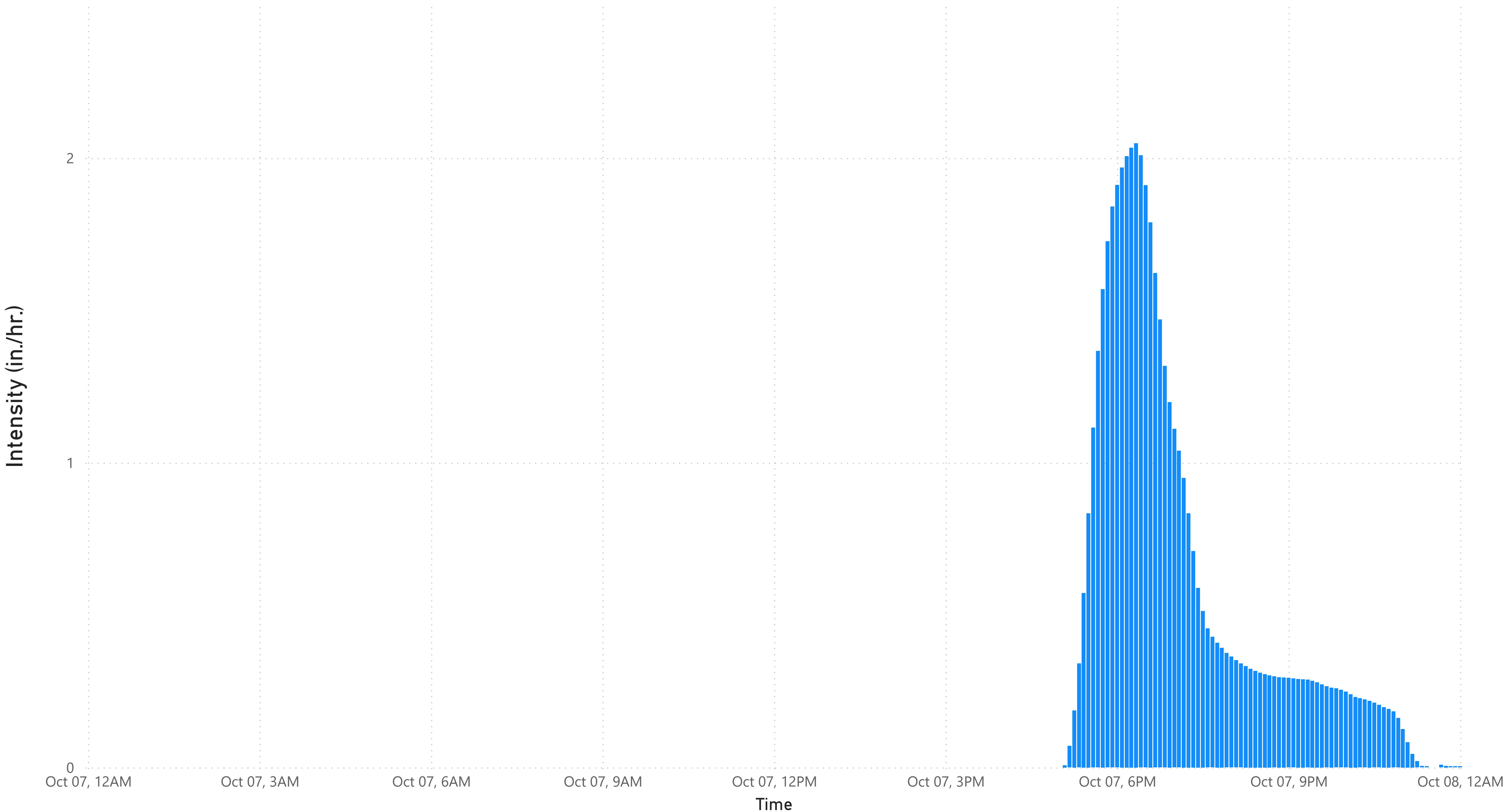
To evaluate and analyze the wastewater collection system under both existing and future conditions, previously established criteria for identifying necessary capacity improvement projects has been considered. While design criteria can vary, for this study, STV set the hydraulic grade line (HGL) to not exceed 3 feet below the manhole rim. This "3 feet below top of manhole rim" criterion allows for some surcharging, which helps prevent potential overflows and optimizes the use of existing system storage. This design approach enables the collection system to better handle peak wet weather flow conditions by attenuating these flows, thereby reducing the need for large-scale capacity improvements. Under this criterion, pipe flow restrictions (bottlenecks) are not considered hydraulic issues as long as the HGL remains within the specified limit. This approach allows the system to use available storage effectively. Additionally, no sanitary sewer overflows (SSOs) are permitted under the model's projected conditions.

When determining the size of proposed wastewater lines, TCEQ design criteria (§217.53(l)(1)) require that gravity sewer lines be sized to maintain a minimum velocity of 2 ft/sec to prevent the settling of solids. Additionally, TCEQ guidelines (§217.67(a)) specify that force mains must be sized to convey the lift station's pumping capacity at a minimum velocity of 3 ft/sec for duplex lift stations, and 2 ft/sec when operating with one pump at a lift station with three or more pumps.

For future wastewater loading, TCEQ Chapter 217 §217.53(j)(3) mandates that "A collection system must be designed to prevent surcharge in any pipe at the expected peak flow." Consequently, all proposed lines are sized to handle peak flows without surcharge conditions. New lines serving undeveloped areas must also meet TCEQ's minimum slope requirements. If proposed lines are constructed at a different slope than initially modeled, the line size should be reassessed based on the updated capacity.

Lift station analysis is based on the firm capacity of the station, which refers to the pumping capacity with the largest pump out of service. A lift station is deemed under capacity if the projected peak flow exceeds its firm capacity. New or upgraded lift stations are designed with a firm pumping capacity capable of handling the projected peak buildout flows.

Figure 7-1. 5-Year, 6-Hour Design Storm Hyetograph



Wastewater treatment plant analysis follows the TCEQ “75/90 rule,” which stipulates that if a plant exceeds 75% of its permitted annual average flow for three consecutive months, it must begin planning for its next expansion. If the facility exceeds 90% of its permitted annual average flow, construction for the next expansion must begin.

7.2 EXISTING SYSTEM ANALYSIS

The critical flow condition for analyzing a wastewater collection system is peak wet weather flow. Key parameters such as flow rate, depth, and velocity are evaluated during peak wet weather simulations. In the model, a design storm event is applied to simulate the impact of rainfall-derived inflow and infiltration (I/I) on the system’s dry weather flow. As the storm progresses (as illustrated in Figure 7-1), additional flow enters the system after a “lag” period—the time between when rainfall reaches the ground and when it contributes to flow within the system. The model identifies the point in time when the flow from the design storm peaks within the system, representing the maximum hydraulic loading condition.

Figure 7-2 presents a color-coded map illustrating the surcharge status of modeled pipes and manholes at the peak of a 5-year, 6-hour storm event. Red lines on the map indicate surcharging caused by downstream restrictions. Modeled overflow locations resulting from the 5-year, 6-hour storm event are shown as red circles, while orange circles represent manholes where the hydraulic grade line (HGL) rises to within 3 feet of the rim. Overall, the existing collection system is generally capable of conveying peak wet weather flows, with only a few modeled overflow locations under current conditions. However, the following areas of concern were identified:

3. Gilleland Creek Gravity Mains– Three Manholes with UID 45766, 75417 and 75418, on the south side of E Pecan St and West of Heritage Loop Trail, experienced significant surcharging, with hydraulic grade lines (HGL) rising within 3 feet of the manhole rim, exceeding the design criteria.

4. Bohls Place Lift Station – The lift station has a firm capacity of 0.33 MGD, while upstream peak flow reaches 0.49 MGD. This exceeds capacity and results in upstream HGL rise, causing sanitary sewer overflows (SSOs) and surcharging within 3 feet of the manhole rim at multiple locations.

5. Verona Lift Station – With a firm capacity of 1.06 MGD and upstream peak wet weather flow at 2.38 MGD, this lift station experiences upstream HGL rise and surcharging within 3 feet of the manhole rim.

6. Weiss Lane Lift Station – With a firm capacity of 8.47 MGD and peak upstream flow of 9.49 MGD, this station also sees upstream HGL rise without surcharging within 3 feet of the manhole rim.

7. Gravity mains in Spring Trails – Five gravity mains with UID 3105, 3106,3107,3108,3109, along Pencil Cactus Dr experienced surcharging; however, the levels did not exceed the design criteria. The surcharging is attributed to the two 8-inch segments being situated between upstream and downstream 12-inch mains, which created a bottleneck in the system.

8. Gravity mains in Settlers Ridge – Ten gravity mains along Settlers Valley Drive exhibited surcharging due to insufficient capacity of gravity mains with UID 14819; however, the levels did not exceed the design criteria.

9. Gravity mains near Union Church - One gravity main on the east side of Union Church experienced surcharging. The surcharge level remained within the acceptable design limits.

10. Gravity mains on the east of Springbrook – Eleven gravity mains experienced surcharging, primarily due to minimal slope in an 8-inch gravity main with UID: 23353. Despite this, the surcharge levels did not exceed the design criteria.

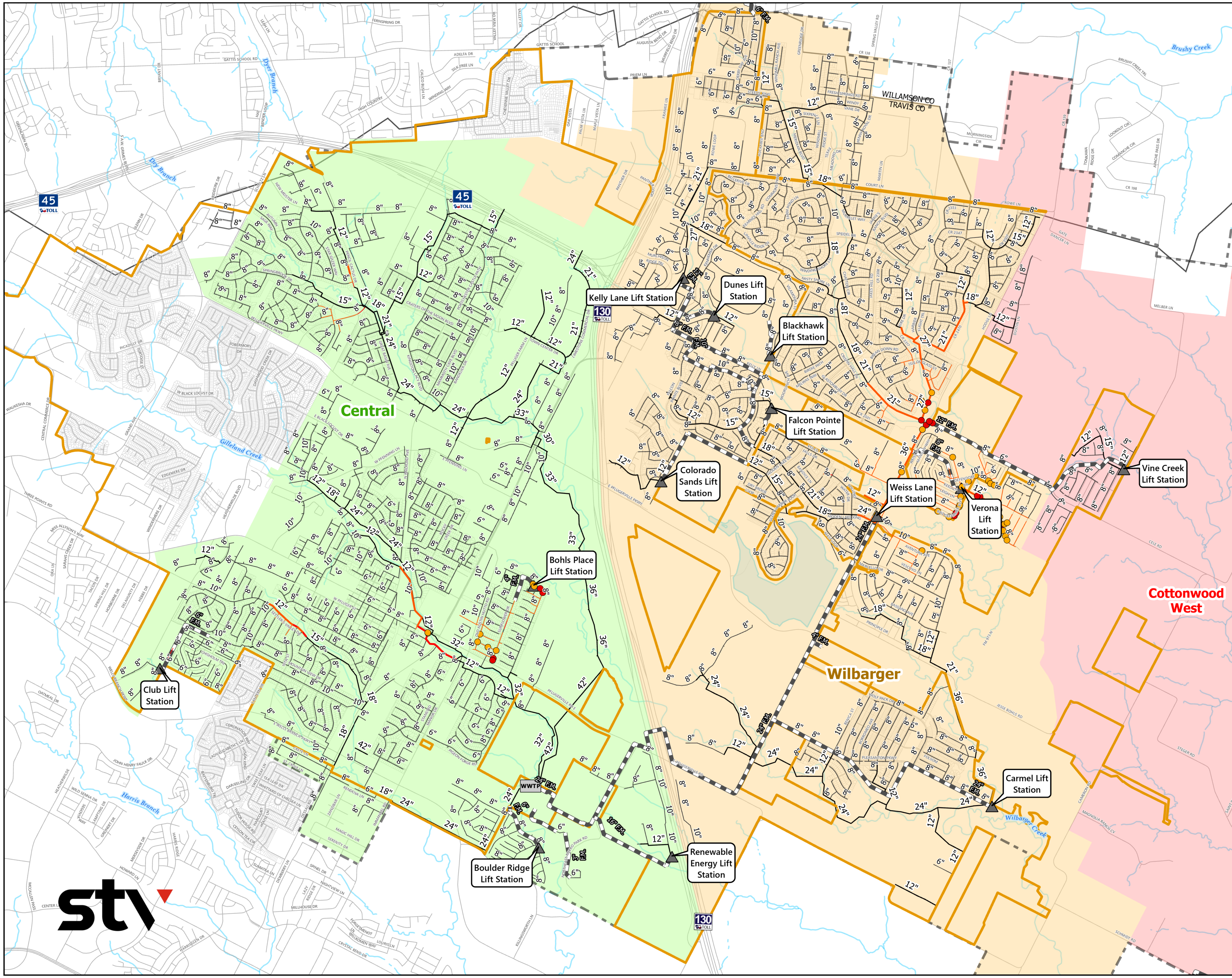


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FIGURE 7-2

CITY OF PFLUGERVILLE

EXISTING WASTEWATER SYSTEM

LEGEND

- ETJ Boundary
- County Boundary
- City Limit
- Parcel Boundary
- Road
- Stream
- Lake

12" and Larger Lines
- Insufficient Capacity
- Surcharged Due to Downstream Capacity Constraint

10" and Smaller Lines
- Insufficient Capacity
- Surcharged Due to Downstream Capacity Constraint
- Lift Station
- Wastewater Treatment Plant
- 10" and Smaller Wastewater Line
- 12" and Larger Wastewater Line

Manholes
- Model-Predicted Overflow
- Model-Predicted Surcharge Level < 3 ft from Mnahole Rim

- Central
- Wilbarger
- Cottonwood West
- Cottonwood East

Round Rock
Pflugerville
79
45
35
95
1
130
183
290

N
0 0.5 1
SCALE IN MILES

7.3 FUTURE SYSTEM ANALYSIS

Hydraulic analyses were performed to evaluate deficiencies identified in the City of Pflugerville's wastewater collection system and to develop a Capital Improvement Plan (CIP) that supports projected growth through the 2030, 2035, and Buildout planning horizons. To accommodate this growth, Pflugerville may need to rehabilitate, replace, or upsize existing infrastructure and extend service to developing areas currently lacking adequate wastewater facilities.

Using the hydraulic model, system improvements were developed through Buildout. Once areas of concern were identified. Key design parameters included the ability to convey peak wet weather flows, maintain appropriate flow velocities, and minimize surcharging and sanitary sewer overflows. These improvements were designed to resolve existing system deficiencies while also providing capacity for future development.

All proposed facilities and collection mains were designed to accommodate Buildout peak wet weather flows. To support timing definition for each improvement, hydraulic modeling was also performed for the 2025 and 2030 planning periods. For these scenarios, dry weather flows were allocated based on the flow projections presented in Section 4, and the design storm was applied to evaluate system performance.

In areas of future development where the pipe layout has not yet been planned, the method described in Section 5.3.2.3 could not be applied. Instead, a base flow rate of 750 gallons per day per acre—per the City's design manual—was used to estimate rain-derived inflow and infiltration (I&I). Based on the modeling results, recommended improvements were phased into 5-year (2030), 10-year (2035), and Buildout categories.

7.3.1 Lift Station Analysis

Table 7-2 provides a summary of existing firm capacities, projected peak wet weather flows for 2030, 2035 and Buildout planning periods.

Table 7-2. Summary of Lift Station Capacity

Lift Station	Existing Firm Capacity (MGD)	Peak Wet Weather Flow			Recommended Firm Capacity [1]
		2030	2035	Buildout	
Blackhawk	0.18	0.006[1]	N/A[1]	N/A[1]	N/A[1]
Bohls Place	0.33	0.77[1]	N/A[1]	N/A[1]	N/A[1]
Boulder Ridge	0.33	0.17[1]	0.16	0.16	0.66
Carmel	5.5	N/A[1]	N/A[1]	N/A[1]	5.5
Club	0.72	0.50[1]	N/A[1]	N/A[1]	N/A[1]
Colorado Sands	2.36	0.20[1]	N/A[1]	N/A[1]	N/A[1]
Dunes	0.89	0.012[1]	N/A[1]	N/A[1]	N/A[1]
Falcon Pointe	0.48	0.04[1]	N/A[1]	N/A[1]	N/A[1]
Kelly Lane	2.52	1.08[1]	N/A[1]	N/A[1]	N/A[1]
Renewable Energy	2.36	0.95	1.91	2.31	2.36
Verona	1.06	2.06[1]	N/A[1]	N/A[1]	N/A[1]
Weiss Lane	8.83	12.96[1]	N/A[1]	N/A[1)]	N/A[1]
Vine Creek	1.27	0.92	0.92	N/A[1]	N/A[1]
Cottonwood West [2]	N/A	-	0.23	2.74	3.0
New Sweden [2]	N/A	-	1.1	10.56	12
Cele	N/A	-	2.27	N/A[1]	N/A[1]
Cottonwood East	N/A	-	1.47	17.42	18

[1] The lift station is anticipated to be decommissioned or flow diverted to a proposed interceptor.

[2] Lift Stations Under construction

As previously identified, the construction of the WCRWWTF in the Wilbarger Basin is scheduled to begin receiving flow in September of 2026. The ability to provide collection and gravity conveyance of wastewater from the Wilbarger and Cottonwood basins to the new treatment facility will result in a shift in the Wilbarger Basin flow management strategy. The City currently has projects at or near construction that will decommission 7 of the existing 14 lift stations. **Table 7-2** identifies 2 additional lift stations being decommissioned by projects currently in progress. The lift station decommissioning will improve the operational efficiency of the existing system by reducing the daily pumping requirements and mitigate operation and maintenance (O&M) vulnerabilities with aging lift station infrastructure.

As wastewater flows in the Wilbarger Basin transition to gravity conveyance, pumping requirements are emerging to manage the development in the Cottonwood Basin. **Table 7-2** identifies 2 lift stations currently under construction in the western subbasin of Cottonwood, or Cottonwood West. Due to the large size of the Cottonwood Basin, the City has previously invested in assessing the feasibility of treating Cottonwood wastewater flows in the Cottonwood Basin. The City has proactively purchased 63-acres in the Cottonwood West subbasin for expansion of the wastewater system. The New Sweden site has been considered for locating a treatment facility and corresponds with the New Sweden Wastewater Treatment Plant discharge permit, with permitted flow phases presented in **Table 7-3.**

Table 7-3. New Sweden WWTP Permitted Phases

Phase	Average Daily Flow (MGD)	Peak 2-Hour Flow (MGD)
Interim I	0.15	0.68
Interim II	0.475	1.8
Interim III	0.95	3.3
Final	3.00	12.0

As the City's flow management strategy in the Wilbarger Basin transitions to gravity conveyance, development in the Cottonwood Basin will require wastewater pumping. Flow management for Cottonwood will have the advantage of the wastewater pumping strategy lessons from the Wilbarger Basin while maintaining the City's goals to not prevent or prohibit growth and to provide stakeholders flexibility with the decision-making process. The New Sweden Lift Station is currently under construction at the site, refer to **Figure 8-1** for site location in Cottonwood West.

7.3.2 Wastewater Treatment Plant Analysis

The Central WWTP located in the Central Basin currently has a wastewater treatment capacity of 7.25 MGD, with the potential for additional capacity in the future. The TCEQ discharge permit for the Central WWTP contains flow phases presented in **Table 7-4**. As the flow increases with each subsequent phase, the total discharge phosphorus limit becomes slightly more stringent, requiring an increasing level of treatment quality. The annual average daily flow for 2024 was 4.7 MGD, with a maximum monthly average daily flow of 5.6 MGD being reported to TCEQ for May 2024.

Table 7-4. Central WWTP Permitted Phases

Phase	Average Daily Flow (MGD)	Peak 2-Hour Flow (MGD)
Interim I	5.3	17.4
Interim II	7.25	24.9
Interim III	8.5	30.0
Final	10.0	35.0

Prior to WCRWWTF coming online and becoming fully operational, the capacity of the Central WWTP is projected to exceed the current 75% threshold of 5.44 MGD. Once WCRWWTF is ready to be placed into service, the Weiss Lane Lift Station will be decommissioned, and wastewater flow will be conveyed by gravity to a diversion structure located upstream of Carmel Lift Station. The diversion structure allows wastewater to flow by gravity to the WCRWWTF via the Wilbarger Creek Interceptor. Flows from Cottonwood West will also be conveyed to the WCRWWTF along the same route from the diversion structure to the Wilbarger Creek Interceptor. The reduction in flow to the Central WWTP in 2027 when WCRWWTF becomes operational can be seen in **Figure 7-3**. In the event flows to WCRWWTF need to be reduced, wastewater can be diverted back to the Carmel Lift Station. The City can make adjustments to the diversion structure flow control gate to direct the wastewater to the Carmel Lift station that pumps flow to the Central WWTP.

The ability to transfer wastewater from WCRWWTF to Central with the Carmel Lift Station provides the City increased flexibility of flow management for short-term operations and maintenance benefits or for more targeted strategies that maintain flows to WCRWWTF below TCEQ's critical thresholds that trigger expansion activities. The TCEQ discharge permit for the WCRWWTF contains flow phases presented in **Table 7-5**. It should be noted that the WCRWWTF site development and treatment expansion was designed for phased implementation, with Phase 2 providing 12.0 MGD ADF capacity, Phase 3 providing 15.75 MGD ADF capacity (with a potential configuration to treat 18.0 MGD ADF) and Phase 4 providing 24.0 MGD ADF capacity. This phasing plan is followed for the WCRWWTF expansion capacities.

Table 7-5. WCRWWTF Permitted Phases

Phase	Average Daily Flow (MGD)	Peak 2-Hour Flow (MGD)
Interim	6.0	24.0
Final	15.75	63.0

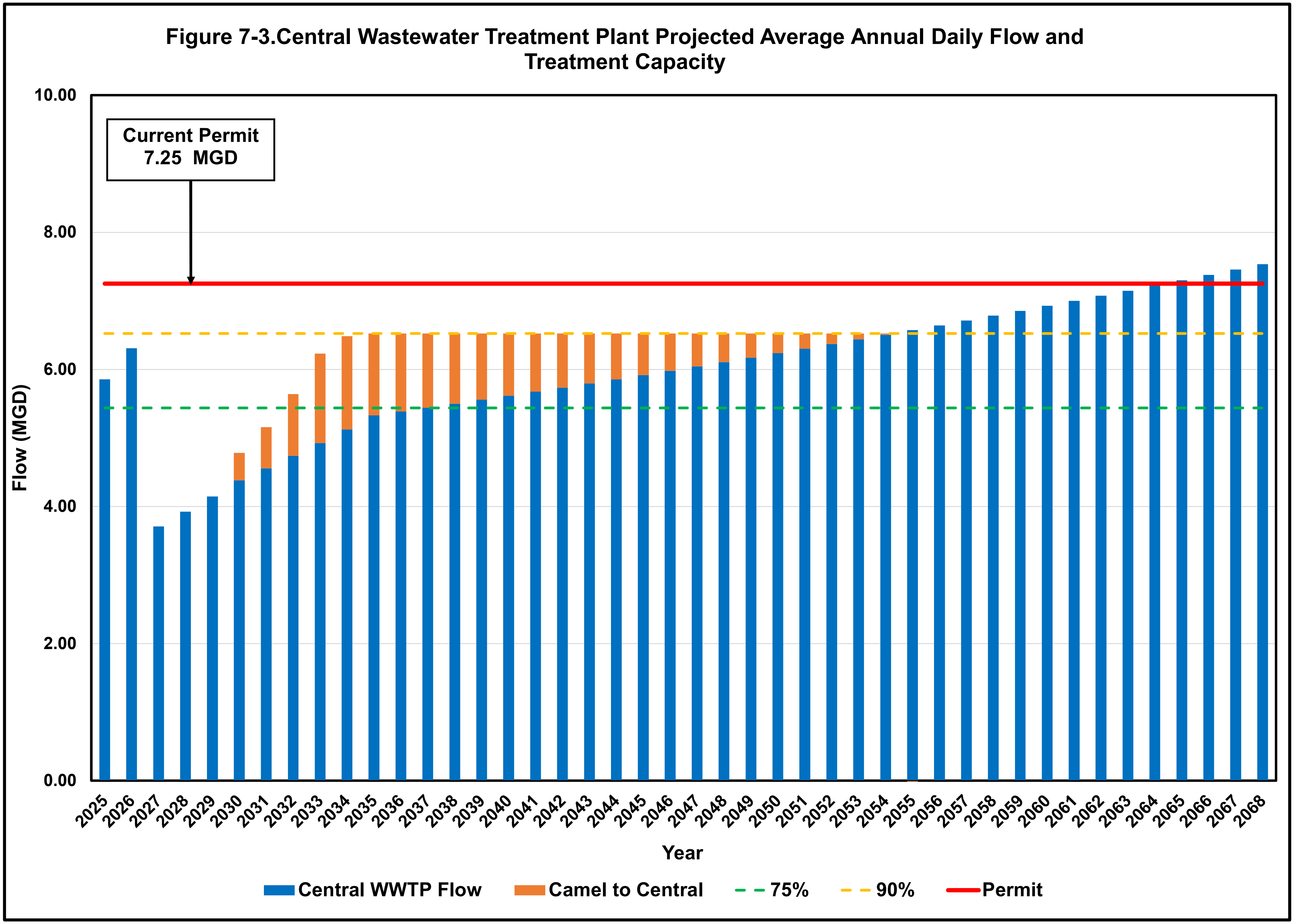
Figure 7-3.Central Wastewater Treatment Plant Projected Average Annual Daily Flow and Treatment Capacity
Current Permit 7.25 MGD
Flow (MGD)
10.00
8.00
6.00
4.00
2.00
0.00
Year
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
2036
2037
2038
2039
2040
2041
2042
2043
2044
2045
2046
2047
2048
2049
2050
2051
2052
2053
2054
2055
2056
2057
2058
2059
2060
2061
2062
2063
2064
2065
2066
2067
2068
Central WWTP Flow
Camel to Central
75%
90%
Permit

The projected flows from the Wilbarger and Cottonwood Basins are presented with the WCRWWTF in **Figure 7-4**. In 2030, wastewater flow projections for Wilbarger and Cottonwood West exceed the 75% threshold of 4.5 MGD at WCRWWTF. Strategically diverting average daily flows to the Central WWTP to utilize the available capacity allows the City to defer initiating design activities for the WCRWWTF Phase 2 Expansion until 2032, an additional 2 years.

To ensure the capacity at the Central WWTP can be fully leveraged to accommodate deferring the WCRWWTF Phase 2 Expansion, completing the rehabilitation and/or replacement of the existing pumps, generator and automation improvements at the Carmel Lift Station are recommended. The Carmel Lift Station is projected to provide the City flexibility with flow management for the next decade, until projected flows in the Central Basin meet and potentially exceed the current available capacity of the Central WWTP. Planning activities in the future will determine if additional treatment capacity will be required at the Central WWTP.

The ultimate decision to treat Cottonwood flows at the WCRWWTF through the use of regional lift stations in the Cottonwood Basin or provide treatment in the Cottonwood Basin will also be determined in the future. The City has strategically incorporated flexibility across the wastewater service area to ensure Pflugerville's wastewater system remains reliable, efficient, and resilient. **Figure 7-4** illustrates incorporation of the WCRWWTF Phase 3 Expansion in the current 20-year long-term planning period to provide confirmation that the capacity of the Carmel Lift Station is not anticipated to exceed the current firm capacity of 5.5 MGD.

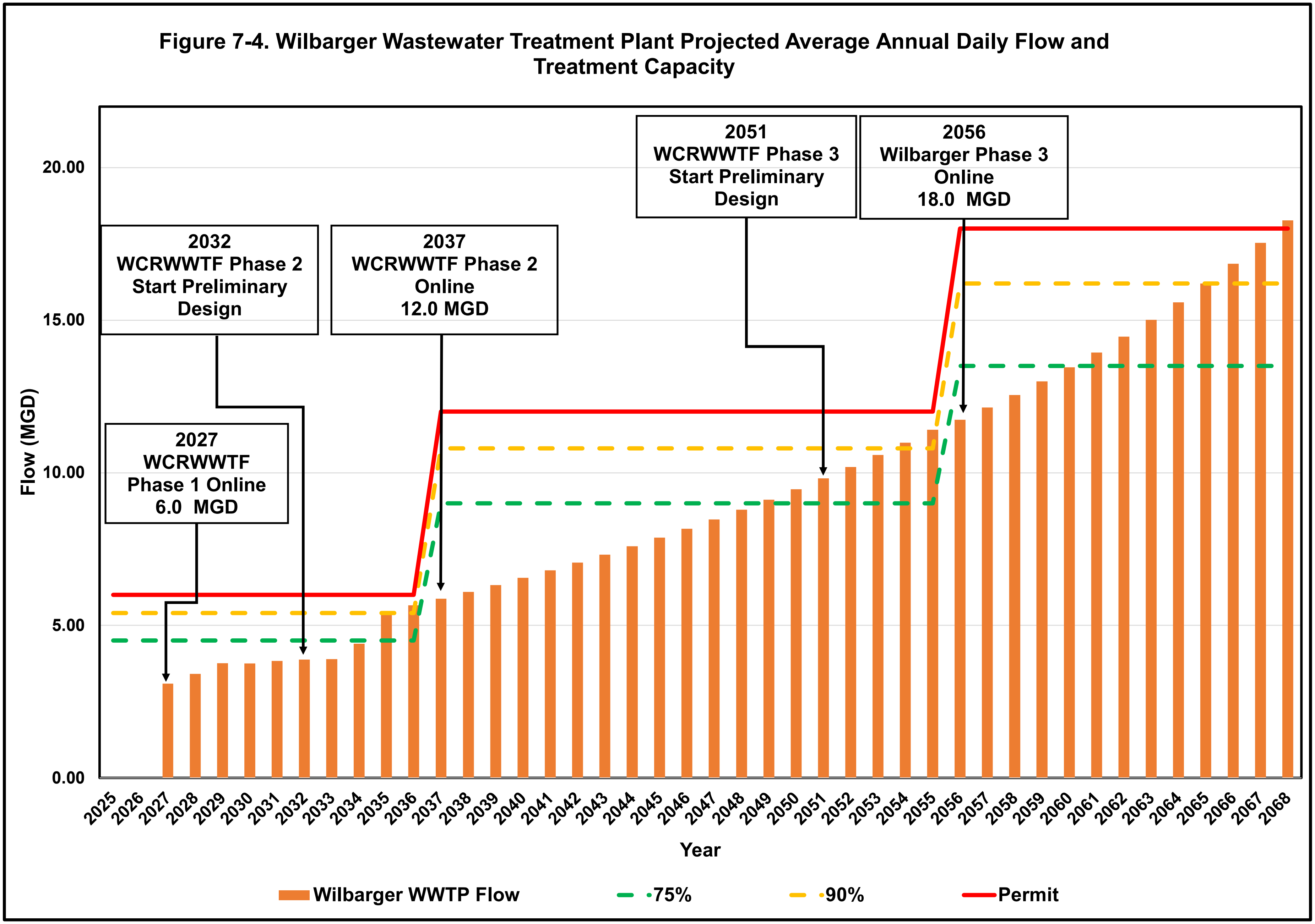
Figure 7-4. Wilbarger Wastewater Treatment Plant Projected Average Annual Daily Flow and Treatment Capacity
2032
WCRWWTF Phase 2
Start Preliminary
Design
2037
WCRWWTF Phase 2
Online
12.0 MGD
2051
WCRWWTF Phase 3
Start Preliminary
Design
2056
Wilbarger Phase 3
Online
18.0 MGD
2027
WCRWWTF
Phase 1 Online
6.0 MGD
Flow (MGD)
20.00
15.00
10.00
5.00
0.00
2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038 2039 2040 2041 2042 2043 2044 2045 2046 2047 2048 2049 2050 2051 2052 2053 2054 2055 2056 2057 2058 2059 2060 2061 2062 2063 2064 2065 2066 2067 2068
Year
Wilbarger WWTP Flow
75%
90%
Permit

7.3.3 Summary of Proposed Improvements

Capital Improvement Plan (CIP) projects were identified for each planning period based on hydraulic modeling results and capacity recommendations developed by STV. The following provides a summary of the recommended CIP projects in each planning phase.

2025- 2030:

- 6.0 MGD Wilbarger Creek Regional Wastewater Treatment Facility
- 54-inch Wilbarger Wastewater Interceptor
- 36-inch Sorento Wastewater Interceptor – Phase 2
- 27-inch Kelly Lane Wastewater Interceptor
- 15-inch North Wilbarger Wastewater Interceptor
- Cottonwood West Lift Station and Force Main
- 12-inch Bohls Place Wastewater Interceptor
- 15-inch Gilleland Creek Wastewater Interceptor
- 15-inch Northwest Wilbarger Wastewater Interceptor
- Boulder Ridge Lift Station Rehabilitation and Expansion
- New Sweden Lift Station and Force Main
- 24-inch Colorado Sands Wastewater Interceptor (Lakeside Meadows)
- Wastewater Line to Pflugerville Water Treatment Plant
- 12-inch Club Drive Wastewater Interceptor
- Carmel Lift Station Improvements
- 24-inch Central Wastewater Interceptor
- 15-inch SH 45 Wastewater Interceptor
- 18-inch Colorado Sands Wastewater Interceptor

2030-2035:

- Wastewater Master Plan Update
- Upper New Sweden Wastewater Interceptor

- Cele Lift Station and Force Main
- Cottonwood East Lift Station and Force Main
- New Sweden Lift Station Expansion to 2.0 MGD
- Rehabilitation of Central Wastewater Treatment Plant
- Wilbarger Creek Regional Wastewater Treatment Plant Expansion – Phase 2

2035 -Buildout

- Cottonwood West Lift Station Expansion to 3.0 MGD
- Cottonwood East Wastewater Interceptor Phase 1
- Cottonwood East Wastewater Interceptor Phase 2
- 36-inch Lower New Sweden Wastewater Interceptor
- 15-inch Vine Creek Wastewater Interceptor
- New Sweden Lift Station Expansion to 12.0 MGD and Force Main
- Cottonwood East Lift Station and Force Main Expansion to 18 MGD
- Wilbarger Creek Regional Wastewater Treatment Plant Expansion – Phase 3

8.0 WASTEWATER SYSTEM CAPITAL IMPROVEMENTS

A Capital Improvement Plan (CIP) has been developed for the City of Pflugerville's wastewater system to ensure it can handle future flow demands and maintain reliable service through Buildout conditions. The proposed improvements are illustrated in **Figure 8-1.** Project locations, including new wastewater lines and other enhancements, were broadly defined for hydraulic modeling purposes; final alignments and facility locations will be refined during the design phase.

While the recommended sequence of construction generally follows the listed order, actual implementation may shift depending on development trends and timing. A detailed breakdown of each project, including descriptions and cost estimates, is provided in **Appendix A**.

Table 8-1 summarizes the total estimated costs of the wastewater CIP. All costs are presented in 2025 dollars and include allowances for engineering, surveying, and contingencies.

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FIGURE 8-1

CITY OF PFLUGERVILLE

WASTEWATER SYSTEM PHASED CAPITAL IMPROVEMENTS

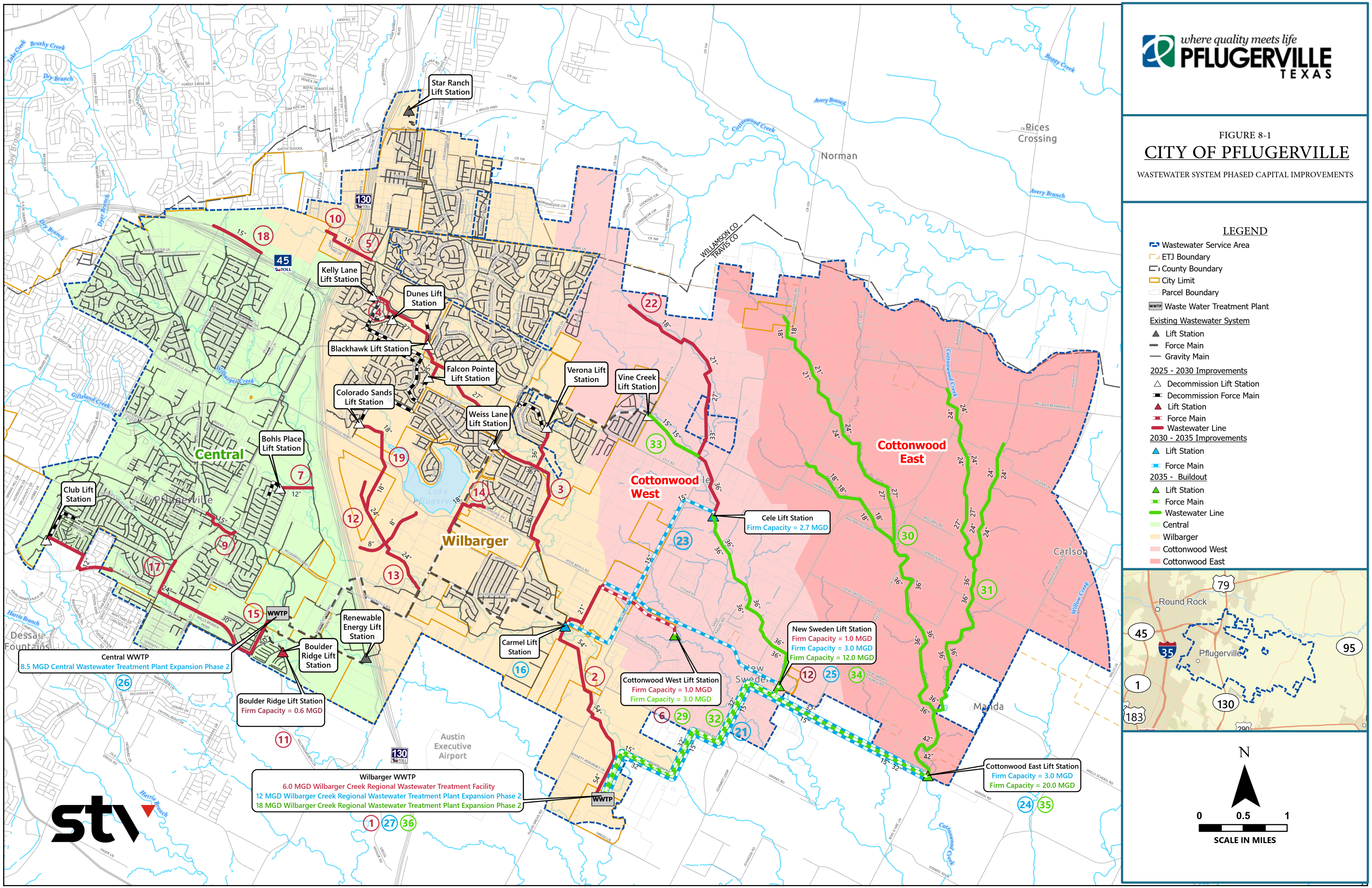


Table 8-1. Wastewater System Capital Improvement Plan

ID No.	Timeframe	Project No.	Project Name	Project Cost	Timeframe Total
1	Ongoing	WW2001	6.0 MGD Wilbarger Creek Regional Wastewater Treatment Facility	$280,893,347	$410,875,469
2	Ongoing	WW2002	54-inch Wilbarger Wastewater Interceptor	$26,202,367	
3	Ongoing	WW2003	36-inch Sorento Wastewater Interceptor Phase 2	$15,703,458	
4	Ongoing	WW2201	27-inch Kelly Lane Wastewater Interceptor	$51,095,681	
5	Ongoing	WW2202	15-inch North Wilbarger Wastewater Interceptor	$2,633,892	
6	Ongoing	WW2302	Cottonwood West Force Main and Lift Station	$10,082,457	
7	Ongoing	WW2304	12-inch Bohls Place Wastewater Interceptor	$2,903,111	
8	Ongoing	WW2306	Rehabilitation of Wastewater Lines	$14,074,345	
9	Ongoing	WW2401	15-inch Gilleland Creek Wastewater Interceptor	$4,504,865	
10	Ongoing	WW2402	15-inch Northwest (NW) Wilbarger Wastewater Interceptor	$2,033,847	
11	Ongoing	WW2403	Boulder Ridge Lift Station Rehabilitation and Expansion	$1,714,000	
12	Ongoing	WW2503	New Sweden Lift Station and Force Main	$11,972,444	
13	Ongoing	WW2601	24-inch Colorado Sands Wastewater Interceptor (Lakeside Meadows)	$343,000	
14	Ongoing	WW2604	Water Treatment Plant Wastewater Line	$793,000	
15	2025-2030	WW2602	12-inch Club Wastewater Interceptor	$8,190,000	$42,832,038
16	2025-2030	WW2701	Carmel Lift Station Rehab and Improvements	$1,076,878	
17	2025-2030	WW2702	24-inch Central Wastewater Interceptor	$26,790,732	
18	2025-2030	WW2703	15-inch SH45 Wastewater Interceptor	$5,945,469	
19	2025-2030	WW2704	18-inch Colorado Sands Wastewater Interceptor	$8,581,180	

ID No.	Timeframe	Project No.	Project Name	Project Cost	Timeframe Total
20	2025-2030	WW2705	Rehabilitation of Wastewater Lines	$5,926,000	
21	2030-2035	WW3001	Wastewater Master Plan Update	$800,000	$228,094,857
22	2030-2035	WW3002	Upper New Sweden Wastewater Interceptor	$500,000	
23	2030-2035	WW3003	Cele Lift Station and Force Main	$500,000	
24	2030-2035	WW3004	Cottonwood East Lift Station and Force Main	$32,161,000	
25	2030-2035	WW3005	New Sweden Lift Station Expansion to 2.0 MGD	$1,419,000	
26	2030-2035	WW2101	Rehabilitation of Central Wastewater Treatment Plant	$22,382,857	
27	2030-2035	WW3006	Wilbarger Creek Regional Wastewater Treatment Plant Expansion Phase 2	$150,332,000	
28	2030-2035	WW3007	Rehabilitation of Wastewater Lines	$20,000,000	
29	2035-Buildout	WW3501	Cottonwood West Lift Station Expansion to 3.0 MGD	$1,534,000	$365,794,328
30	2035-Buildout	WW3502	Cottonwood East Wastewater Interceptor Phase 1	$62,716,328	
31	2035-Buildout	WW3503	Cottonwood East Wastewater Interceptor Phase 2	$54,293,000	
32	2035-Buildout	WW3504	36-inch Lower New Sweden Interceptor	$23,535,000	
33	2035-Buildout	WW3505	15-inch Vine Creek Interceptor	$4,923,000	
34	2035-Buildout	WW3506	New Sweden Lift Station Expansion to 12.0 MGD and Force Main	$45,997,000	
35	2035-Buildout	WW3507	Cottonwood East Lift Station and Force Main Expansion to 18 MGD	$73,086,000	
36	2035-Buildout	WW3510	Wilbarger Creek Regional Wastewater Treatment Plant Expansion Phase 3	$99,710,000	

APPENDIX A. WASTEWATER CAPITAL IMPROVEMENT PLAN PROJECT SUMMARIES

CITY OF PFLUGERVILLE

WW2001

6.0 MGD Wilbarger Creek Regional Wastewater Treatment Facility

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:

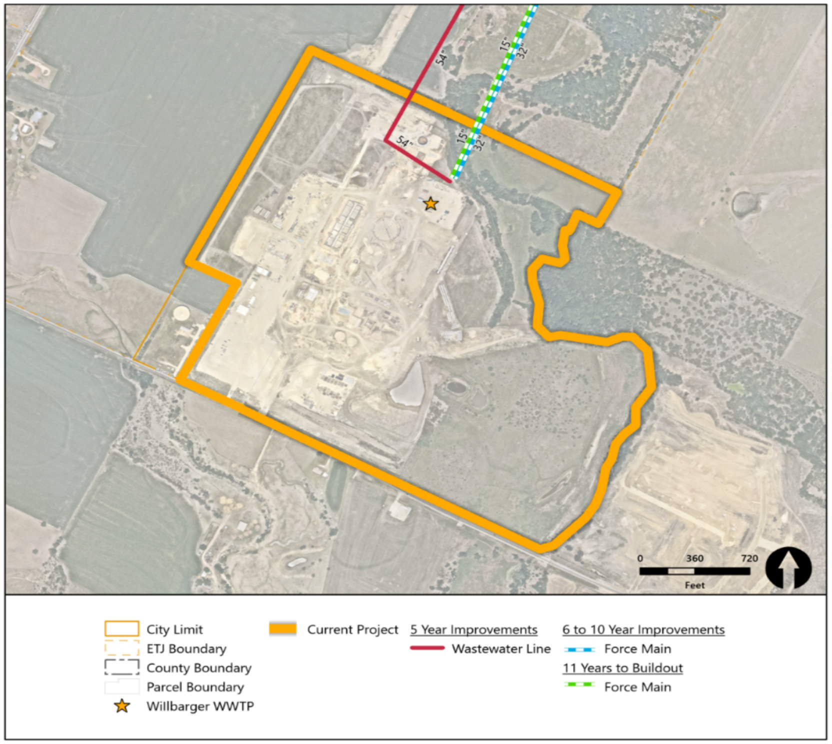
Design and construct wastewater treatment plant that will serve the Wilbarger Basin.

PROJECT DRIVER:

These improvements will need to be substantially completed to meet the City's projected growth needs. This project supports the Safety, Infrastructure and Services pillars of the Strategic Plan and Comprehensive Plan by providing a safe, resilient infrastructure for our citizens.

TIMELINE: FY20 - FY27

WW2001 6.0 MGD Wilbarger Creek Regional Wastewater Treatment Facility							
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**		**UNIT SUBTOTAL**	
1	6.0 MGD Wilbarger Creek RWWTF	LS	1	$	255,756,908	$	255,756,908
					Contingency	$	503,814
					Subtotal	**$**	**256,260,722**
					Engineering/Survey	$	24,581,228
Easement/ROW Acqusition							
1	**Property Acquisition**	LS	1	$	51,397	$	51,397
					Project Total	**$**	**280,893,347**



CITY OF PFLUGERVILLE

WW2002
54-inch Wilbarger Wastewater Interceptor

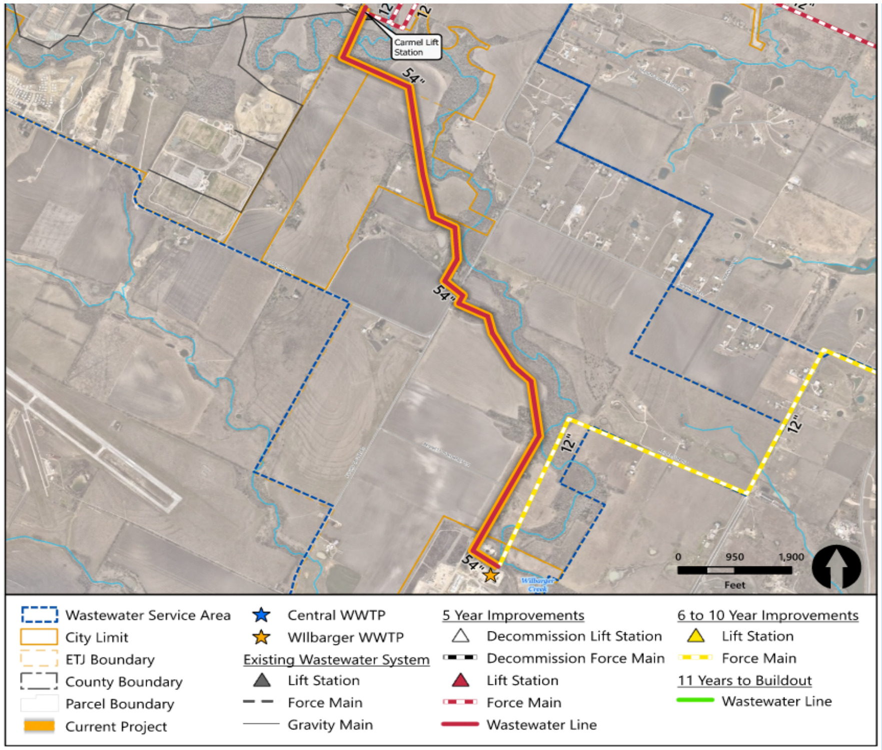
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
54-inch interceptor in the southern portion of the Wilbarger Basin.

PROJECT DRIVER:
This project addresses increased flows due to growth in the Wilbarger and Cottonwood Basins. This project supports the Comprehensive Plan by providing a safe, resilient infrastructure for our citizens. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan.

TIMELINE: FY21 - FY26

WW2002 54-inch Wilbarger Wastewater Interceptor					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	54-inch Wastewater Interceptor	LS	1	$ 21,343,000	$ 21,343,000
				Contingency	$ 1,067,150
				Subtotal	**$ 22,410,150**
				Engineering/Survey	$ 3,312,045
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 480,172	$ 480,172
				Project Total	**$ 26,202,367**



CITY OF PFLUGERVILLE

WW2003
36-inch Sorento Wastewater Interceptor Phase 2

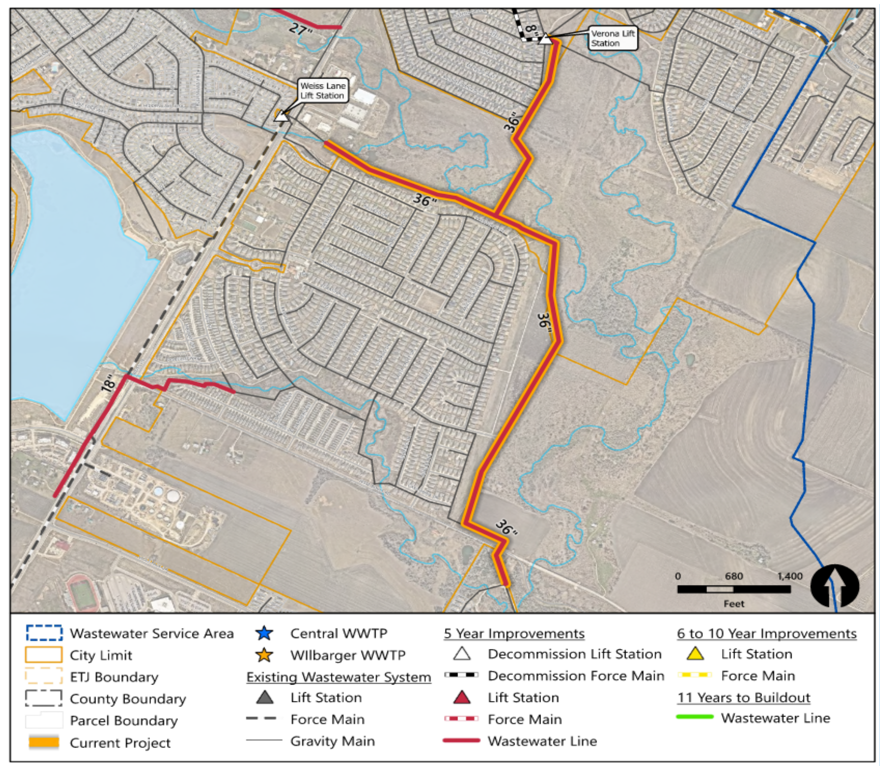
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
36-inch interceptor from Weiss Lane Lift Station and Verona Lift Station. Decommissioning Weiss Lane and Verona Lift Station upon interceptor completion.

PROJECT DRIVER:
This project addresses increased flows due to growth in the Wilbarger and Cottonwood Basin. This project supports the Comprehensive Plan by providing a safe, resilient infrastructure for our citizens. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan.

TIMELINE: FY21 - FY26

WW2003 36-inch Sorento Wastewater Interceptor Phase 2					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	36-inch Wastewater Interceptor	LS	1	$ 13,331,000	$ 13,331,000
				Contingency	$ 1,333,100
				Subtotal	**$ 14,664,100**
				Engineering/Survey	$ 754,354
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 285,004	$ 285,004
				Project Total	**$ 15,703,458**



CITY OF PFLUGERVILLE

WW2201

27-inch Kelly Lane Wastewater Interceptor

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:

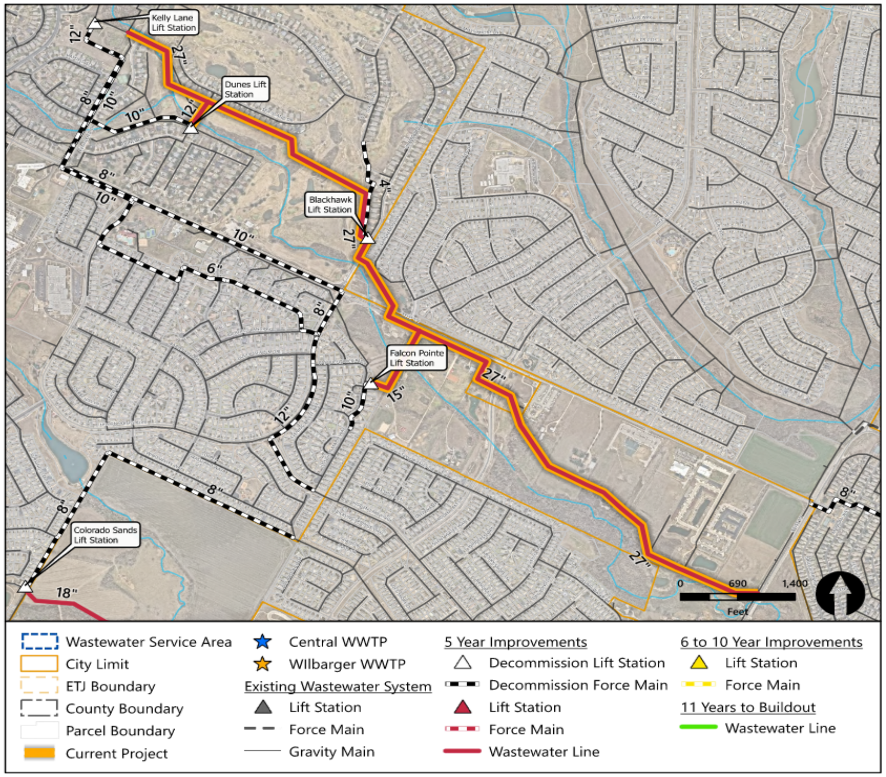
A 27-inch interceptor connecting the areas served by the Kelly Lane Lift Station to the existing 36-inch interceptor along Weiss Lane. 15/12-inch interceptors connecting the areas served by the Dunes, Blackhawk, and Falcon Pointe lift stations to the new 27-inch

PROJECT DRIVER:

The project will provide increased wastewater capacity, convey wastewater flows to the proposed Wilbarger Wastewater Treatment Plant and facilitate more efficient and environmentally safe conveyance of wastewater flows to provide a robust infrastructure and benefit the residents of the City of Pflugerville. This project supports the Comprehensive Plan and aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan.

TIMELINE: FY22 - FY27

WW2201 27-inch Kelly Lane Wastewater Interceptor					
ITEM NO.	DESCRIPTION	UNITS	QNTY	UNIT COST	UNIT SUBTOTAL
1	27-inch Wastewater Interceptor	LS	1	$ 38,708,056	$ 38,708,056
				Contingency	$ 3,870,806
				Subtotal	**$ 42,578,862**
				Engineering/Survey	$ 2,773,199
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 5,743,620	$ 5,743,620
				Project Total	**$ 51,095,681**



CITY OF PFLUGERVILLE

WW2202
15-inch North Wilbarger Interceptor

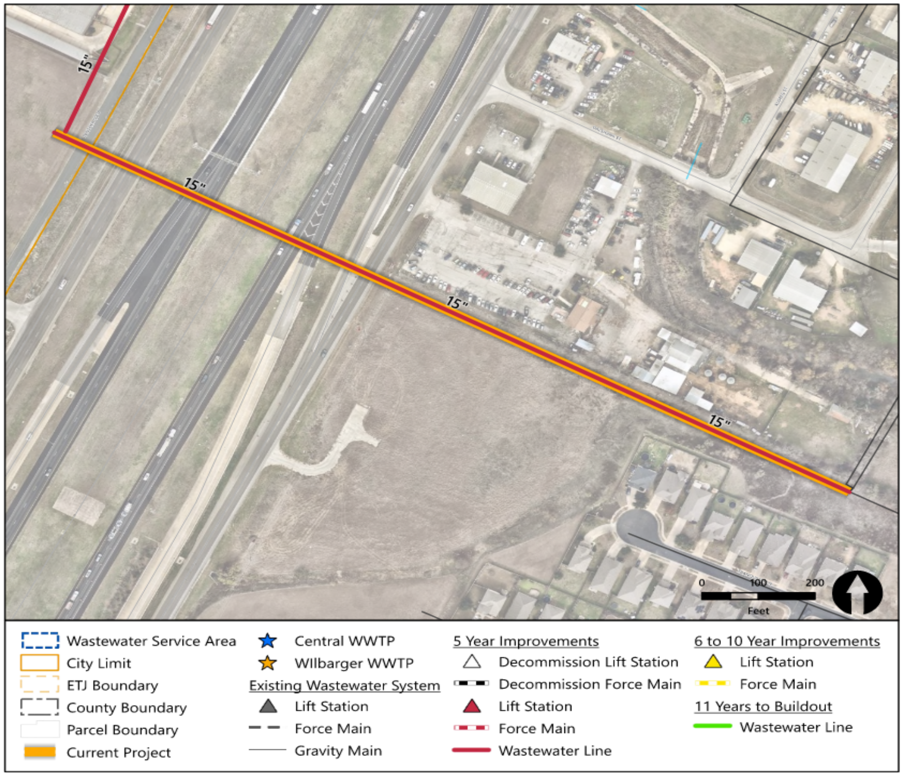
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
A 15-inch wastewater interceptor extending wastewater service in the Wilbarger basin to the west side of SH130, north of SH45.

PROJECT DRIVER:
The Project will serve new development west of SH 130 to be served by the Wilbarger Basin. This project supports the Safety, Infrastructure and Services pillars of the Strategic Plan and Comprehensive Plan by providing a safe, resilient infrastructure for our citizens.

TIMELINE: FY22 - FY26

WW2202 15-inch North Wilbarger Interceptor					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	15-inch Wastewater Interceptor	LS	1	$ 2,051,000	$ 2,051,000
				Contingency	$ 205,100
				Subtotal	**$ 2,256,100**
				Engineering/Survey	$ 231,365
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 146,427	$ 146,427
				Project Total	**$ 2,633,892**



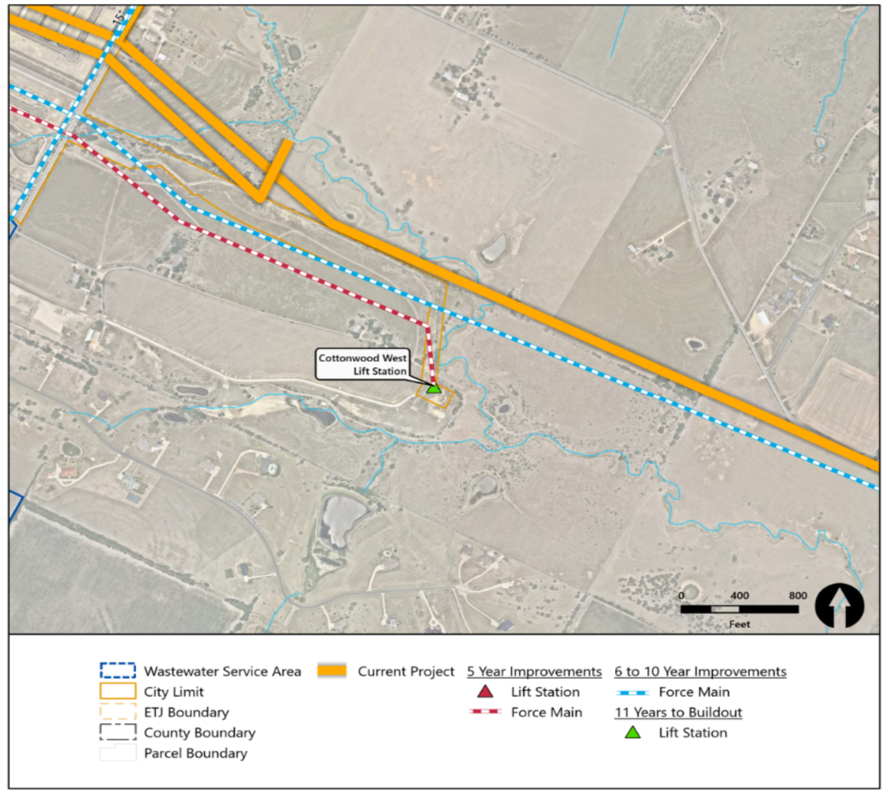
CITY OF PFLUGERVILLE

WW2302
Cottonwood West Force Main and Lift Station

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
Regional lift station aimed to serve developments on the western edge of the Cottonwood sewer shed to the Wilbarger Creek Regional Wastewater Treatment Facility.

PROJECT DRIVER:
Project will address new development in the Cottonwood Basin and convey those flows to the new Wilbarger Creek Regional Wastewater Treatment Facility. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing resilient infrastructure for our citizens.



TIMELINE: FY23 - FY27

WW2302 Cottonwood West Force Main and Lift Station					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	Lift Station and Force Main	LS	1	$ 7,302,173	$ 7,302,173
				Contingency	$ 363,234
				Subtotal	**$ 7,665,407**
				Engineering/Survey	$ 1,939,602
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 477,448	$ 477,448
				Project Total	**$ 10,082,457**

CITY OF PFLUGERVILLE

WW2304

12-inch Bohls Place Wastewater Interceptor

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:

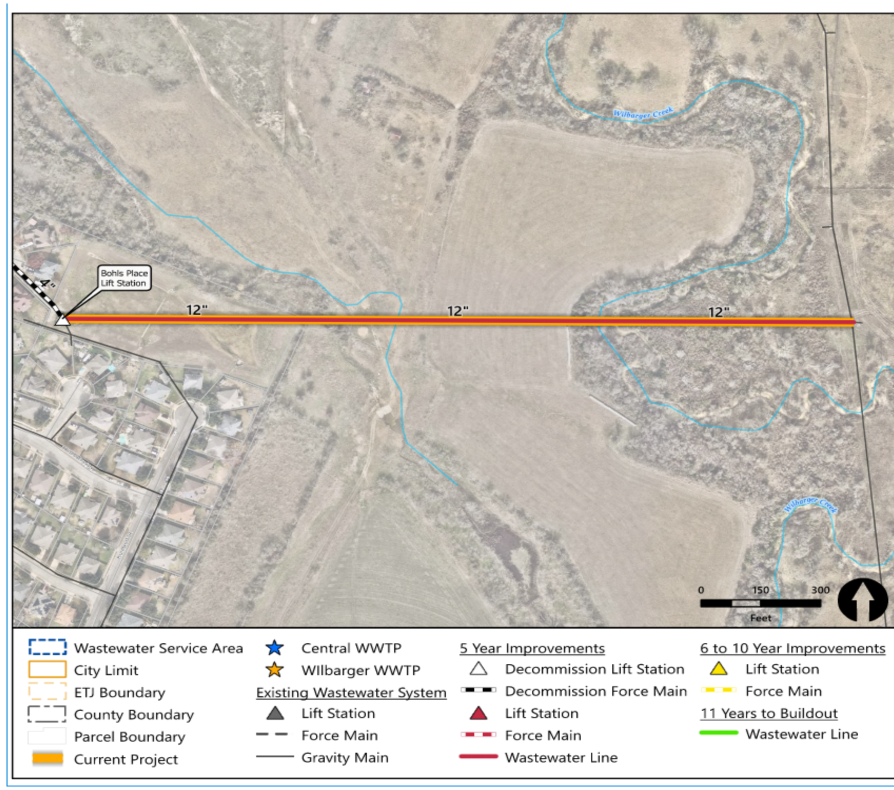
Design and construct an 12-inch interceptor connecting the Bohls place development to the SH 130 interceptor and decommissioning of the Bohls Place Lift Station after completion of the interceptor.

PROJECT DRIVER:

The project will improve system reliability and insufficient firm pumping capacity to meet existing peak flows. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing resilient infrastructure for our citizens.

TIMELINE: FY23 - FY26

WW2304 12-inch Bohls Place Wastewater Interceptor					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	12-inch Wastewater Interceptor & LS Decom.	LS	1	$ 1,922,364	$ 1,922,364
				Contingency	$ 192,236
				Subtotal	**$ 2,114,600**
				Engineering/Survey	$ 406,511
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 382,000	$ 382,000
				Project Total	**$ 2,903,111**



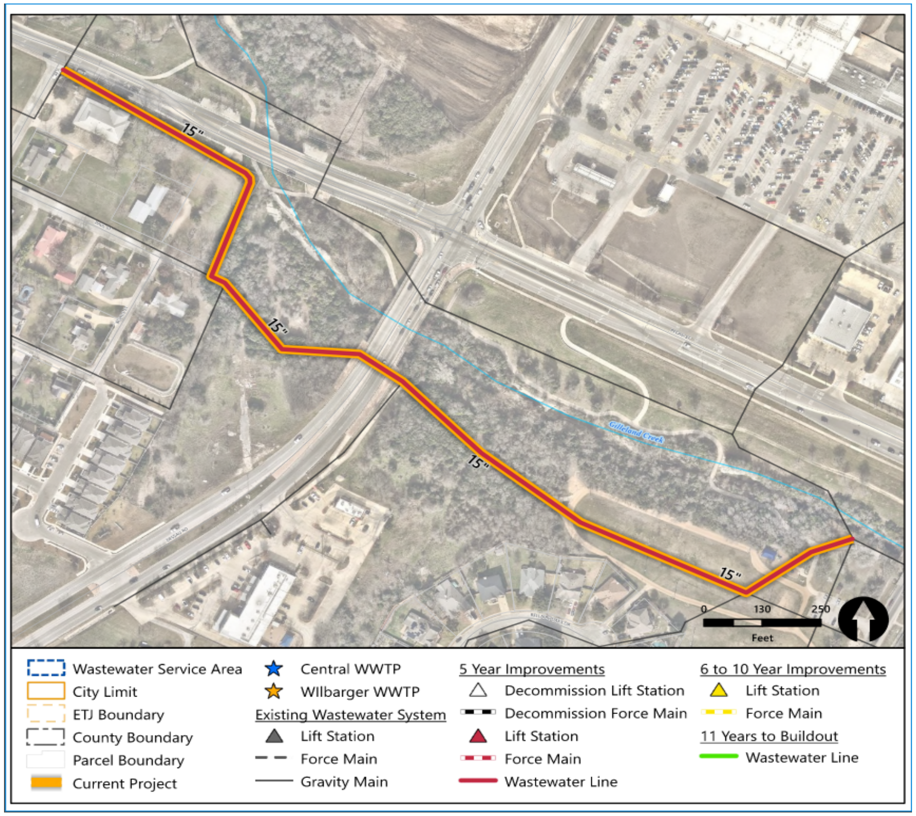
CITY OF PFLUGERVILLE

WW2401
15-inch Gilleland Creek Wastewater Interceptor

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
15-inch interceptor along Gilleland Creek replacing an existing 12-inch interceptor.

PROJECT DRIVER:
Project addresses insufficient interceptor capacity to meet projected peak flows and recommended to prevent SSOs in an impaired watershed. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing resilient infrastructure for our citizens.



TIMELINE: FY24 - FY27

WW2401 15-inch Gilleland Creek Wastewater Interceptor					
ITEM NO.	DESCRIPTION	UNITS	QNTY	UNIT COST	UNIT SUBTOTAL
1	15-inch Wastewater Interceptor	LS	1	$ 3,220,000	$ 3,220,000
				Contingency	$ 322,000
				Subtotal	**$ 3,542,000**
				Engineering/Survey	$ 542,787
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 420,078	$ 420,078
				Project Total	**$ 4,504,865**

CITY OF PFLUGERVILLE

WW2402
15-inch Northwest (NW) Wilbarger Wastewater Interceptor

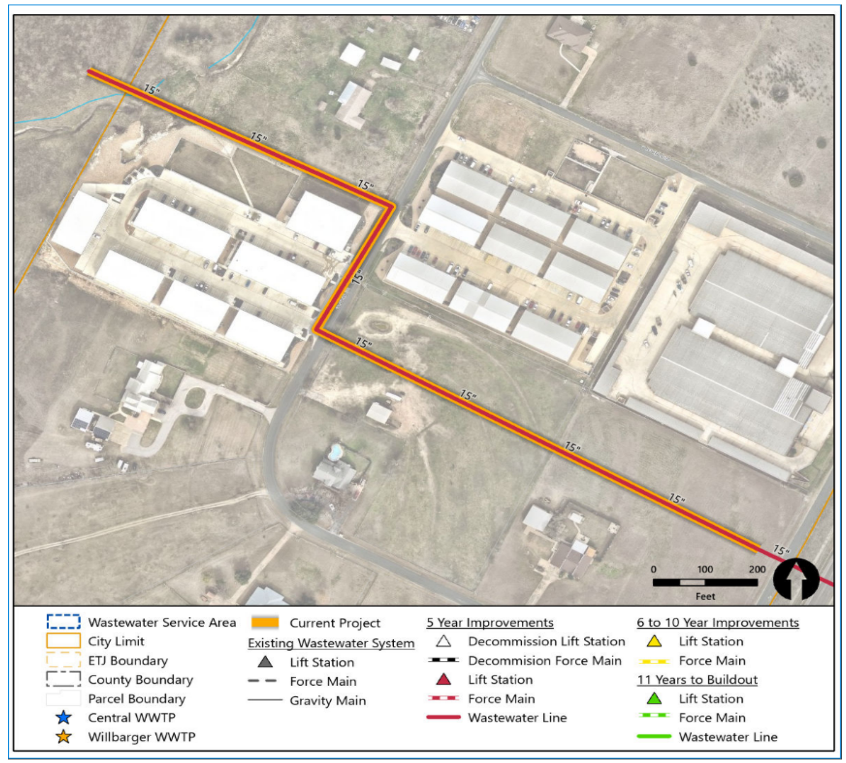
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
A 15-inch wastewater line extending from the western terminus of the 15-inch North Wilbarger Interceptor crossing SH 130 to the western edge of Pflugerville Acres Subdivision, following along Panther Loop and Panther Drive. The wastewater extension is approximately 1,900 feet in length along the proposed route.

PROJECT DRIVER:
This is a critical gravity wastewater line segment for development within the SH 45 area inside the city limits, which is within the TIRZ. The construction of this line, by the City or developers seeking cost-participation, would eliminate the need for a temporary lift station. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing resilient infrastructure for our citizens.

TIMELINE: FY24 - FY26

WW2402 15-inch Northwest (NW) Wilbarger Wastewater Interceptor					
ITEM NO.	DESCRIPTION	UNITS	QNTY	UNIT COST	UNIT SUBTOTAL
1	15-inch Wastewater Interceptor	LS	1	$ 1,100,000	$ 1,100,000
				Contingency	$ 110,000
				Subtotal	**$ 1,210,000**
				Engineering/Survey	$ 358,847
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 465,000	$ 465,000
				Project Total	**$ 2,033,847**



CITY OF PFLUGERVILLE

WW2403

Boulder Ridge Lift Station Rehabilitation and Expansion

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:

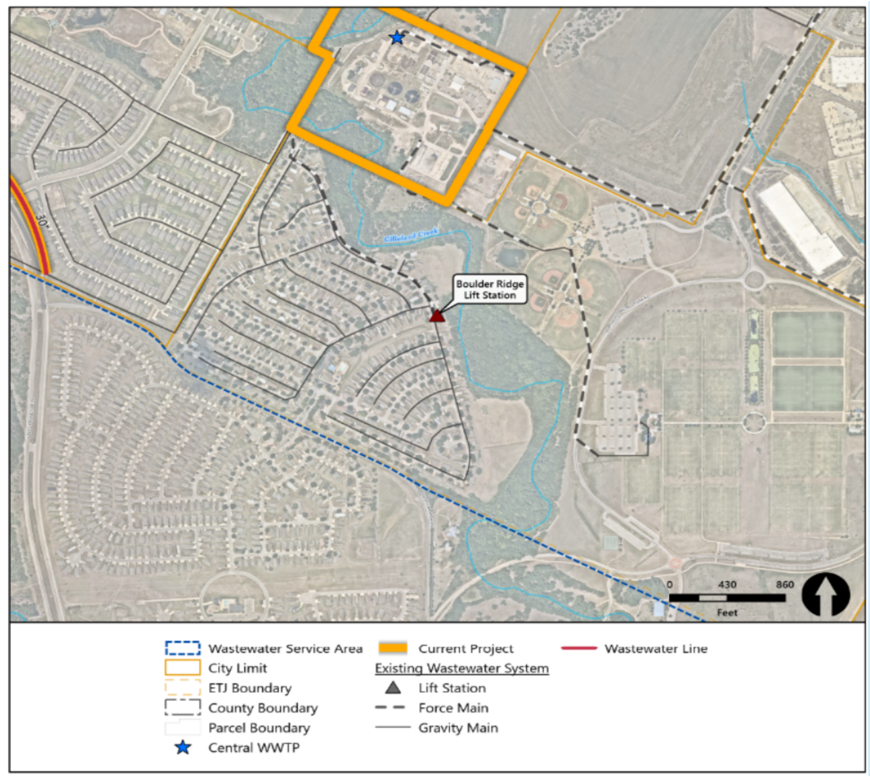
Expansion and rehabilitation of the Boulder Ridge Lift Station from a firm capacity of .33 MGD to .6 MGD. Install a permanent power generator.

PROJECT DRIVER:

Insufficient pumping capacity to meet existing peak flows and observed rehabilitation needs. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing resilient infrastructure for our citizen

TIMELINE: FY25 - FY27

WW2403 Boulder Ridge Lift Station Rehabilitation and Expansion					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	Boulder Ridge Lift Station Rehabilitation	LS	1	$ 1,305,364	$ 1,305,364
				Contingency	$ 130,536
				Subtotal	**$ 1,435,900**
				Engineering/Survey	$ 270,600
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 7,500	$ 7,500
				Project Total	**$ 1,714,000**



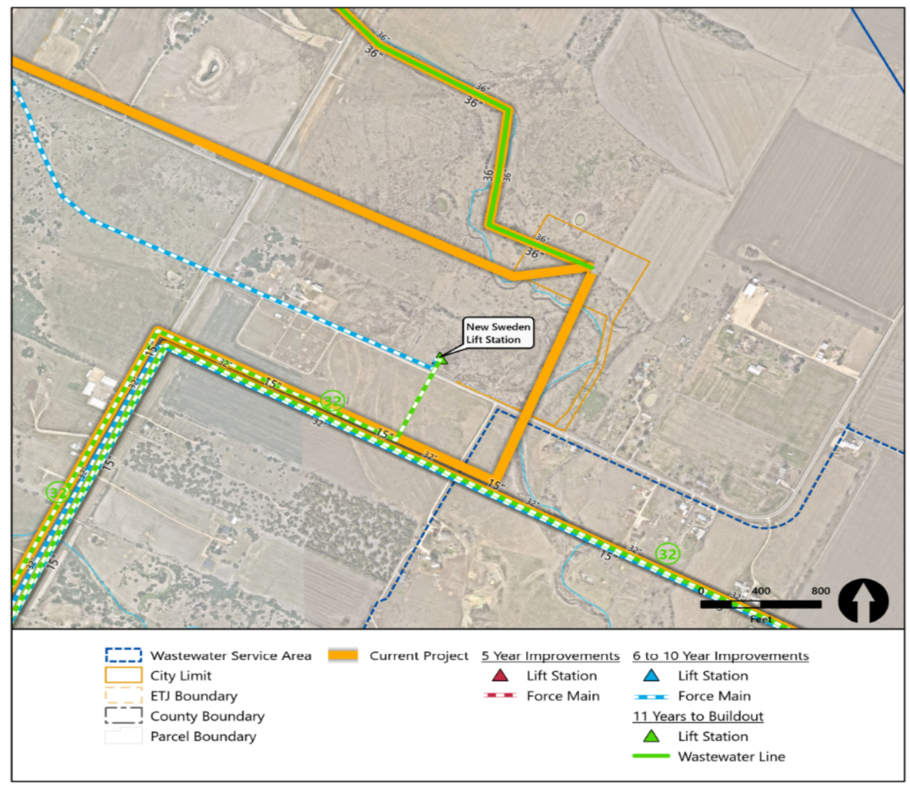
CITY OF PFLUGERVILLE

WW2503
New Sweden Lift Station and Force Main

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
This project includes a new 1.0 MGD lift station and 12-inch force main in the Cottonwood West basin. The lift station and force main will send wastewater flow to the Carmel Lift Station.

PROJECT DRIVER:
This project will serve development in the Cottonwood West basin. This project supports the Comprehensive Plan by providing a safe, resilient infrastructure for our citizens. This project aligns with the Safety, Infrasturcure and Services pillars of the Strategic Plan.



TIMELINE: FY25 - FY27

WW2503 New Sweden Lift Station and Force Main					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	New Sweden Lift Station and Force Main	LS	1	$ 8,584,000	$ 8,584,000
				Contingency	$ 858,400
				Subtotal	**$ 9,442,400**
				Engineering/Survey	$ 370,044
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 2,160,000	$ 2,160,000
				Project Total	**$ 11,972,444**

CITY OF PFLUGERVILLE

WW2601

24-inch Colorado Sands Wastewater Interceptor (Lakeside Meadows)

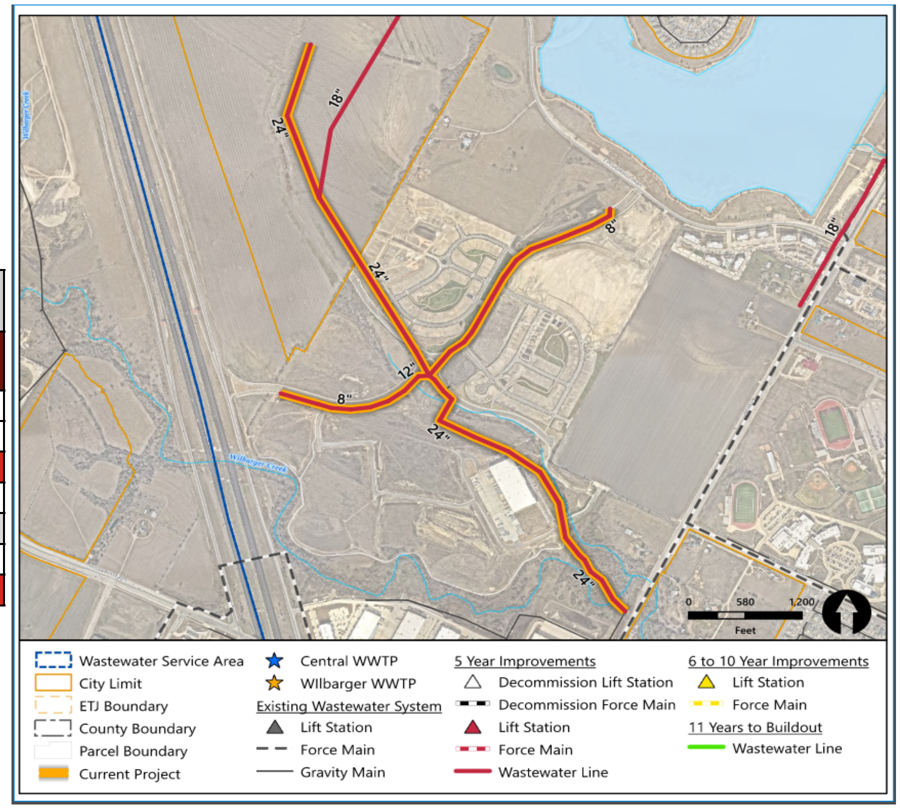
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:

This interceptor includes 8-inch and 24-inch gravity mains in the Wilbarger basin, tying in to the existing 24-inch gravity main along Wilbarger Creek flowing to Carmel Lift Station.

PROJECT DRIVER:

This gravity wastewater line segment will serve development within the Wilbarger basin. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.



TIMELINE: FY26 - FY27

ITEM NO.	DESCRIPTION	UNITS	QNTY	UNIT COST	UNIT SUBTOTAL
WW2601 24-inch Colorado Sands Wastewater Interceptor (Lakeside Meadows)					
1	Developer Participation	LS	1	$ 342,475	$ 342,475
				Contingency	$ -
				Subtotal	**$ 343,000**
				Engineering/Survey	$ -
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	0	$ -	$ -
				Project Total	**$ 343,000**

CITY OF PFLUGERVILLE

WW2604
Water Treatment Plant Wastewater Line

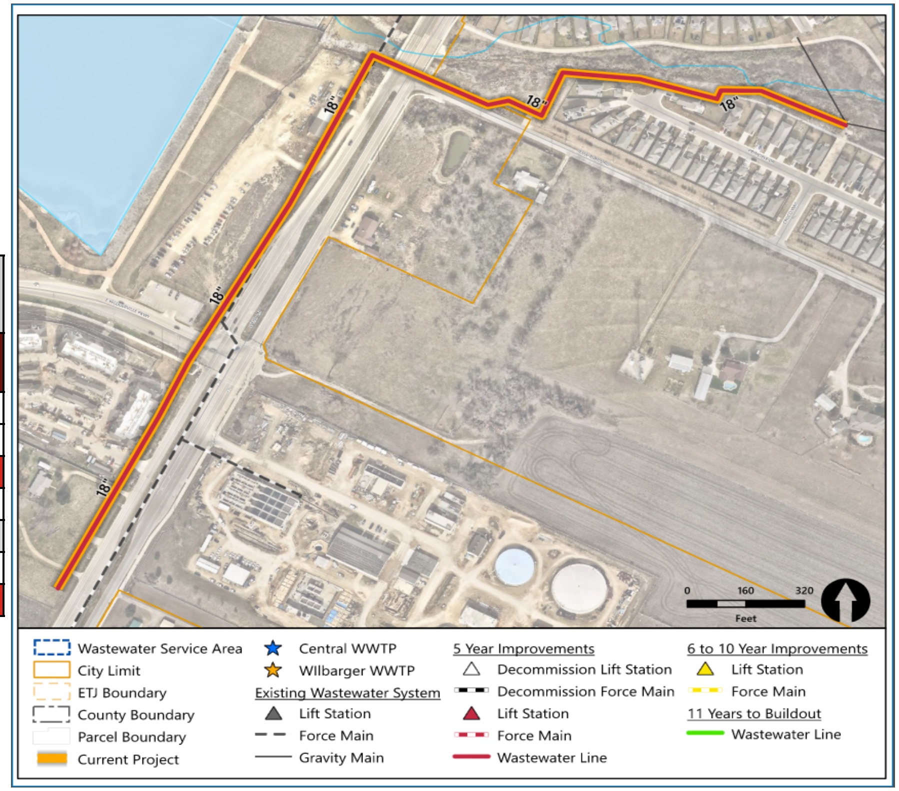
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
18-inch wastewater treatment plant extension to the Water Treatment Plant site east of Weiss Lane.

PROJECT DRIVER:
This project will allow the Water Treatment Plant waste to be conveyed by gravity flow, and removed from the existing forcemain in Weiss Lane. The existing force main will be abandoned.

TIMELINE: FY24 - FY26

WW2604 Water Treatment Plant Wastewater Line						
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**	
1	18-inch Wastewater Interceptor	LS	1	$ 792,346	$	792,346
				Contingency	$	-
				Subtotal	**$**	**793,000**
				Engineering/Survey	$	-
Easement/ROW Acqusition						
1	**Property Acquisition**	LS	0	$ -	$	-
				Project Total	**$**	**793,000**



CITY OF PFLUGERVILLE

WW2602
12-inch Club Wastewater Interceptor

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
12-inch interceptor connecting the area served by the Club Lift Station to the existing 8-inch interceptor along Wells Branch Parkway. Decommissioning of Club Lift Station after completion of the interceptor.

PROJECT DRIVER:
The project will improve system reliability and insufficient firm pumping capacity to meet existing peak flows. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens

TIMELINE: FY26 - FY28

WW2602 12-inch Club Wastewater Interceptor					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	12-inch Wastwater Interceptor and LS Decommissioning	LS	1	$ 5,263,368	$ 5,263,368
				Contingency	$ 526,337
				Subtotal	**$ 5,790,000**
				Engineering/Survey	$ 1,050,000
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 1,350,000	$ 1,350,000
				Project Total	**$ 8,190,000**

CITY OF PFLUGERVILLE

WW2701
Camel Lift Station Rehabilitation and Expansion

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
Purchase and install two new 200 horse power pumps and corresponding electrical service.

PROJECT DRIVER:
This project will support growth in the Wilbarger Basin and divert flows as necessary to the Central Pump Station. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.

TIMELINE: FY25 - FY27

WW2701 Camel Lift Station Rehabilitation and Expansion					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	Camel Lift Station Rehabilitation	LS	1	$ 878,354	$ 878,354
				Contingency	$ 87,835
				Subtotal	**$ 966,189**
				Engineering/Survey	$ 110,689
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ -	$ -
				Project Total	**$ 1,076,878**

CITY OF PFLUGERVILLE

WW2702
24-inch Central Wastewater Interceptor

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
30/24-inch interceptors replacing an existing 24/18-inch wastewater line along Dessau Road and Wells Branch Parkway.

PROJECT DRIVER:
This project is recommended to serve growth in the Central Basin that is projected to increase flow in this area. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.

TIMELINE: FY27 - FY29

WW2702 24-inch Central Wastewater Interceptor					
ITEM NO.	DESCRIPTION	UNITS	QNTY	UNIT COST	UNIT SUBTOTAL
1	24-inch Central Interceptor	LS	1	$ 21,014,533	$ 21,014,533
				Contigency	$ 2,101,453
				Subtotal	**$ 23,115,986**
				Design/Surveying	$ 2,660,950
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 1,013,796	$ 1,013,796
				Project Total	**$ 26,790,732**

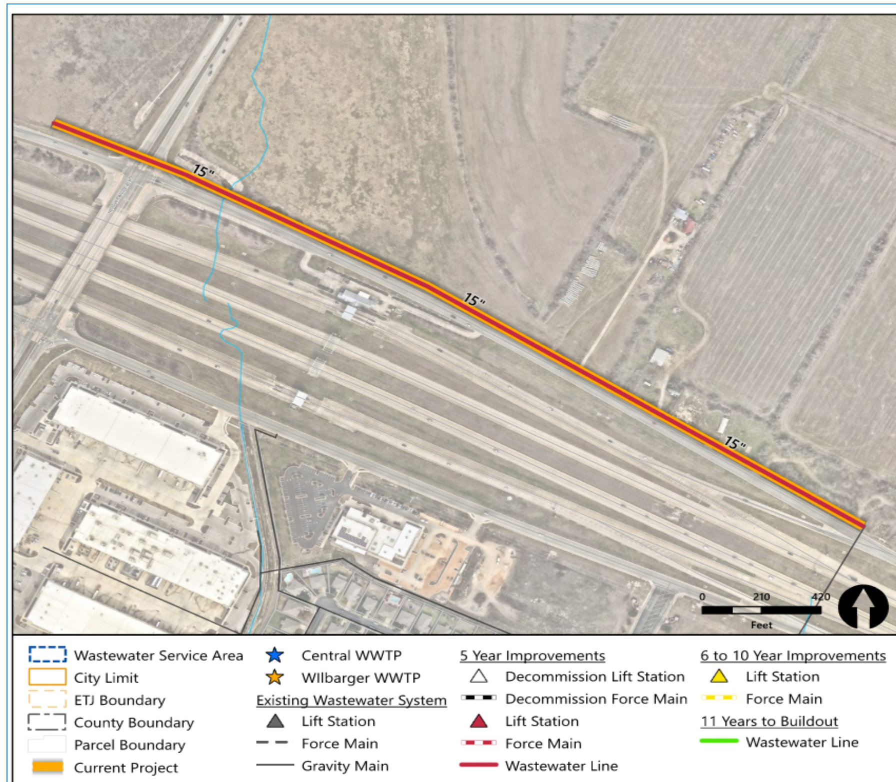
CITY OF PFLUGERVILLE

WW2703
SH45 Wastewater Interceptor

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
15-inch wastewater main north of State Highway 45 between Heatherwilde Boulevard and State Highway 130. This project will serve development northwest of the intersection of State Highway 45 and State Highway 130.

PROJECT DRIVER:
This project supports increased flows and serves growth north of State Highway 45 in the Central Wastewater Basin. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.



TIMELINE: FY27 - FY29

WW2703 SH45 Wastewater Interceptor					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	15-inch Wastewater Interceptor	LS	1	$4,210,426	$ 4,210,426
				Contingency	$ 421,043
				Subtotal	**$ 4,631,469**
				Engineering/Survey	$ 564,000
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 750,000	$ 750,000
				Project Total	**$ 5,945,469**

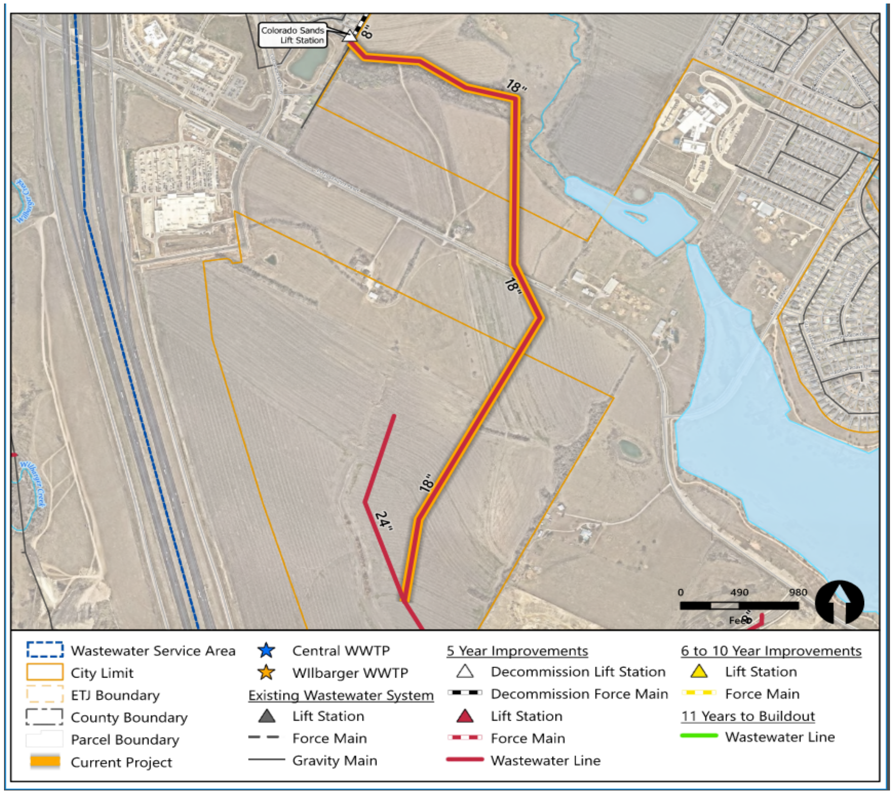
CITY OF PFLUGERVILLE

WW2704
18-inch Colorado Sands Wastewater Interceptor

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
18-inch interceptor in the western portion of the Wilbarger Basin that will serve the Colorado Sands development. The 24-inch interceptor downstream of this project will be financed by the developer.

PROJECT DRIVER:
New development in currently undeveloped areas of the Wilbarger Basin and was recommended in the 2022 Impact Fee Study. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.



TIMELINE: FY27 - FY29

WW2704 18-inch Colorado Sands Wastewater Interceptor					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	18-inch Wastewater Interceptor	LS	1	$ 5,551,582	$ 5,551,582
				Contingency	$ 555,158
				Subtotal	**$ 6,106,740**
				Engineering/Survey	$ 700,000
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	1	$ 1,774,440	$ 1,774,440
				Project Total	**$ 8,581,180**

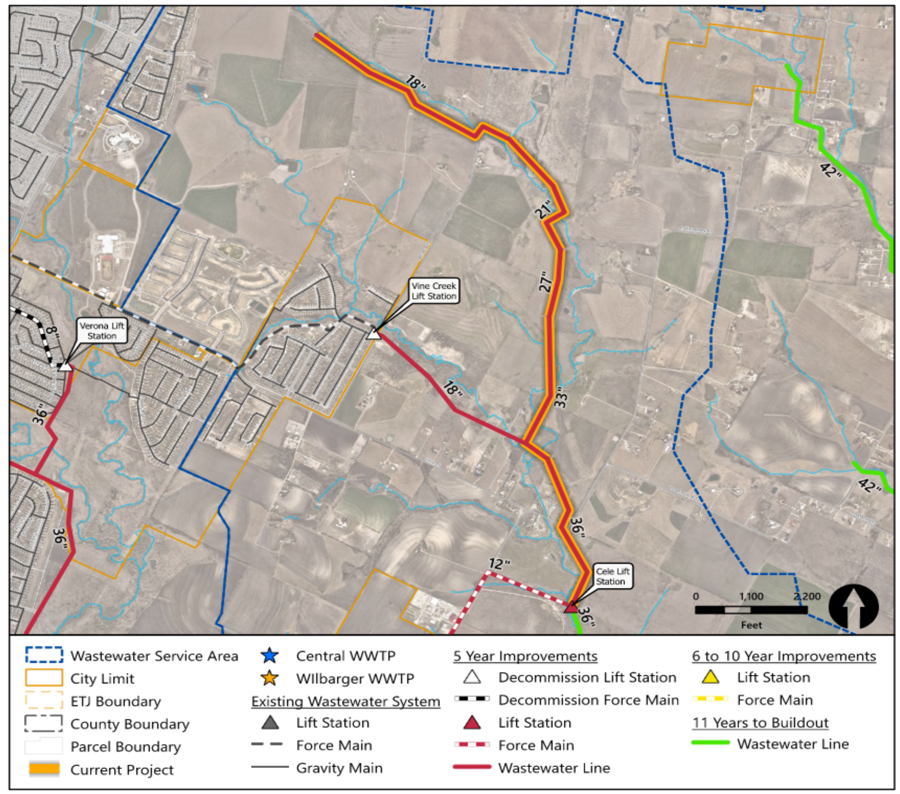
CITY OF PFLUGERVILLE

WW3002
Upper New Sweden Wastewater Interceptor

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
This interceptor includes 18-inch, 21-inch, 27-inch, 33-inch, and 36-inch gravity mains in the Cottonwood West basin.

PROJECT DRIVER:
This gravity wastewater line segment will serve development within the Cottonwood West basin. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.



TIMELINE: FY30 - FY35

WW3002 Upper New Sweden Wastewater Interceptor					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	Developer Participation	LS	1	$ 500,000	$ 500,000
				Contingency	$ -
				Subtotal	**$ 500,000**
				Engineering/Survey	$ -
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	0	$ -	$ -
				Project Total	**$ 500,000**

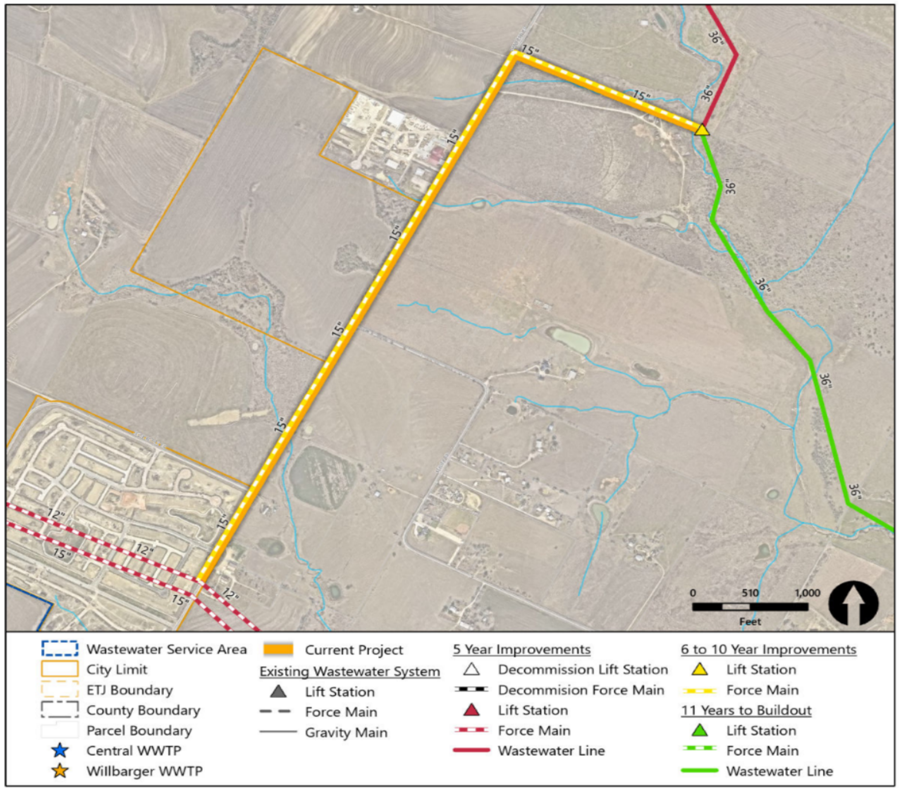
CITY OF PFLUGERVILLE

WW3003
Cele Lift Station and Force Main

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
2.7 MGD Lift Station and 12-inch Force Main to serve new development in the Cottonwood West Basin.

PROJECT DRIVER:
This lift station will serve development within the upper Cottonwood West basin. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and suports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.



TIMELINE: FY30 - FY35

WW3003 Cele Lift Station and Force Main					
ITEM NO.	DESCRIPTION	UNITS	QNTY	UNIT COST	UNIT SUBTOTAL
1	Developer Participation	LS	1	$ 500,000	$ 500,000
				Contingency (30%)	-
				Subtotal	**$ 500,000**
				Engineering/Survey (18%)	-
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	0	-	-
				Project Total	**$ 500,000**

CITY OF PFLUGERVILLE

WW3004
Cottonwood East Lift Station and Force Main

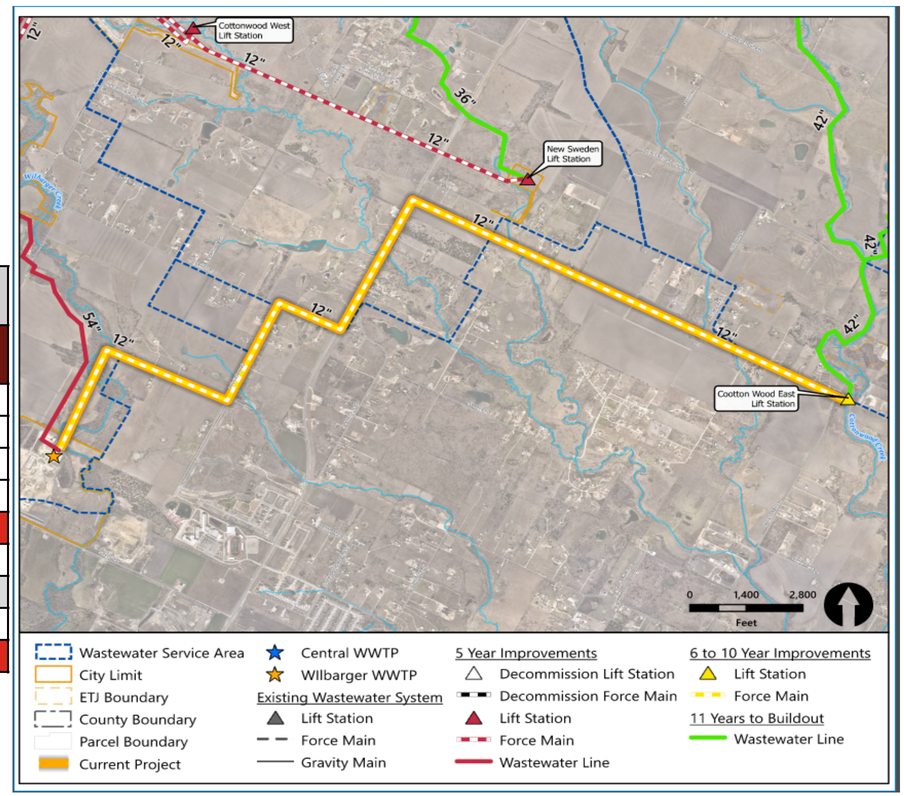
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
3.0 MGD Lift Station and 12-inch Force Main to serve new development in the Cottonwood East Basin.

PROJECT DRIVER:
This lift station and force main will serve development within the Cottonwood East basin. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and suports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.

TIMELINE: FY30 - FY35

WW3004 Cottonwood East Lift Station and Force Main					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	3.0 MGD Lift Station	LS	1	$ 3,500,000	$ 3,500,000
2	12-inch Force Main, Open Cut	LF	25300	$ 500	$ 12,650,000
3	12-inch Force Main, Trenchless	LF	2200	$ 1,700	$ 3,740,000
				Contingency (30%)	$ 5,967,000
				Subtotal	**$ 25,857,000**
				Engineering/Survey (18%)	$ 4,654,000
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	206,250	$ 8	$ 1,650,000
				Project Total	**$ 32,161,000**



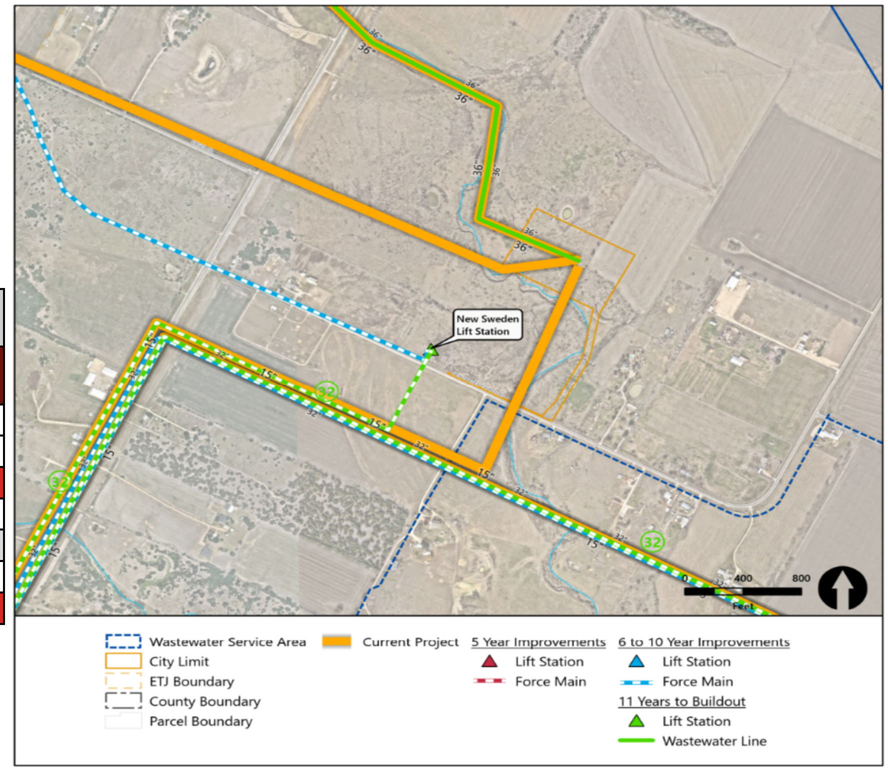
CITY OF PFLUGERVILLE

WW3005
New Sweden Lift Station Expansion to 2.0 MGD

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
Expand the New Sweden Lift Station to 2.0 MGD.

PROJECT DRIVER:
This lift station expansion will serve growth and development within the Cottonwood West basin. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and suports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.



TIMELINE: FY30 - FY35

WW3005 New Sweden Lift Station Expansion to 2.0 MGD					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	Lift Station Expansion to 2.0 MGD	LS	1	$ 925,000	$ 925,000
				Contingency (30%)	$ 277,500
				Subtotal	**$ 1,202,500**
				Engineering/Survey (18%)	$ 216,450
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	0	$ 8	$ -
				Project Total	**$ 1,419,000**

CITY OF PFLUGERVILLE

WW2010
Rehabilitation of Central Wastewater Treatment Plant

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
Rehabilitation of Central Wastewater Treatment Plant

PROJECT DRIVER:
This project will address increased flows due to growth in the Central and Wilbarger Basins. This project supports the Safety, Infrastructure and Services pillars of the Strategic Plan and Comprehensive Plan by providing a safe, resilient infrastructure for our citizens.

TIMELINE: FY30 - FY35

WW2010 Rehabilitation of Central Wastewater Treatment Plant					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	Wastewater Treatment Plant Rehab	LS	1	$ 18,289,732	$ 18,289,732
				Contingency	$ 1,828,973
				Subtotal	**$ 20,118,705**
				Engineering/Survey	$ 2,264,152
Easement/ROW Acqusition					
1	**Property Acquisition**	LS	0	$ -	$ -
				Project Total	**$ 22,382,857**

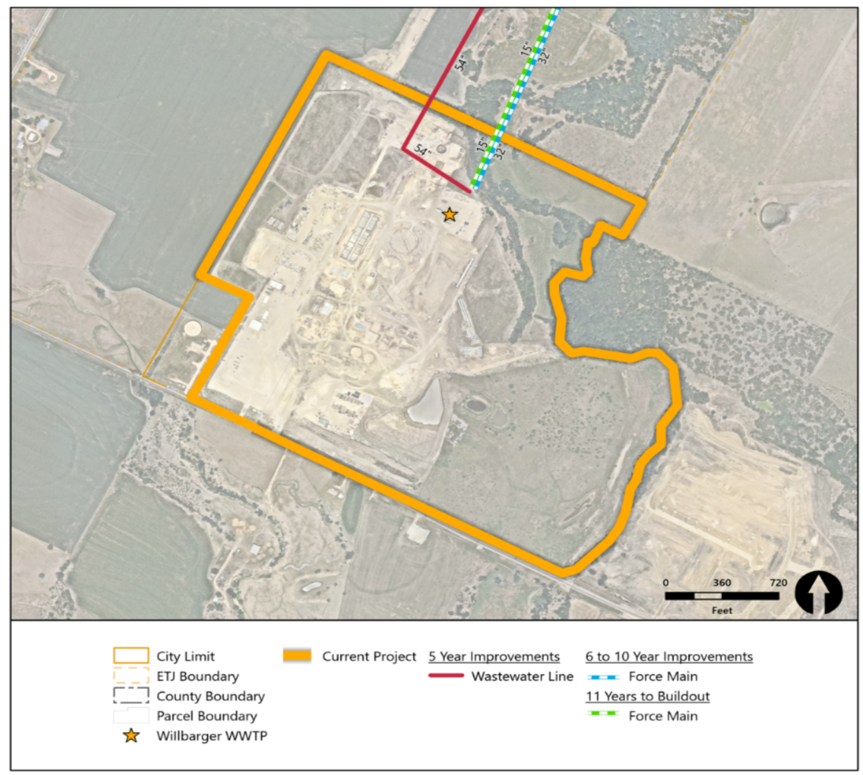
CITY OF PFLUGERVILLE

WW3006
Wilbarger Creek Regional Wastewater Treatment Plant Expansion Phase 2

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
Expand the Wilbarger Creek Regional Wastewater Treatment Facility from 6.0 MGD to 12.0 MGD.

PROJECT DRIVER:
Growth in the Wilbarger and Cottonwood Basins drives the need for additional treatment capacity at the Wilbarger Creek Regional Wastewater Treatment Facility. This project supports the Safety, Infrastructure and Services pillars of the Strategic Plan and Comprehensive Plan by providing a safe, resilient infrastructure for our citizens.



TIMELINE: FY30 - FY35

WW3006 Wilbarger Creek Regional Wastewater Treatment Plant Expansion Phase 2					
ITEM NO.	DESCRIPTION	UNITS	QNTY	UNIT COST	UNIT SUBTOTAL
1	WWTF Expansion to 12.0 MGD	LS	1	$ 98,000,000	$ 98,000,000
				Contingency (30%)	$ 29,400,000
				Subtotal	**$ 127,400,000**
				Engineering/Survey (18%)	$ 22,932,000
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	0	$ 8	$ -
				Project Total	**$ 150,332,000**

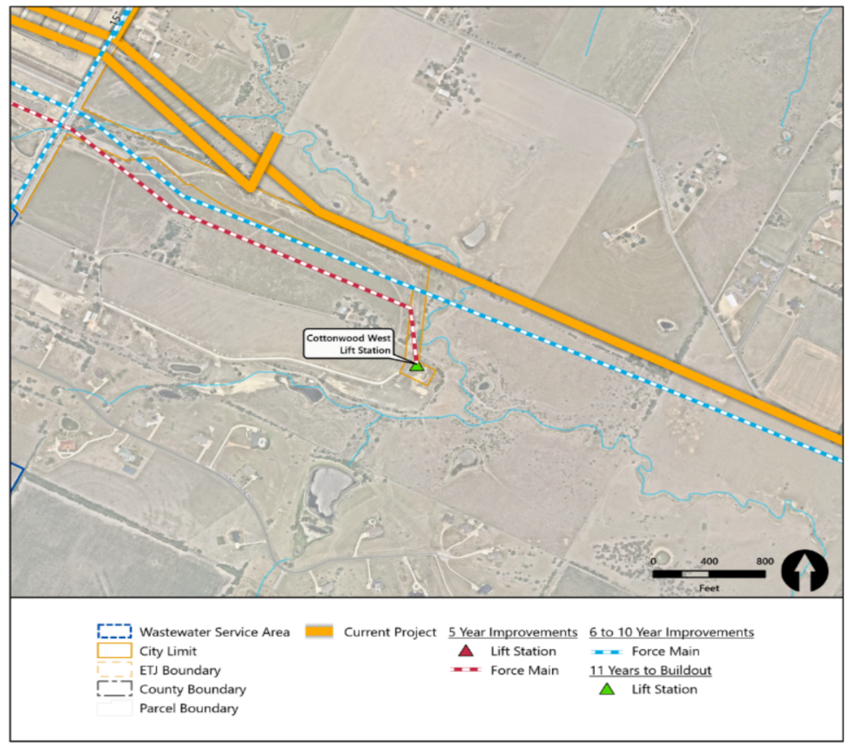
CITY OF PFLUGERVILLE

WW3501
Cottonwood West Lift Station Expansion to 3.0 MGD

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
Expand the Cottonwood West Lift Station to 3.0 MGD.

PROJECT DRIVER:
This lift station expansion and force main will serve growth and development within eastern portion of the Cottonwood West basin. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and suports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.



TIMELINE: FY35 - Ultimate

WW3501 Cottonwood West Lift Station Expansion to 3.0 MGD					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	Lift Station Expansion to 3.0 MGD	LS	1	1,000,000	$ 1,000,000
				Contingency (30%)	$ 300,000
				Subtotal	**$ 1,300,000**
				Engineering/Survey (18%)	$ 234,000
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	0	$ 8	$ -
				Project Total	**$ 1,534,000**

CITY OF PFLUGERVILLE

WW3502

Cottonwood East Wastewater Interceptor Phase 1

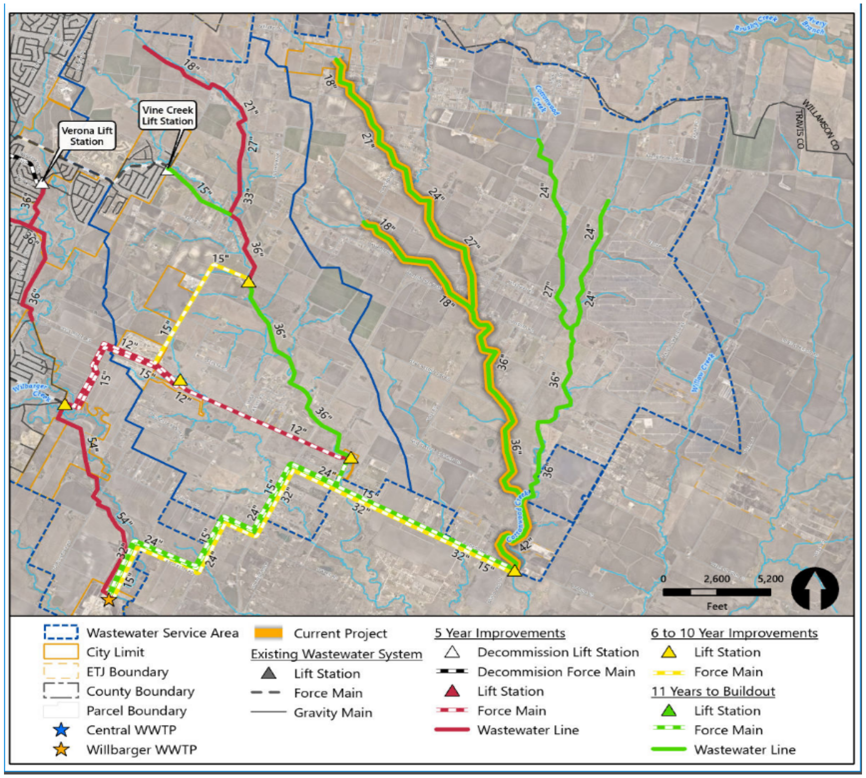
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
42-inch wastewater interceptor to serve the western half of the Cottonwood East basin.

PROJECT DRIVER:
This gravity wastewater interceptor will serve growth and development within the western half of the Cottonwood East basin. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.

TIMELINE: FY35 - Ultimate

ITEM NO.	DESCRIPTION	UNITS	QNTY	UNIT COST	UNIT SUBTOTAL
	WW3502 Cottonwood East Wastewater Interceptor Phase 1				
1	18-inch Wastewater Interceptor, Open Cut	LF	9111	$ 700.00	$ 6,377,700
2	18-inch Wastewater Interceptor, Trenchless	LF	793	$ 1,300.00	$ 1,030,900
3	21-inch Wastewater Interceptor, Open Cut	LF	3557	$ 760.00	$ 2,703,320
4	21-inch Wastewater Interceptor, Trenchless	LF	310	$ 1,450.00	$ 449,500
5	24-inch Wastewater Interceptor, Open Cut	LF	4329	$ 860.00	$ 3,722,940
6	24-inch Wastewater Interceptor, Trenchless	LF	377	$ 1,600.00	$ 603,200
7	27-inch Wastewater Interceptor, Open Cut	LF	5428	$ 940.00	$ 5,102,320
8	27-inch Wastewater Interceptor, Trenchless	LF	472	$ 2,100.00	$ 991,200
9	36-inch Wastewater Interceptor, Open Cut	LF	11541	$ 1,010.00	$ 11,656,410
10	36-inch Wastewater Interceptor, Trenchless	LF	1004	$ 2,250.00	$ 2,259,000
11	42-inch Wastewater Interceptor, Open Cut	LF	120	$ 1,160.00	$ 139,200
12	42-inch Wastewater Interceptor, Trenchless	LF	20	$ 2,500.00	$ 50,000
				Contingency (30%)	$ 10,525,707
				Subtotal	**$ 45,611,000**
				Engineering/Survey (18%)	$ 8,209,980
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	1,111,860	$ 8	$ 8,894,880
				Project Total	**$ 62,716,000**



CITY OF PFLUGERVILLE

WW3503
Cottonwood East Wastewater Interceptor Phase2

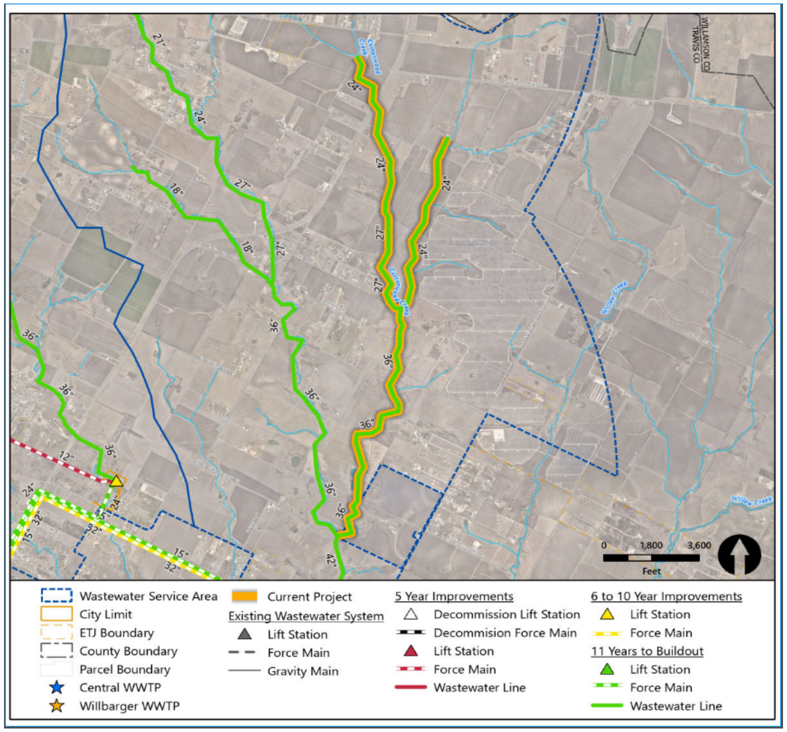
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
42-inch wastewater interceptor to serve the eastern half of the Cottonwood East basin.

PROJECT DRIVER:
This gravity wastewater interceptor will serve growth and development within the Eastern half of the Cottonwood East basin. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.

TIMELINE: FY35 - Ultimate

WW3503 Cottonwood East Wastewater Interceptor Phase2						
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**		**UNIT SUBTOTAL**
1	24-inch Wastewater Interceptor, Open Cut	LF	12930	$860	$	11,119,800
2	24-inch Wastewater Interceptor, Trenchless	LF	1125	$1,600	$	1,800,000
3	27-inch Wastewater Interceptor, Open Cut	LF	4465	$940	$	4,197,100
4	27-inch Wastewater Interceptor, Trenchless	LF	389	$2,100	$	816,900
5	36-inch Wastewater Interceptor, Open Cut	LF	10540	$1,010	$	10,645,400
6	36-inch Wastewater Interceptor, Trenchless	LF	917	$2,250	$	2,063,250
				Contingency (30%)	$	9,192,735
				Subtotal	**$**	**39,835,185**
				Engineering/Survey (18%)	$	7,170,333
Easement/ROW Acqusition						
1	**Property Acquisition**	SF	910,980	$ 8	$	7,287,840
				Project Total	**$**	**54,293,000**



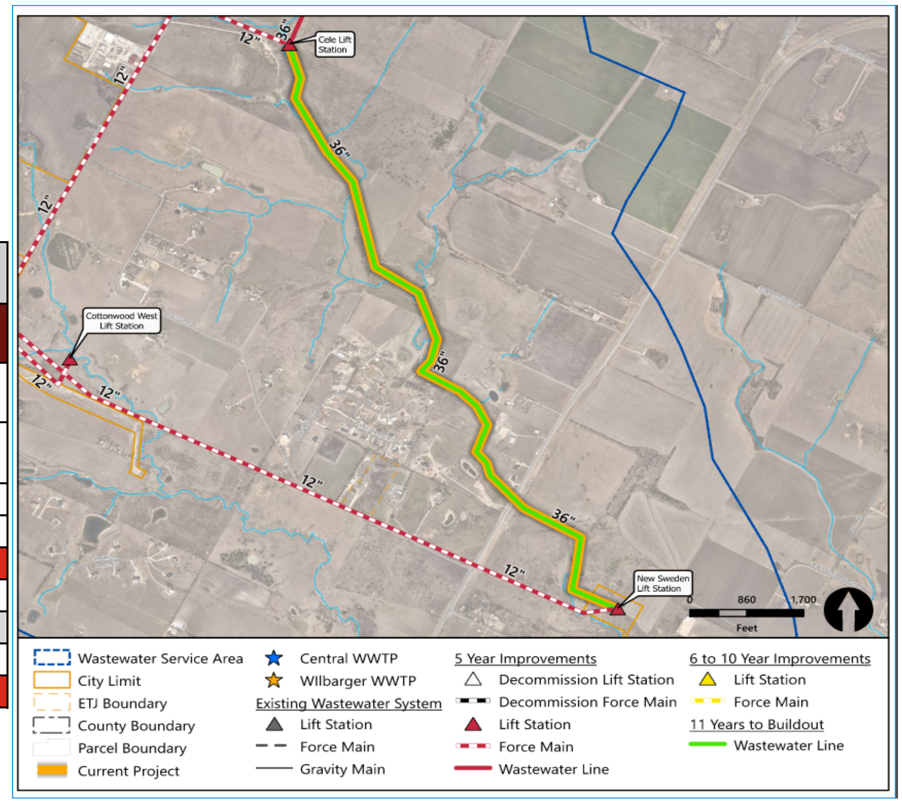
CITY OF PFLUGERVILLE

WW3504
36-inch Lower New Sweden Interceptor

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
36-inch Wastewater Interceptor from New Sweden Lift Station to the Cele Lift Station. This project will allow the Cele Lift Station to be decommissioned.

PROJECT DRIVER:
This gravity wastewater interceptor will serve growth and development within the upper Cottonwood West basin and allow for the decommissioning of a lift station. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.



TIMELINE: FY35 - Ultimate

WW3504 36-inch Lower New Sweden Interceptor					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	36-inch Wastewater Interceptor, Open Cut	LF	11040	$1,010	$ 11,150,400
2	36-inch Wastewater Interceptor, Trenchless	LF	960	$2,250	$ 2,160,000
3	Lift Station Decommissioning	LS	1	$200,000	$ 200,000
				Contingency (30%)	$ 3,993,120
				Subtotal	**$ 17,504,000**
				Engineering/Survey (18%)	$ 3,151,000
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	360,000	$ 8	$ 2,880,000
				Project Total	**$ 23,535,000**

CITY OF PFLUGERVILLE

WW3505
15-inch Vine Creek Interceptor

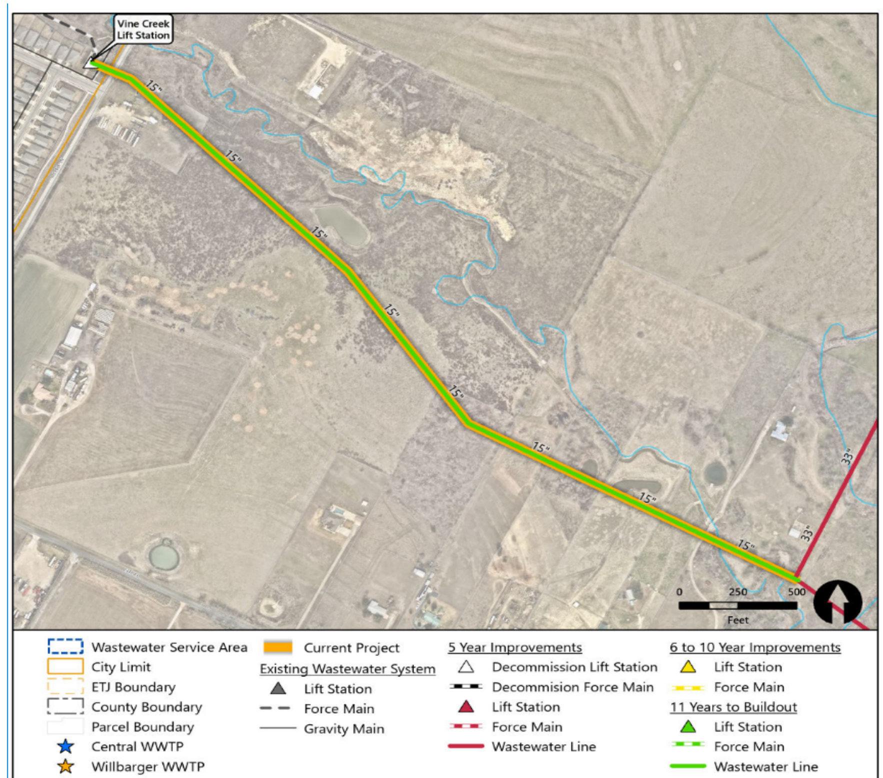
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
15-inch gravity wastewater interceptor, allowing for the decommissioning of Vine Creek Lift Station.

PROJECT DRIVER:
This gravity wastewater interceptor will serve growth and development within the upper Cottonwood West basin and allow for the decommissioning of a lift station. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and supports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.

TIMELINE: FY35 - Ultimate

WW3505 15-inch Vine Creek Interceptor					
ITEM NO.	DESCRIPTION	UNITS	QNTY	UNIT COST	UNIT SUBTOTAL
1	15-inch Wastewater Interceptor, Open Cut	LF	3680	$ 600	$ 2,208,000
2	15-inch Wastewater Interceptor, Trenchless	LF	320	$ 1,200	$ 384,000
3	Lift Station Decommissioning	LS	1	$ 200,000	$ 200,000
				Contingency (30%)	$ 837,600
				Subtotal	**$ 3,629,600**
				Engineering/Survey (18%)	$ 653,000
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	80,000	$ 8	$ 640,000
				Project Total	**$ 4,923,000**



CITY OF PFLUGERVILLE

WW3506
New Sweden Lift Station Expansion to 12.0 MGD and Force Main

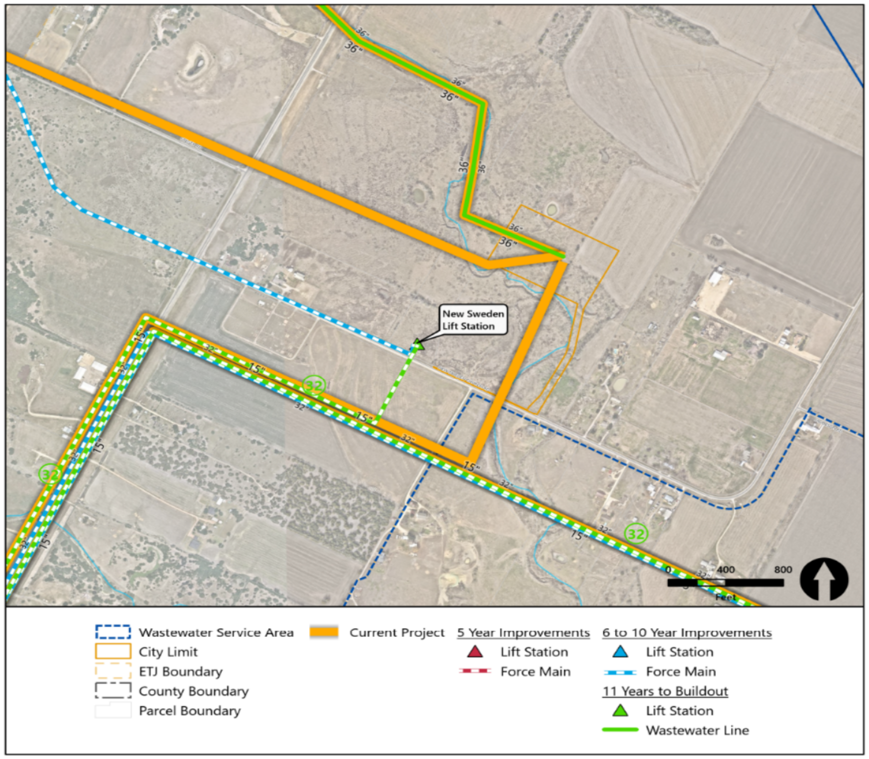
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
Expansion of the New Sweden Lift Station and construction of a new forcemain to the Wilbarger Creek RWWTF.

PROJECT DRIVER:
This lift station expansion and force main will serve growth and development within the Cottonwood West basin and ultimately serve as the main point of conveyance from the Cottonwood West basin to the Wilbarger Creek RWWTF. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and suports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.

TIMELINE: FY35 - Ultimate

WW3506 New Sweden Lift Station Expansion to 12.0 MGD and Force Main					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	Lift Station Expansion to 12.0 MGD	LS	1	$ 10,000,000	$ 10,000,000
1	24-inch Force Main, Open Cut	LF	16560	$ 850	$ 14,076,000
1	24-inch Force Main, Trenchless	LF	1440	$ 2,800	$ 4,032,000
				Contingency (30%)	$ 8,432,400
				Subtotal	**$ 36,540,400**
				Engineering/Survey (18%)	$ 6,577,000
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	360,000	$ 8	$ 2,880,000
				Project Total	**$ 45,997,000**



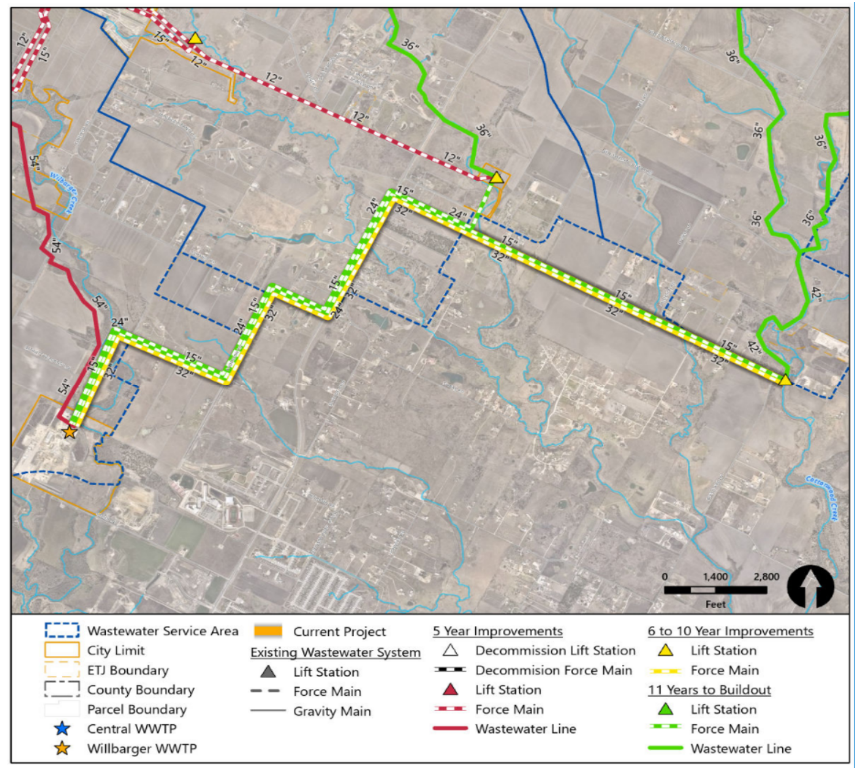
CITY OF PFLUGERVILLE

WW3507
Cottonwood East Lift Station and Force Main Phase 2

CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
Expansion of the Cottonwood East Lift Station and construction of a new parallel forcemain to the Wilbarger Creek RWWTF.

PROJECT DRIVER:
This lift station expansion and force main will serve growth and development within the Cottonwood West basin and ultimately serve as the main point of conveyance from the Cottonwood East basin to the Wilbarger Creek RWWTF. This project aligns with the Safety, Infrastructure and Services pillars of the Strategic Plan and suports the Comprehensive Plan by providing safe, resilient infrastructure for our citizens.



TIMELINE: FY35 - Ultimate

WW3507 Cottonwood East Lift Station and Force Main Phase 2					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	Lift Station Expansion to 18.0 MGD	LS	1	$ 14,750,000	$ 14,750,000
1	30-inch Force Main, Open Cut	LF	24840	$ 950	$ 23,598,000
1	30-inch Force Main, Trenchless	LF	2160	$ 3,000	$ 6,480,000
				Contingency (30%)	$ 13,448,000
				Subtotal	**$ 58,276,000**
				Engineering/Survey (18%)	$ 10,490,000
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	540,000	$ 8	$ 4,320,000
				Project Total	**$ 73,086,000**

CITY OF PFLUGERVILLE

WW3508
Wilbarger Creek Regional Wastewater Treatment Plant Expansion Phase 3

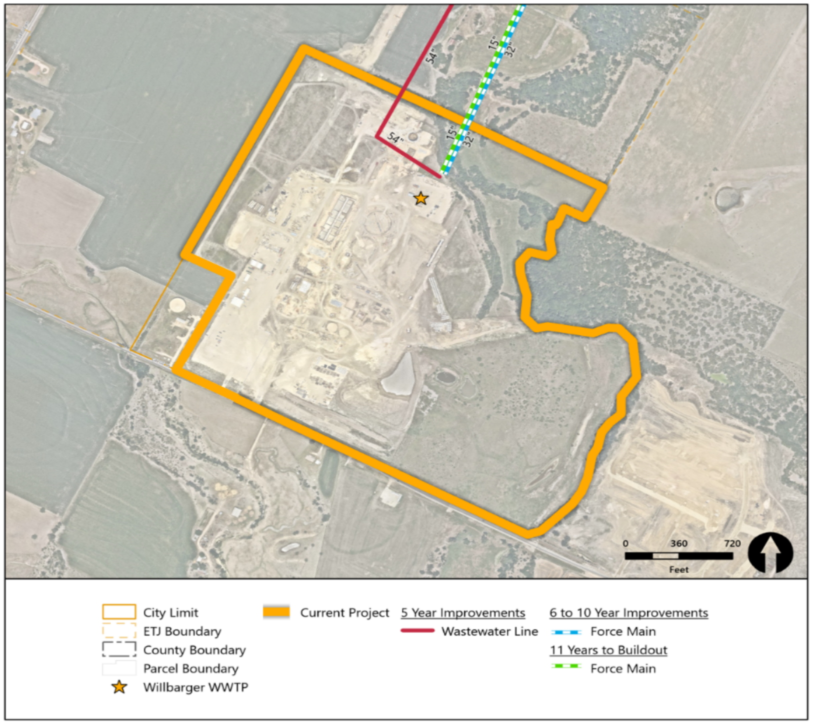
CAPITAL IMPROVEMENT PROJECT SUMMARY

PROJECT DESCRIPTION:
Expand the Wilbarger Creek Regional Wastewater Treatment Facility from 12.0 MGD to 18.0 MGD.

PROJECT DRIVER:
Growth in the Wilbarger and Cottonwood Basins drives the need for additional treatment capacity at the Wilbarger Creek Regional Wastewater Treatment Facility. In future updates to the Wastewater Master Plan, it may be reexamined whether to continue expanding this treatment facility, or construct a third treatment plant near the Cottonwood East Lift Station Site. This project supports the Safety, Infrastructure and Services pillars of the Strategic Plan and Comprehensive Plan by providing a safe, resilient infrastructure for our citizens.

TIMELINE: FY35 - Ultimate

WW3508 Wilbarger Creek Regional Wastewater Treatment Plant Expansion Phase 3					
ITEM NO.	**DESCRIPTION**	**UNITS**	**QNTY**	**UNIT COST**	**UNIT SUBTOTAL**
1	WWTF Expansion to 18.0 MGD	LS	1	$ 65,000,000	$ 65,000,000
				Contingency (30%)	$ 19,500,000
				Subtotal	**$ 84,500,000**
				Engineering/Survey (18%)	$ 15,210,000
Easement/ROW Acqusition					
1	**Property Acquisition**	SF	0	$ 8	$ -
				Project Total	**$ 99,710,000**



APPENDIX B. WASTEWATER FLOW PER CONNECTION ANALYSIS

Table B-1. Wastewater Flow per Connection

Year	Month	Connections	Average Monthly Flow (MGD)	gpCd (Gallon per Connection per day)	Weight
2014	1	15567	3.507	225	0.52%
2014	2	15605	3.396	218	0.52%
2014	3	15663	3.404	217	0.52%
2014	4	15759	3.176	202	0.52%
2014	5	15846	3.681	232	0.52%
2014	6	15974	3.545	222	0.52%
2014	7	16033	3.307	206	0.52%
2014	8	16167	3.199	198	0.52%
2014	9	16230	3.465	213	0.52%
2014	10	16240	3.413	210	0.52%
2014	11	16386	3.844	235	0.52%
2014	12	16447	3.566	217	0.52%
2015	1	16498	4.449	270	0.52%
2015	2	16614	3.905	235	0.52%
2015	3	16696	4.806	288	0.52%
2015	4	16831	3.801	226	0.52%
2015	5	16904	5.838	345	0.52%
2015	6	16949	4.255	251	0.52%
2015	7	17074	3.654	214	0.52%
2015	8	17129	3.452	202	0.52%
2015	9	17182	3.579	208	0.52%
2015	10	17264	4.356	252	0.52%
2015	11	17350	4.764	275	0.52%
2015	12	17377	4.976	286	0.52%
2016	1	17481	4.091	234	0.52%
2016	2	17572	3.837	218	0.52%
2016	3	17582	4.608	262	0.52%

Year	Month	Connections	Average Monthly Flow (MGD)	gpCd (Gallon per Connection per day)	Weight
2016	4	17772	4.863	274	0.52%
2016	5	17832	5.208	292	0.52%
2016	6	17844	4.826	270	0.52%
2016	7	17966	3.750	209	0.52%
2016	8	18072	4.405	244	0.52%
2016	9	18111	4.015	222	0.52%
2016	10	18193	3.884	213	0.52%
2016	11	18268	4.148	227	0.52%
2016	12	18420	4.237	230	0.52%
2017	1	18422	4.480	243	0.52%
2017	2	18503	4.276	231	0.52%
2017	3	18526	4.373	236	0.52%
2017	4	18654	4.112	220	0.52%
2017	5	18731	3.987	213	0.52%
2017	6	18820	3.943	210	0.52%
2017	7	18947	3.847	203	0.52%
2017	8	19014	4.633	244	0.52%
2017	9	19104	4.202	220	0.52%
2017	10	19200	4.122	215	0.52%
2017	11	19242	3.981	207	0.52%
2017	12	19340	4.414	228	0.52%
2018	1	19355	4.118	213	0.52%
2018	2	19395	4.121	212	0.52%
2018	3	19449	4.458	229	0.52%
2018	4	19632	4.426	225	0.52%
2018	5	19784	4.257	215	0.52%
2018	6	19927	4.350	218	0.52%
2018	7	19969	4.287	215	0.52%
2018	8	20070	4.499	224	0.52%

Year	Month	Connections	Average Monthly Flow (MGD)	gpCd (Gallon per Connection per day)	Weight
2018	9	20,130	4.767	237	0.52%
2018	10	20,173	5.751	285	0.52%
2018	11	20,270	5.063	250	0.52%
2018	12	20,361	5.573	274	0.52%
2019	1	20,464	6.030	295	0.52%
2019	2	20,520	4.656	227	0.52%
2019	3	20,606	4.397	213	0.52%
2019	4	20,745	5.291	255	0.52%
2019	5	20,877	5.793	277	0.52%
2019	6	21,060	4.762	226	0.52%
2019	7	21,179	4.624	218	0.52%
2019	8	21,279	5.182	244	0.52%
2019	9	21,431	5.095	238	0.52%
2019	10	21,540	4.978	231	0.52%
2019	11	21,620	5.201	241	0.52%
2019	12	21,731	5.103	235	0.52%
2020	1	21,823	5.131	235	0.52%
2020	2	21,961	5.660	258	0.52%
2020	3	22,028	6.009	273	0.52%
2020	4	22,131	6.225	281	0.52%
2020	5	22,220	6.047	272	0.52%
2020	6	22,430	5.892	263	0.52%
2020	7	22,620	6.085	269	0.52%
2020	8	22,724	6.344	279	0.52%
2020	9	22,759	6.044	266	0.52%
2020	10	22,879	5.755	252	0.52%
2020	11	22,989	5.682	247	0.52%
2020	12	23,093	5.805	251	0.52%
2021	1	23,123	6.155	266	0.52%

Year	Month	Connections	Average Monthly Flow (MGD)	gpCd (Gallon per Connection per day)	Weight
2021	2	22,503	6.630	295	0.52%
2021	3	23,290	5.923	254	0.52%
2021	4	23,417	6.025	257	0.52%
2021	5	23,480	7.722	329	0.52%
2021	6	23,609	8.063	342	0.52%
2021	7	23,152	6.809	294	0.52%
2021	8	23,326	6.205	266	0.52%
2021	9	23,314	6.025	258	0.52%
2021	10	23,341	6.108	262	0.52%
2021	11	23,353	5.970	256	0.52%
2021	12	23,377	4.196	179	0.52%
2022	1	23,418	5.258	225	2.08%
2022	2	24,074	5.797	241	2.08%
2022	3	24,275	4.753	196	2.08%
2022	4	24,261	4.560	188	2.08%
2022	5	23,729	4.619	195	2.08%
2022	6	23,947	4.999	209	2.08%
2022	7	23,533	5.074	216	2.08%
2022	8	23,505	4.550	194	2.08%
2022	9	23,358	4.235	181	2.08%
2022	10	24,125	4.089	169	2.08%
2022	11	24,193	4.457	184	2.08%
2022	12	24,076	4.084	170	2.08%
2023	1	24,112	3.887	161	2.08%
2023	2	24,152	4.898	203	2.08%
2023	3	24,175	4.470	185	2.08%
2023	4	24,218	5.247	217	2.08%
2023	5	24,279	5.188	214	2.08%
2023	6	24,392	5.128	210	2.08%

Year	Month	Connections	Average Monthly Flow (MGD)	gpCd (Gallon per Connection per day)	Weight
2023	7	24,458	4.860	199	2.08%
2023	8	24,484	4.647	190	2.08%
2023	9	24,522	4.586	187	2.08%
2023	10	24,522	4.559	186	2.08%
2023	11	24,522	4.209	172	2.08%
2023	12	24,524	4.083	166	2.08%

APPENDIX C. DRY WEATHER MODEL CALIBRATION RESULTS

Flow Meter-01

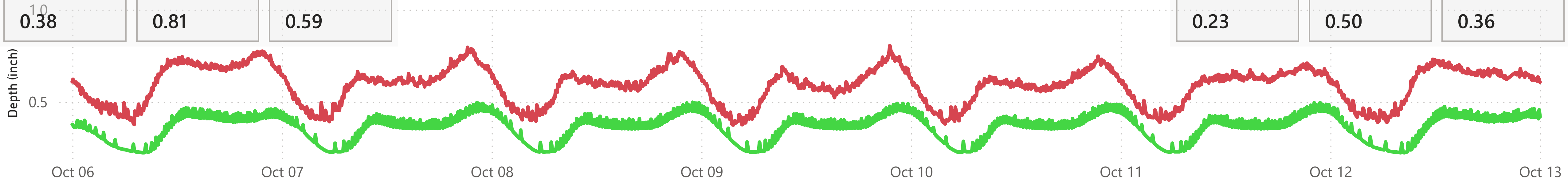
Depth

Observed

Min (inch)	Max (inch)	Average (inch)
0.38	0.81	0.59

Predicted

Min (inch)	Max (inch)	Average (inch)
0.23	0.50	0.36



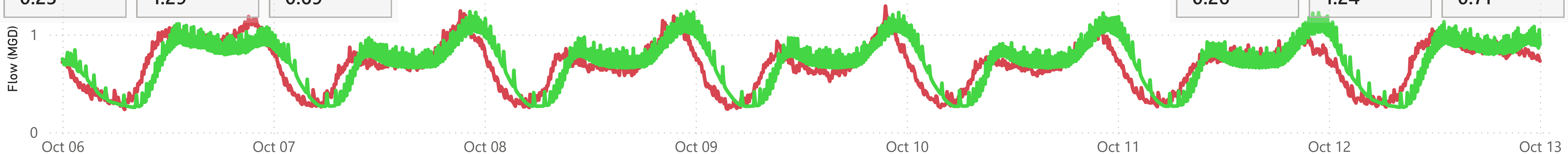
Flow

Observed

Min (MGD)	Max (MGD)	Average (MGD)
0.23	1.29	0.69

Predicted

Min (MGD)	Max (MGD)	Average (MGD)
0.26	1.24	0.71



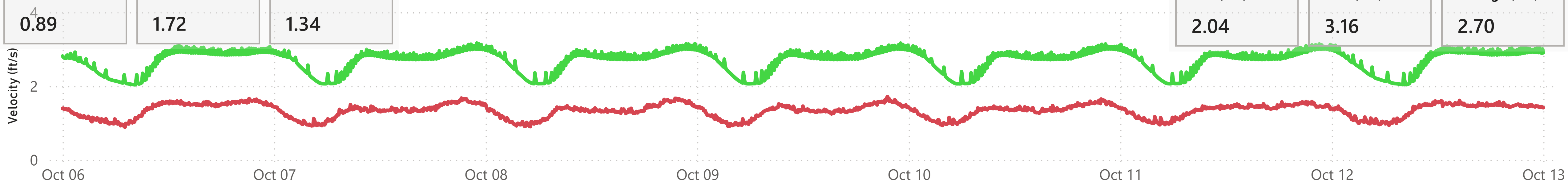
Velocity

Observed

Min (ft/s)	Max (ft/s)	Average (ft/s)
0.89	1.72	1.34

Predicted

Min (ft/s)	Max (ft/s)	Average (ft/s)
2.04	3.16	2.70



Flow Meter-02

Depth

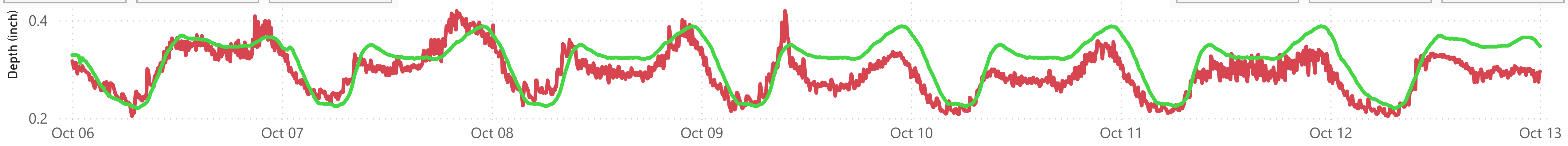
Observed (inch) | Predicted (inch)

Observed

Min (inch)	Max (inch)	Average (inch)
0.20	0.42	0.29

Predicted

Min (inch)	Max (inch)	Average (inch)
0.22	0.39	0.32



Flow

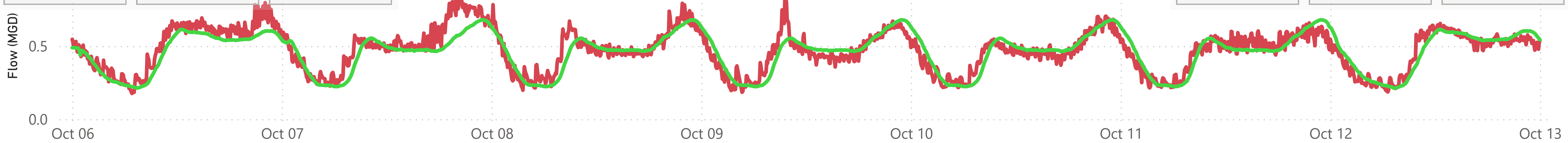
Observed (MGD) | Predicted (MGD)

Observed

Min (MGD)	Max (MGD)	Average (MGD)
0.18	0.85	0.48

Predicted

Min (MGD)	Max (MGD)	Average (MGD)
0.21	0.68	0.46



Velocity

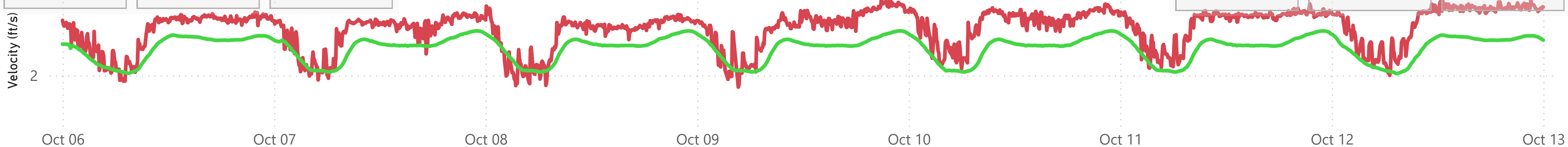
Observed (ft/s) | Predicted (ft/s)

Observed

Min (ft/s)	Max (ft/s)	Average (ft/s)
1.76	3.56	2.96

Predicted

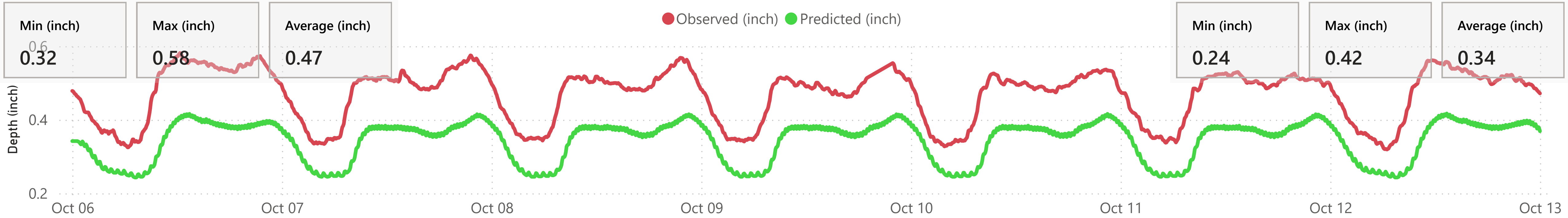
Min (ft/s)	Max (ft/s)	Average (ft/s)
2.04	2.90	2.56



Flow Meter-03

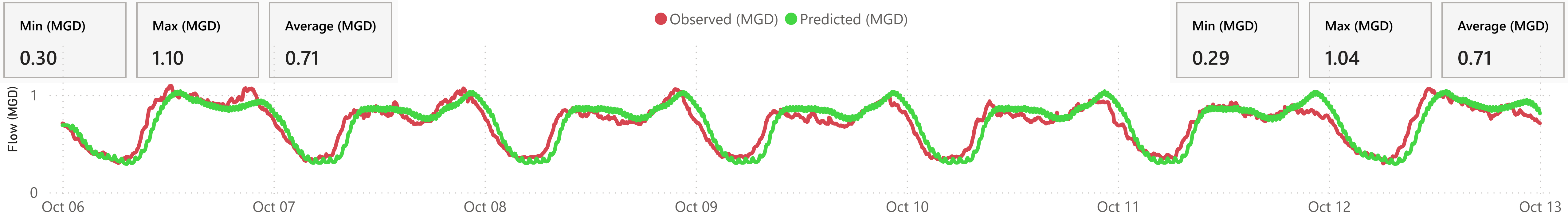
Depth

	Min (inch)	Max (inch)	Average (inch)
Observed	0.32	0.58	0.47
Predicted	0.24	0.42	0.34



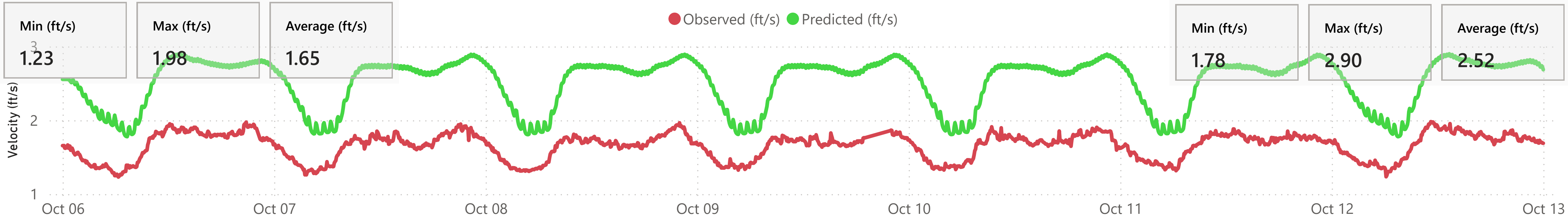
Flow

	Min (MGD)	Max (MGD)	Average (MGD)
Observed	0.30	1.10	0.71
Predicted	0.29	1.04	0.71

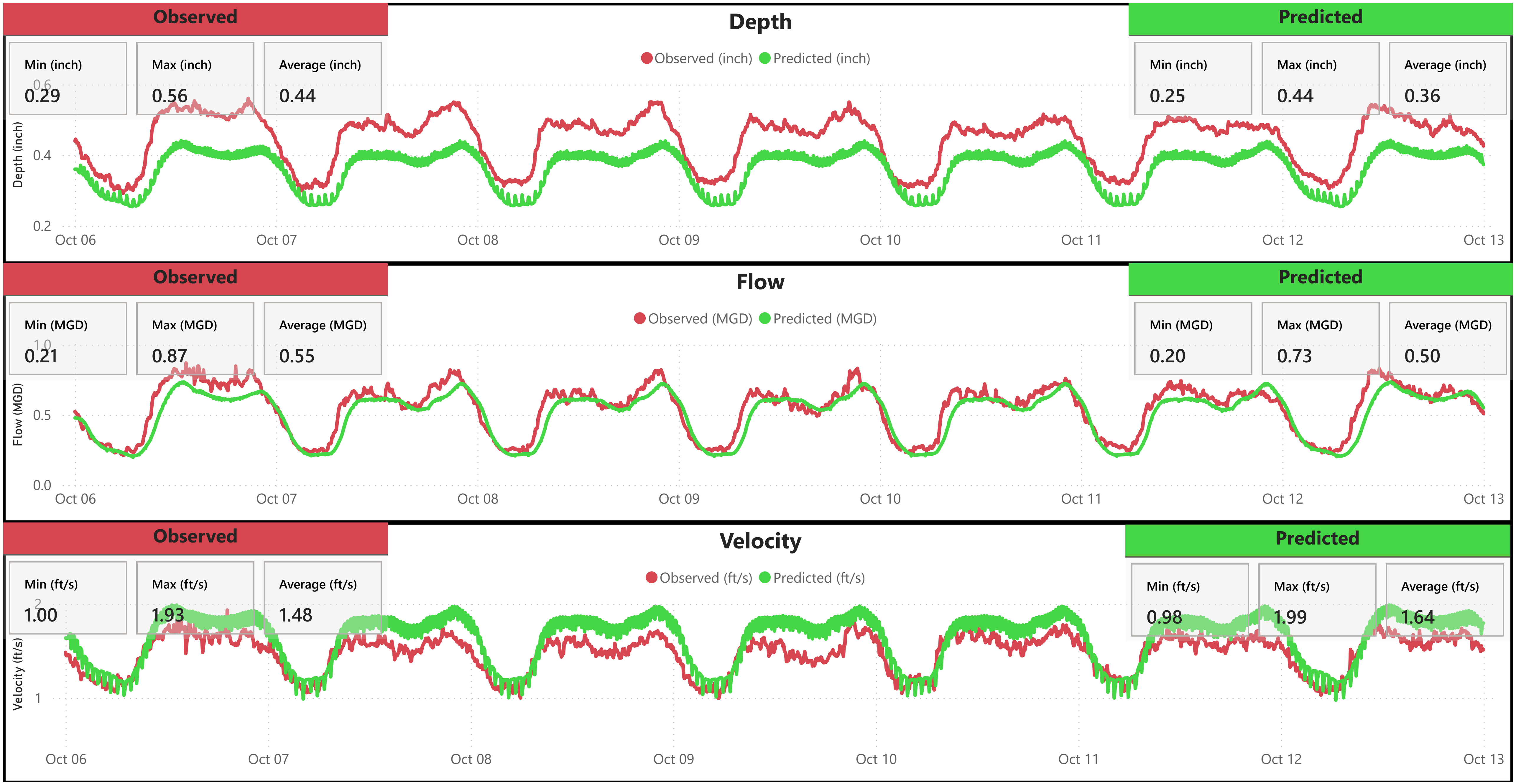


Velocity

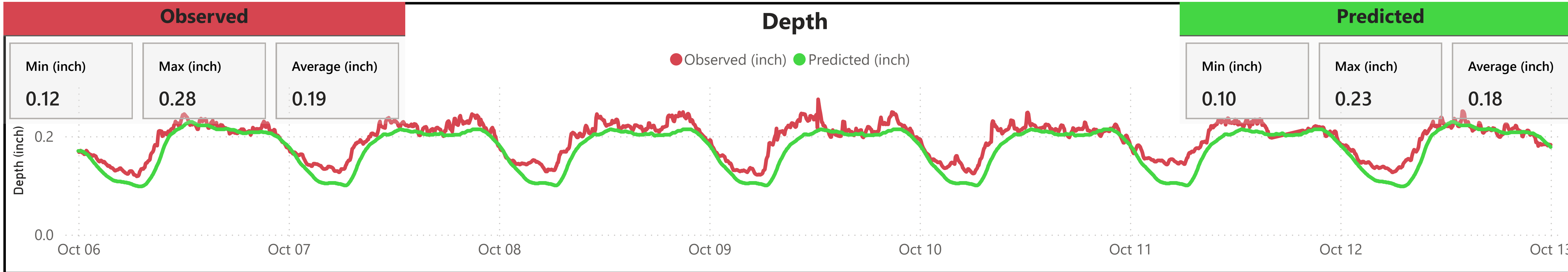
	Min (ft/s)	Max (ft/s)	Average (ft/s)
Observed	1.23	1.98	1.65
Predicted	1.78	2.90	2.52

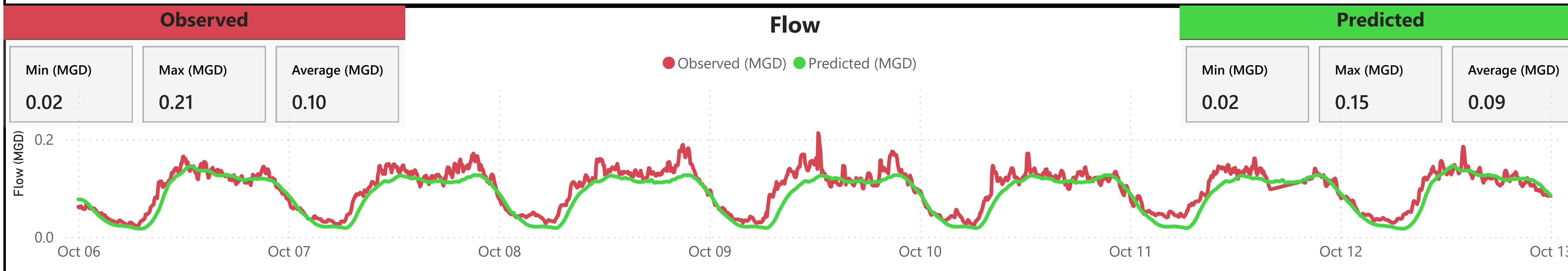


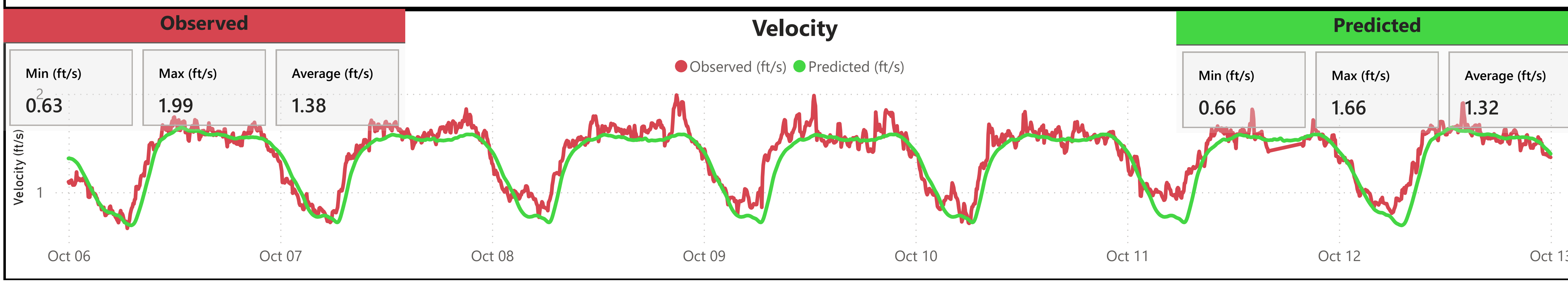
Flow Meter-04



Flow Meter-05







Flow Meter-06

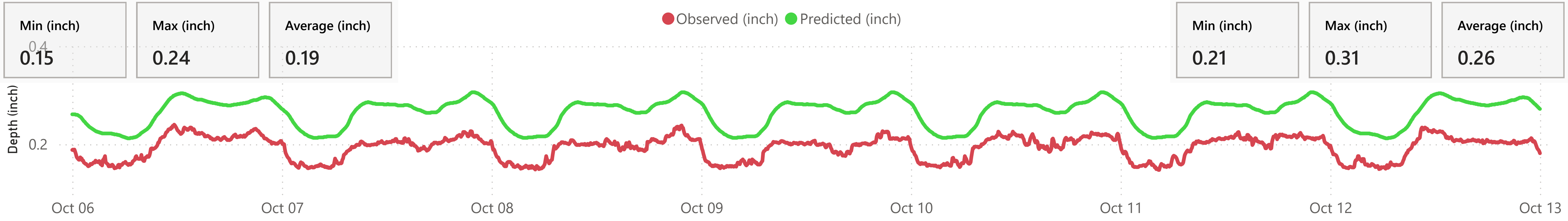
Depth

Observed

Min (inch)	Max (inch)	Average (inch)
0.15	0.24	0.19

Predicted

Min (inch)	Max (inch)	Average (inch)
0.21	0.31	0.26



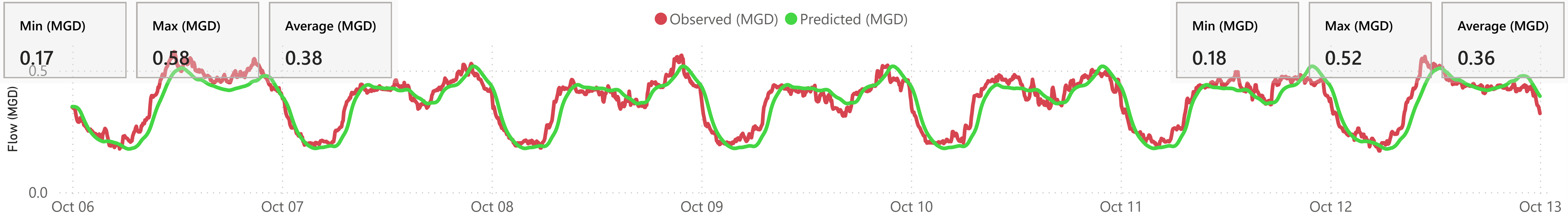
Flow

Observed

Min (MGD)	Max (MGD)	Average (MGD)
0.17	0.58	0.38

Predicted

Min (MGD)	Max (MGD)	Average (MGD)
0.18	0.52	0.36



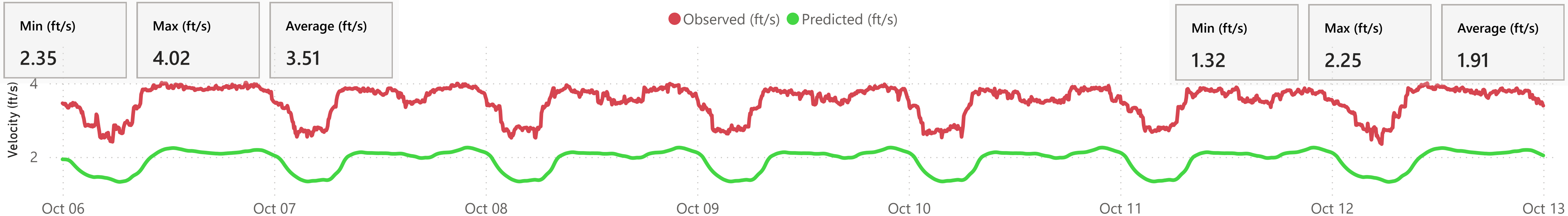
Velocity

Observed

Min (ft/s)	Max (ft/s)	Average (ft/s)
2.35	4.02	3.51

Predicted

Min (ft/s)	Max (ft/s)	Average (ft/s)
1.32	2.25	1.91



Flow Meter-07

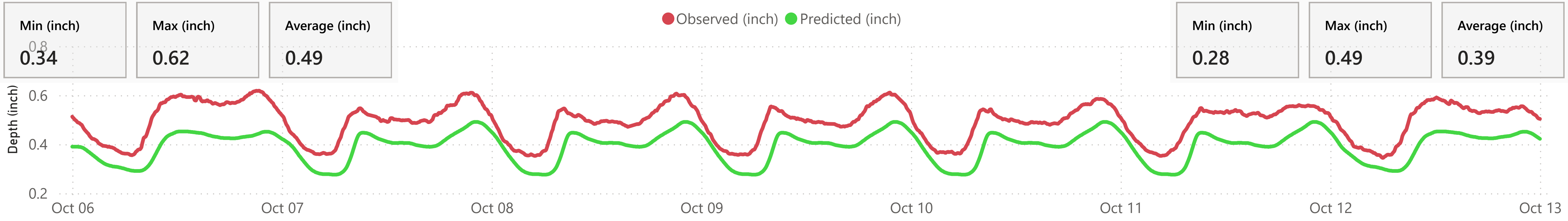
Depth

Observed

Min (inch)	Max (inch)	Average (inch)
0.34	0.62	0.49

Predicted

Min (inch)	Max (inch)	Average (inch)
0.28	0.49	0.39



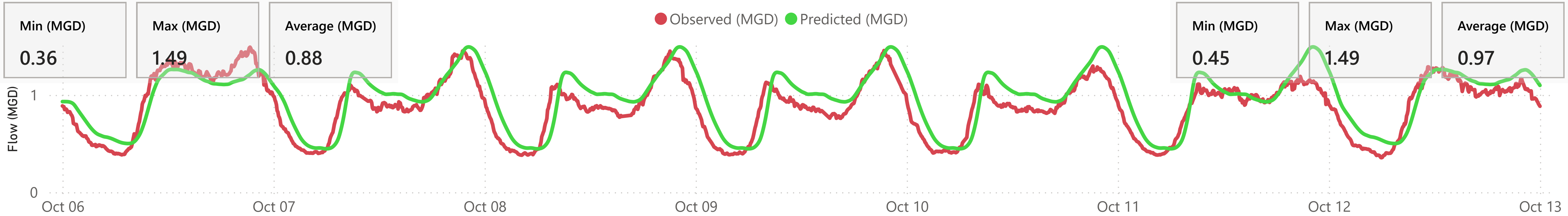
Flow

Observed

Min (MGD)	Max (MGD)	Average (MGD)
0.36	1.49	0.88

Predicted

Min (MGD)	Max (MGD)	Average (MGD)
0.45	1.49	0.97



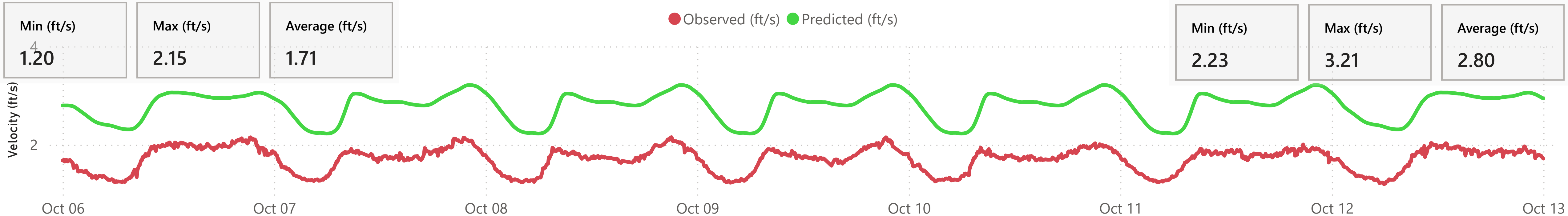
Velocity

Observed

Min (ft/s)	Max (ft/s)	Average (ft/s)
1.20	2.15	1.71

Predicted

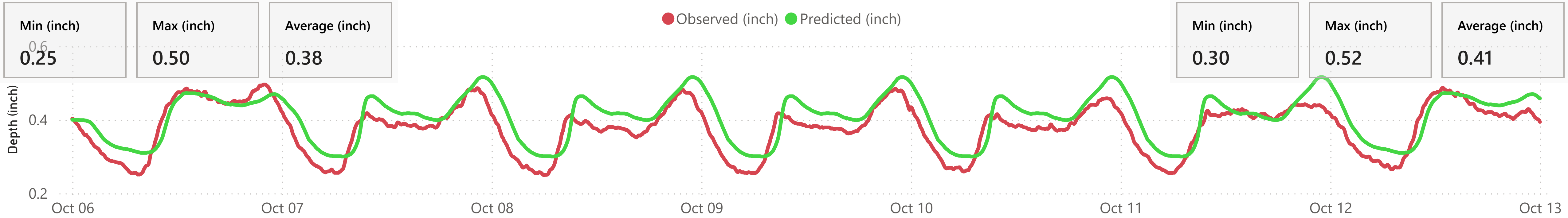
Min (ft/s)	Max (ft/s)	Average (ft/s)
2.23	3.21	2.80



Flow Meter-08

Depth

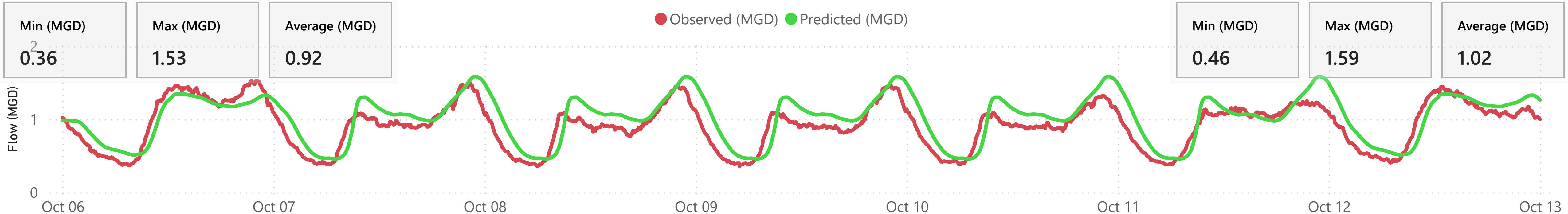
Observed		
Min (inch)	Max (inch)	Average (inch)
0.25	0.50	0.38



Predicted		
Min (inch)	Max (inch)	Average (inch)
0.30	0.52	0.41

Flow

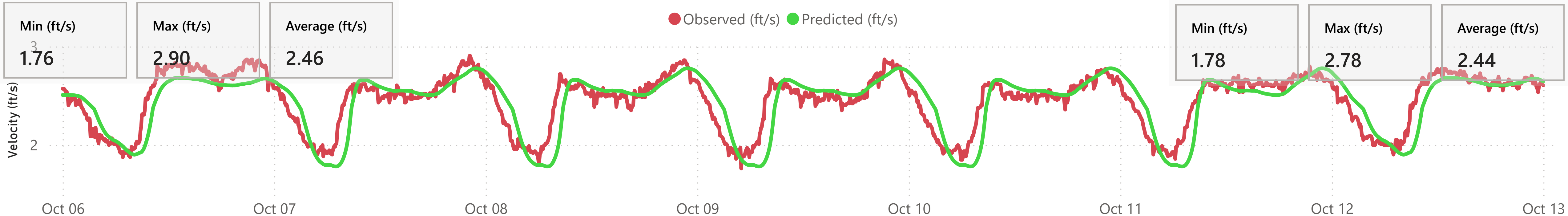
Observed		
Min (MGD)	Max (MGD)	Average (MGD)
0.36	1.53	0.92



Predicted		
Min (MGD)	Max (MGD)	Average (MGD)
0.46	1.59	1.02

Velocity

Observed		
Min (ft/s)	Max (ft/s)	Average (ft/s)
1.76	2.90	2.46

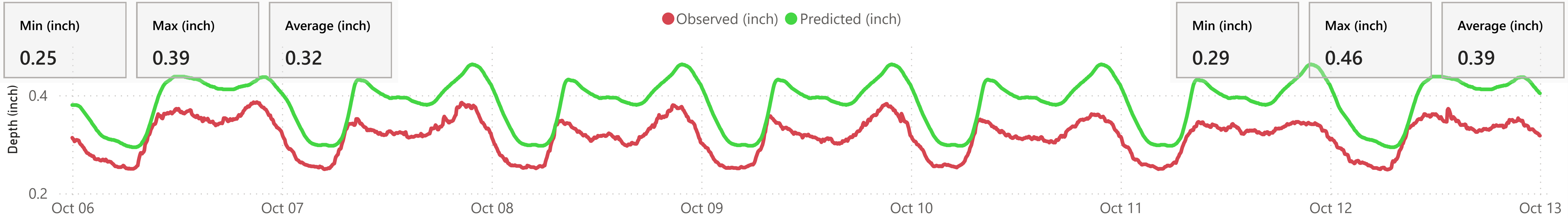


Predicted		
Min (ft/s)	Max (ft/s)	Average (ft/s)
1.78	2.78	2.44

Flow Meter-09

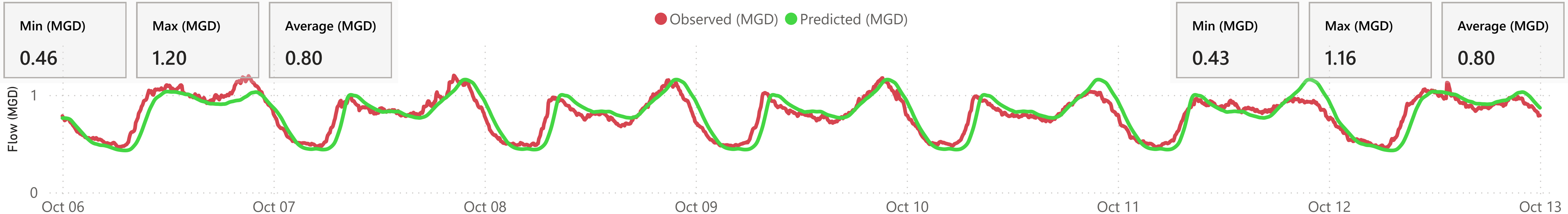
Depth

Observed	Min (inch)	Max (inch)	Average (inch)
Observed	0.25	0.39	0.32
Predicted	0.29	0.46	0.39



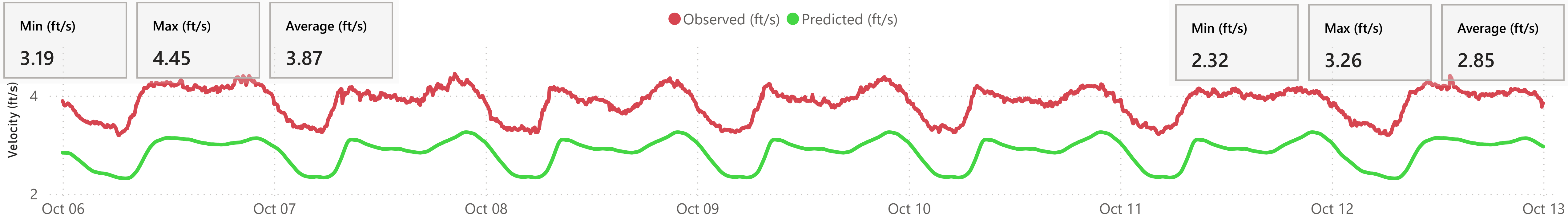
Flow

	Min (MGD)	Max (MGD)	Average (MGD)
Observed	0.46	1.20	0.80
Predicted	0.43	1.16	0.80

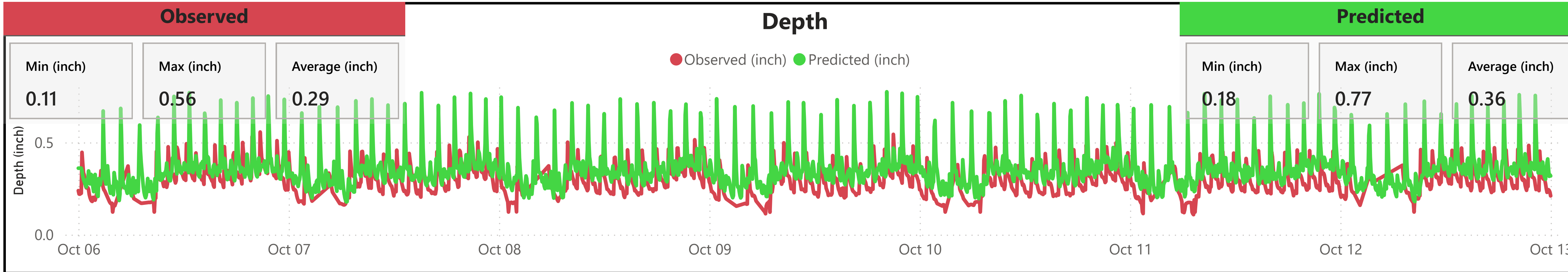


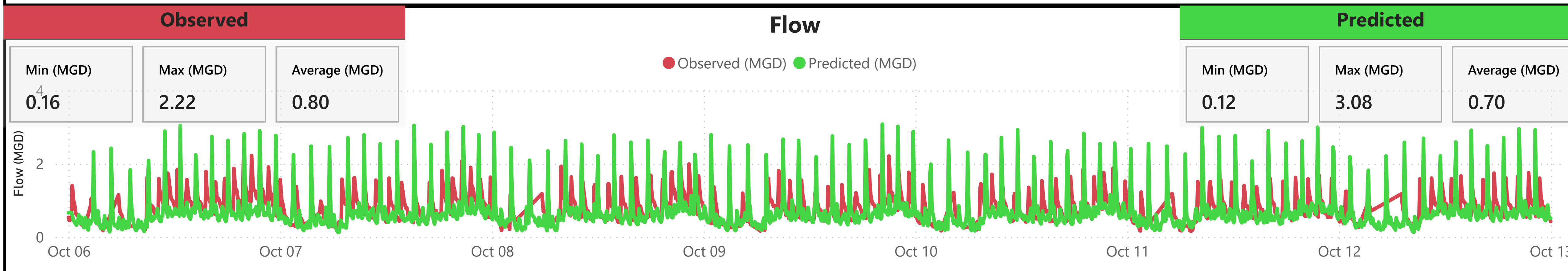
Velocity

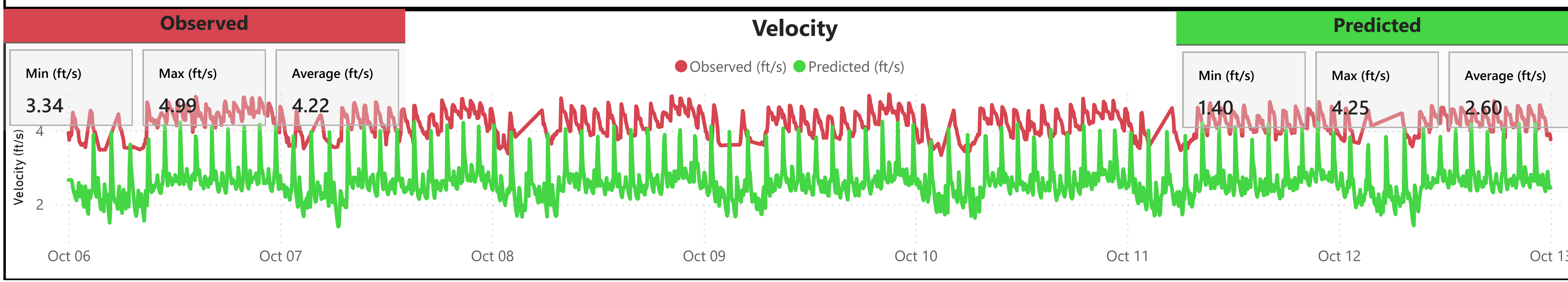
	Min (ft/s)	Max (ft/s)	Average (ft/s)
Observed	3.19	4.45	3.87
Predicted	2.32	3.26	2.85



Flow Meter-10





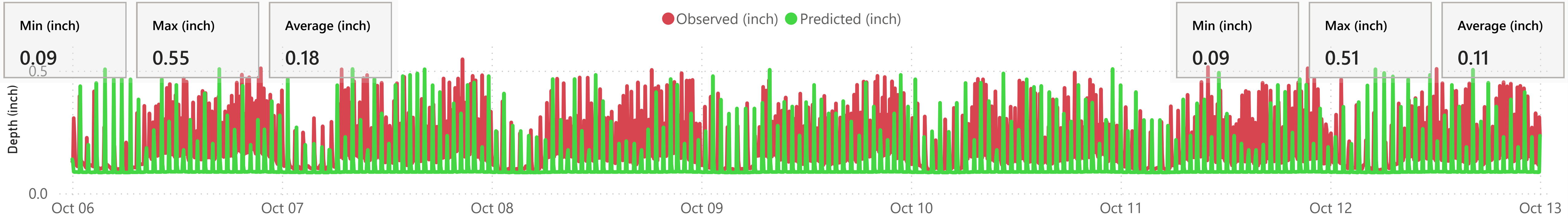


Flow Meter-11

Depth

Observed		
Min (inch)	Max (inch)	Average (inch)
0.09	0.55	0.18

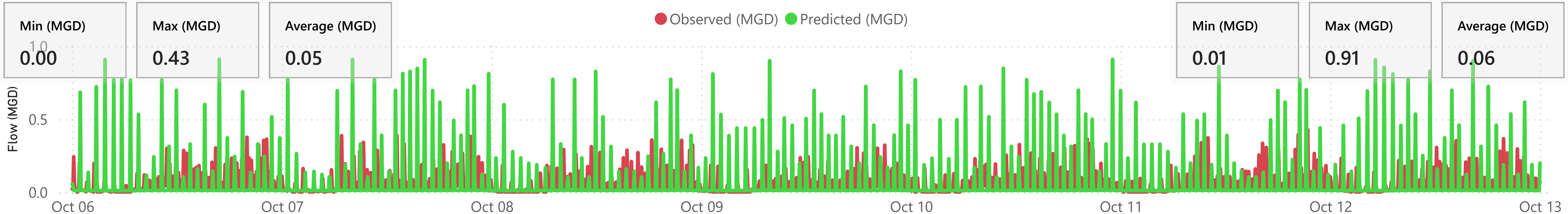
Predicted		
Min (inch)	Max (inch)	Average (inch)
0.09	0.51	0.11



Flow

Observed		
Min (MGD)	Max (MGD)	Average (MGD)
0.00	0.43	0.05

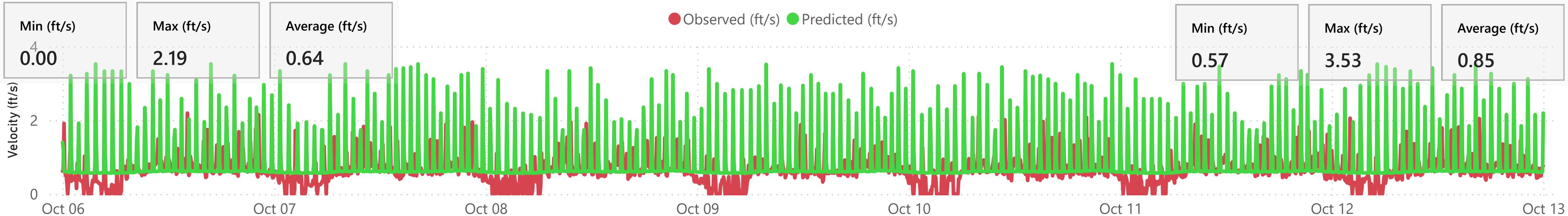
Predicted		
Min (MGD)	Max (MGD)	Average (MGD)
0.01	0.91	0.06



Velocity

Observed		
Min (ft/s)	Max (ft/s)	Average (ft/s)
0.00	2.19	0.64

Predicted		
Min (ft/s)	Max (ft/s)	Average (ft/s)
0.57	3.53	0.85



Flow Meter-12

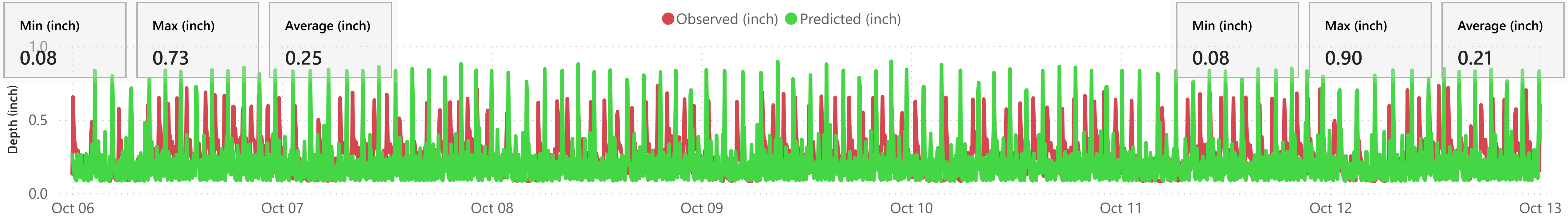
Depth

Observed

Min (inch)	Max (inch)	Average (inch)
0.08	0.73	0.25

Predicted

Min (inch)	Max (inch)	Average (inch)
0.08	0.90	0.21



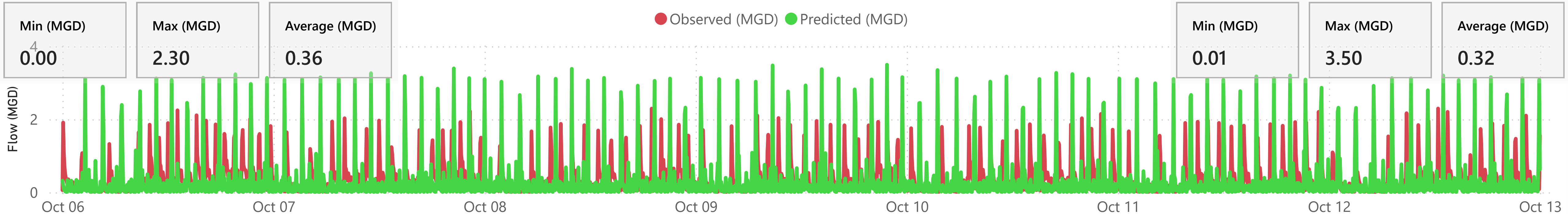
Flow

Observed

Min (MGD)	Max (MGD)	Average (MGD)
0.00	2.30	0.36

Predicted

Min (MGD)	Max (MGD)	Average (MGD)
0.01	3.50	0.32



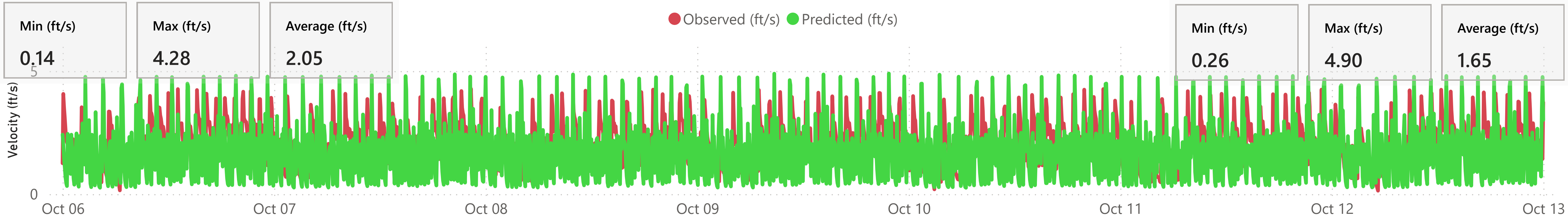
Velocity

Observed

Min (ft/s)	Max (ft/s)	Average (ft/s)
0.14	4.28	2.05

Predicted

Min (ft/s)	Max (ft/s)	Average (ft/s)
0.26	4.90	1.65

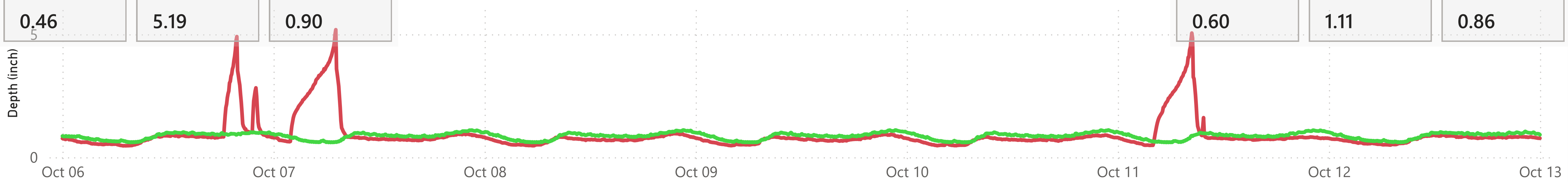


Flow Meter-13

Depth

Observed

Min (inch)	Max (inch)	Average (inch)
0.46	5.19	0.90



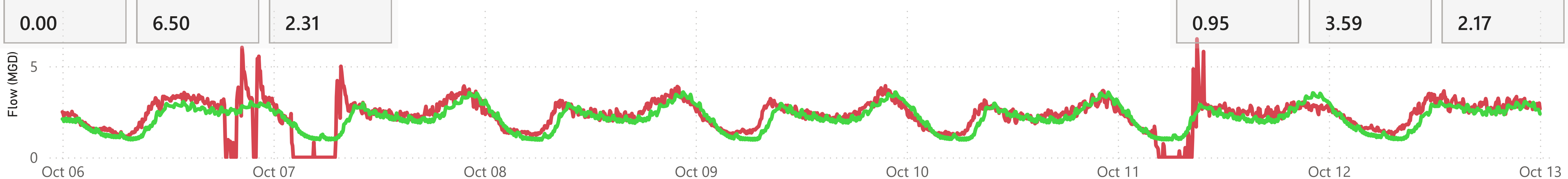
Predicted

Min (inch)	Max (inch)	Average (inch)
0.60	1.11	0.86

Flow

Observed

Min (MGD)	Max (MGD)	Average (MGD)
0.00	6.50	2.31



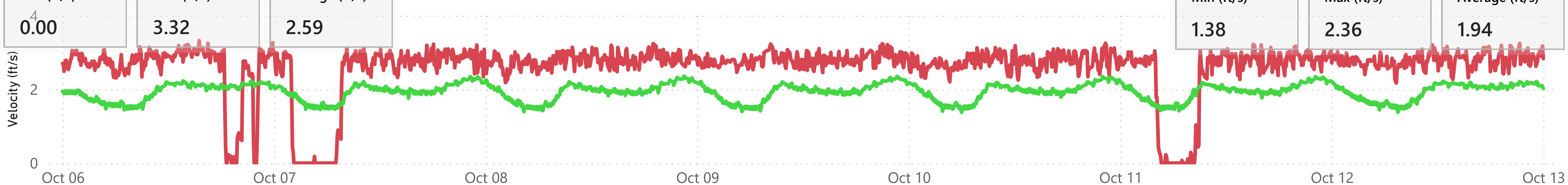
Predicted

Min (MGD)	Max (MGD)	Average (MGD)
0.95	3.59	2.17

Velocity

Observed

Min (ft/s)	Max (ft/s)	Average (ft/s)
0.00	3.32	2.59



Predicted

Min (ft/s)	Max (ft/s)	Average (ft/s)
1.38	2.36	1.94

Flow Meter-14

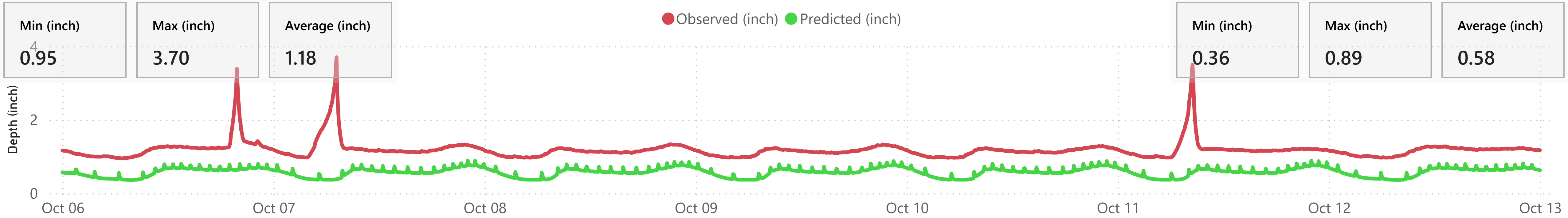
Depth

Observed

Min (inch)	Max (inch)	Average (inch)
0.95	3.70	1.18

Predicted

Min (inch)	Max (inch)	Average (inch)
0.36	0.89	0.58



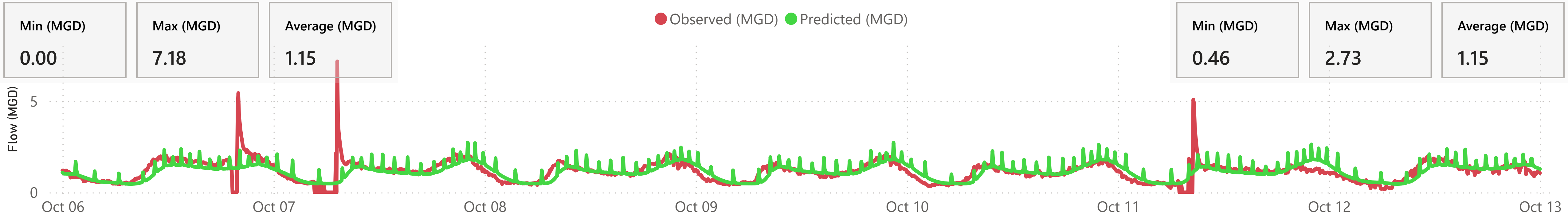
Flow

Observed

Min (MGD)	Max (MGD)	Average (MGD)
0.00	7.18	1.15

Predicted

Min (MGD)	Max (MGD)	Average (MGD)
0.46	2.73	1.15



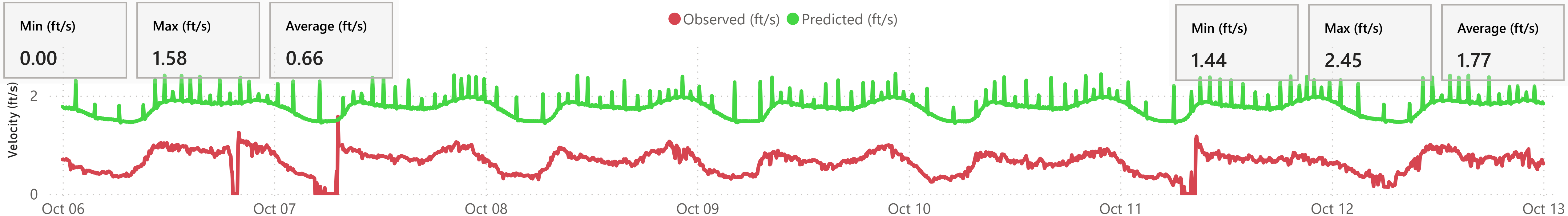
Velocity

Observed

Min (ft/s)	Max (ft/s)	Average (ft/s)
0.00	1.58	0.66

Predicted

Min (ft/s)	Max (ft/s)	Average (ft/s)
1.44	2.45	1.77

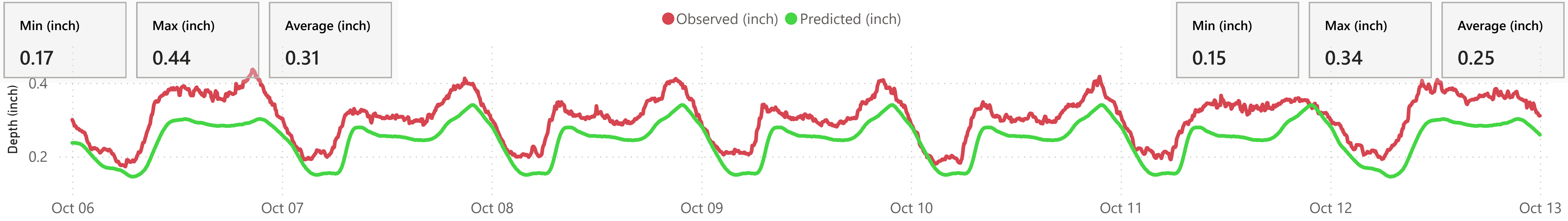


Flow Meter-15

Depth

Observed		
Min (inch)	Max (inch)	Average (inch)
0.17	0.44	0.31

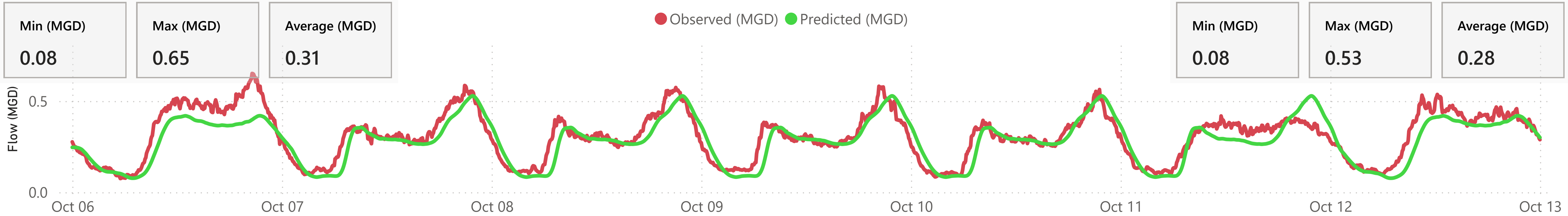
Predicted		
Min (inch)	Max (inch)	Average (inch)
0.15	0.34	0.25



Flow

Observed		
Min (MGD)	Max (MGD)	Average (MGD)
0.08	0.65	0.31

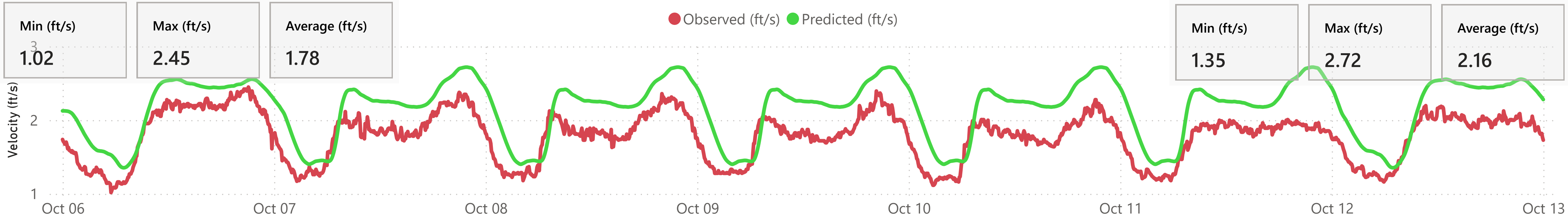
Predicted		
Min (MGD)	Max (MGD)	Average (MGD)
0.08	0.53	0.28



Velocity

Observed		
Min (ft/s)	Max (ft/s)	Average (ft/s)
1.02	2.45	1.78

Predicted		
Min (ft/s)	Max (ft/s)	Average (ft/s)
1.35	2.72	2.16



Flow Meter-16

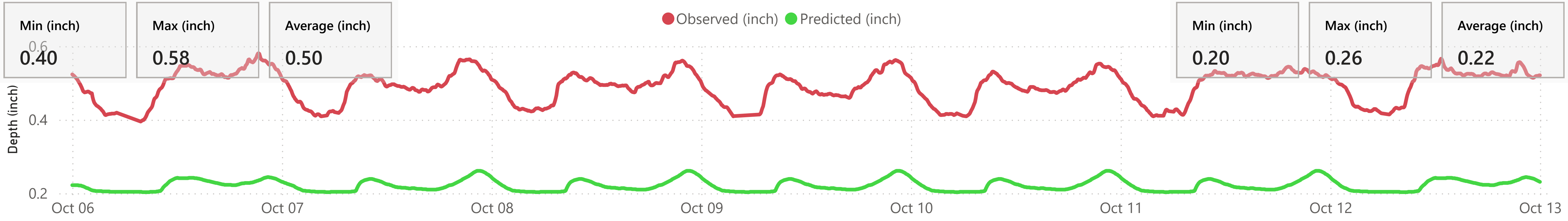
Depth

Observed

Min (inch)	Max (inch)	Average (inch)
0.40	0.58	0.50

Predicted

Min (inch)	Max (inch)	Average (inch)
0.20	0.26	0.22



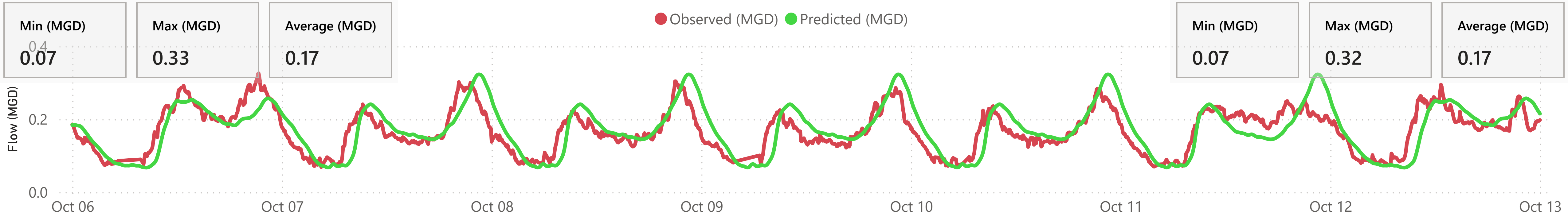
Flow

Observed

Min (MGD)	Max (MGD)	Average (MGD)
0.07	0.33	0.17

Predicted

Min (MGD)	Max (MGD)	Average (MGD)
0.07	0.32	0.17



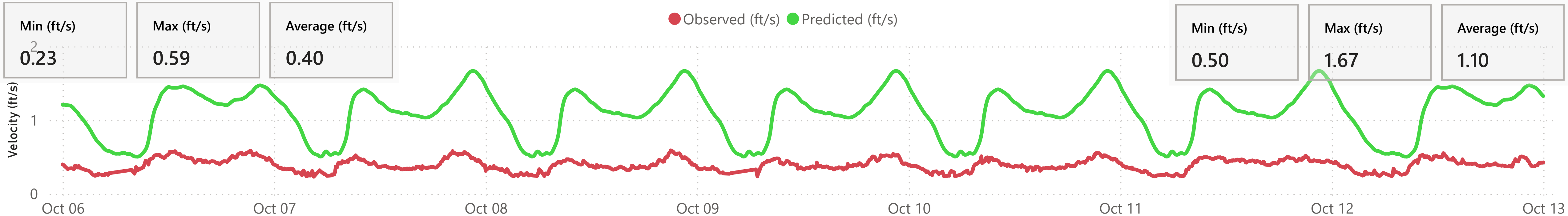
Velocity

Observed

Min (ft/s)	Max (ft/s)	Average (ft/s)
0.23	0.59	0.40

Predicted

Min (ft/s)	Max (ft/s)	Average (ft/s)
0.50	1.67	1.10

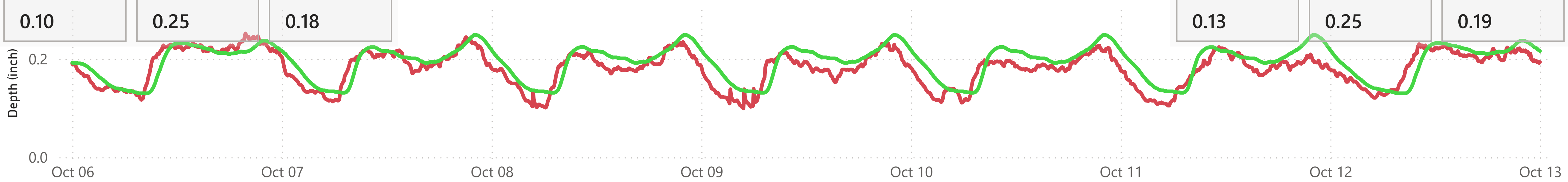


Flow Meter-17

Depth

Observed		
Min (inch)	Max (inch)	Average (inch)
0.10	0.25	0.18

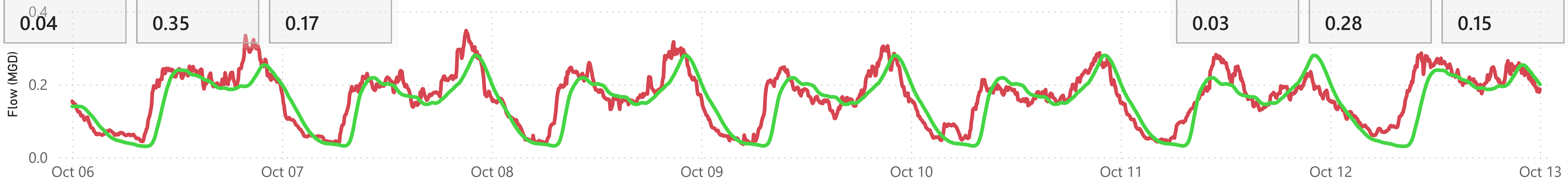
Predicted		
Min (inch)	Max (inch)	Average (inch)
0.13	0.25	0.19



Flow

Observed		
Min (MGD)	Max (MGD)	Average (MGD)
0.04	0.35	0.17

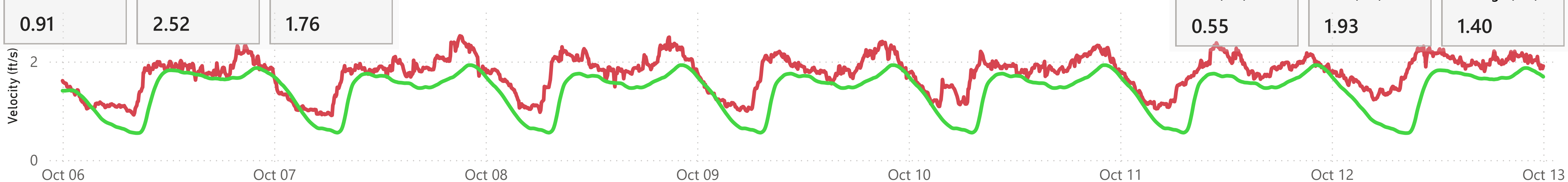
Predicted		
Min (MGD)	Max (MGD)	Average (MGD)
0.03	0.28	0.15



Velocity

Observed		
Min (ft/s)	Max (ft/s)	Average (ft/s)
0.91	2.52	1.76

Predicted		
Min (ft/s)	Max (ft/s)	Average (ft/s)
0.55	1.93	1.40



APPENDIX D. DESIGN STORM TECHNICAL MEMORANDUM

Pflugerville Texas
Design Storm Hydrologic Assessment
Technical Memorandum

SUBMITTED TO

SUBMITTED BY

Madeline Richards, Hydrologist
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AEM
1531 Skyway Drive, Unit D
Longmont, CO 80504
Office: (405) 325-1818

DATE

April 3, 2025

I. Introduction

This technical memorandum describes the development and analysis of a set of four dimensionless hyetographs for select design storms, as well as one dimensional 5-year, 6-hour event. These events are incorporated into the StormBuilder tool to assist Wastewater Master Plan in Pflugerville Texas. This analysis was performed to identify the spatial and temporal storm characteristics representative of conditions in the Pflugerville jurisdictional area. Individual storm events were derived from long- term hourly rain gauge records maintained by the National Centers for Environmental Information (NCEI) and Iowa Environmental Mesonet (IEM) were evaluated to determine the median hyetograph shape using the spatial and temporal distribution of rainfall intensities and typical direction and speed of storm motion.

II. Methods

A. Study Area & Representation Gauge Selection

Long-term rain gauges, either within or nearby Pflugerville, were identified and reviewed for data completeness and availability. Although the KATT gauge is approximately 10 miles away from Pflugerville it was ultimately chosen for this analysis, as the data was the most complete. The data from KATT is available at hourly intervals from 1949 to 2024, as shown in Table 1, and was created by merging data from Cooperative Observer Network (COOP), Quality-Controlled Local Climatological Data (QCLCD) and METeorological Aerodrome Reports (METAR) sources to create a longer and more complete period of record (POR). The hourly COOP data for KATT was available from 1949 – 1999, and the POR was extended using OCLCD (200-2017) and METAR observations (2018 - 2024). For the entire 74-year POR, only 0.58% is missing data at KATT.

A rain gauge within the city limits of Pflugerville was considered for this analysis, but the period of record for that gauge was significantly less than the period of record for the KATT gauge. The KATT gauge was considered more appropriate due to the longer period of record. A comparison of the NOAA Atlas 14 data at the Pflugerville gauge and KATT was also performed, and on average the precipitation frequencies between the two gauge locations differed by only 2.8%. While the NOAA atlas data was derived from the KATT gauge, it only used data through 2017. We chose to do an updated analysis using the KATT gauge, using data through 2024 which includes 7 years of additional precipitation data. This additional data accounts for approximately 9% more history, and includes more recent precipitation information that was used in the statistical analysis

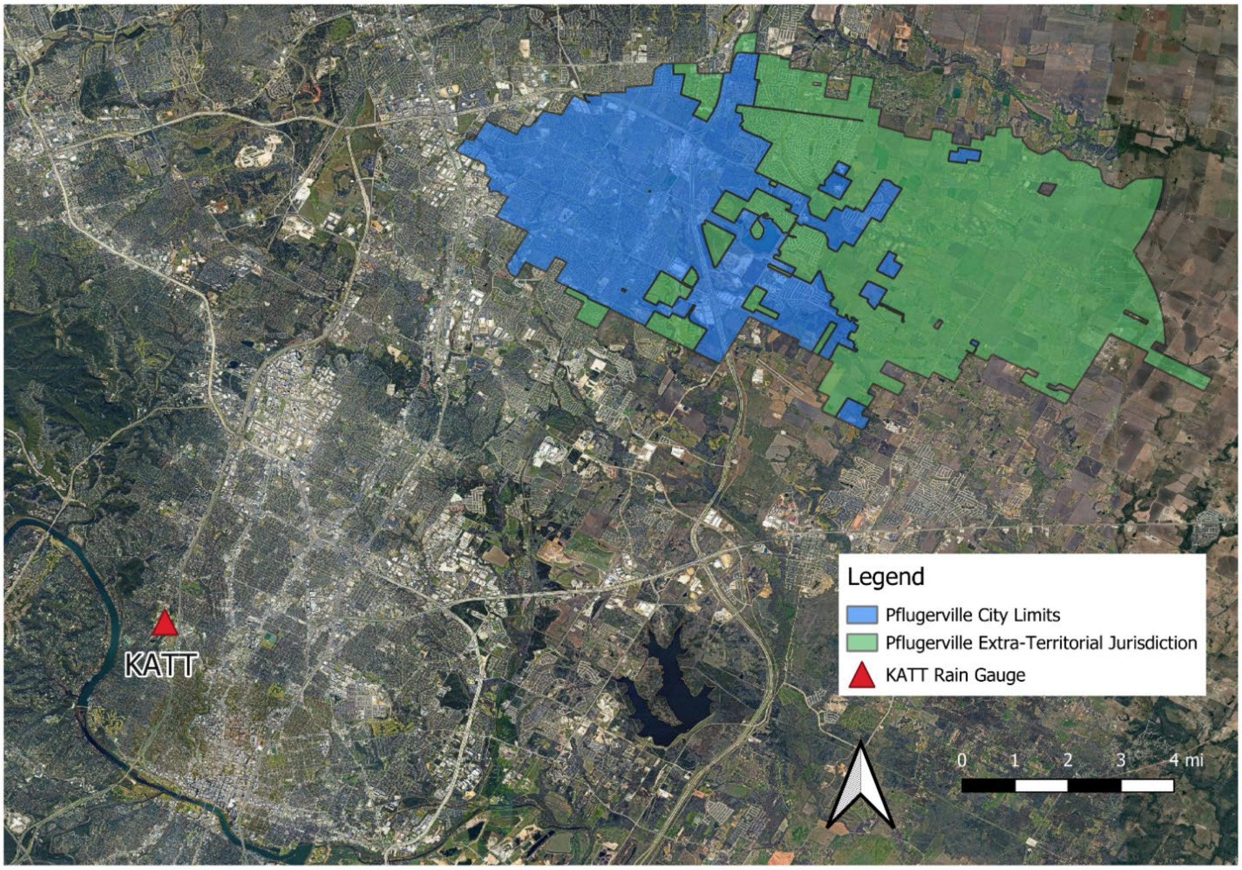

Figure 1. Study area showing the Pflugerville boundary and proximity to the KATT gauge

Table 1. Data available for KATT

Name	COOP ID	Start Date	End Date	PoR (Years)	Missing Data
KATT	410428	1/1/1949	1/1/2025	76	0.58%

B. Hyetograph Analysis

To be considered an event, the 60-minute rainfall depth in a single event must exceed 0.25 inches and have a minimum of 4 hours of duration. Additionally, an individual storm event is determined to end when there is a period of time during which no rain fell for a duration of 6 hours. The KATT rain gauge hourly time series was segmented according to this event definition into 1025 events, shown in Figure 2, which displays rainfall event depth by event, with an average depth of 1.46 inches over the period of record. The distribution of these events, sorted by event duration and ranging from the minimum of 4 hours up to a maximum of 76 hours, is shown in Figure 3. The median event duration for storm events, according to the aforementioned definition of a storm event, is 8 hours at the KATT gauge.

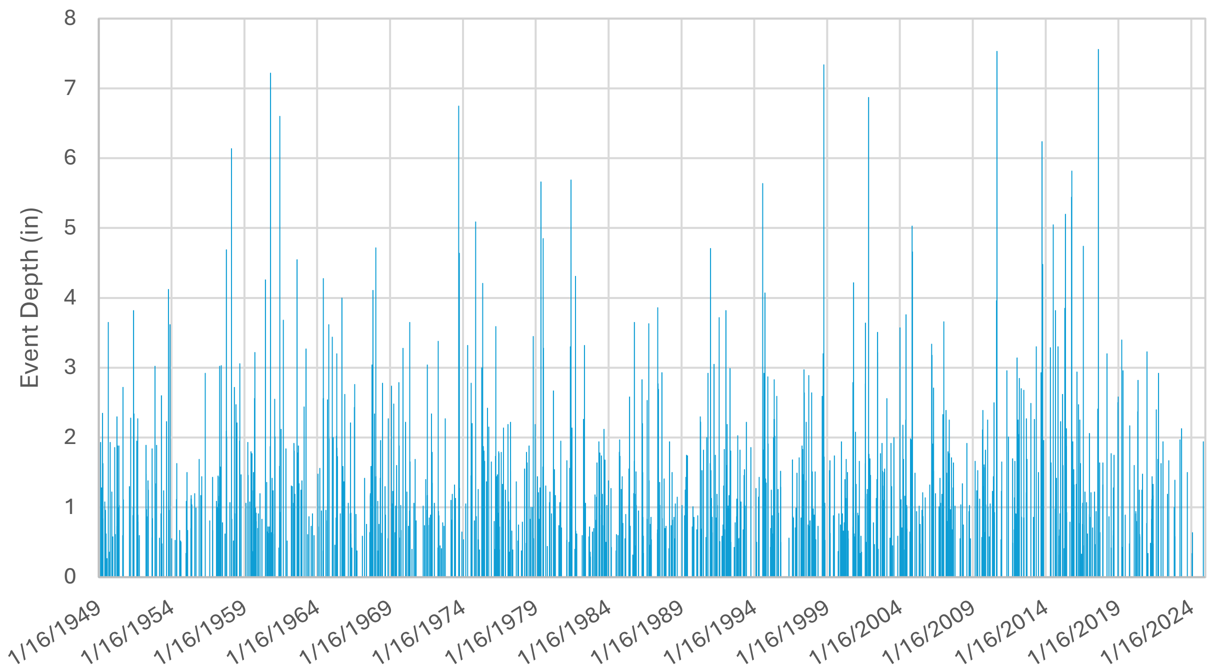

Figure 2. Storm event rainfall depth (in) at KATT for the period of record, 1949-2025

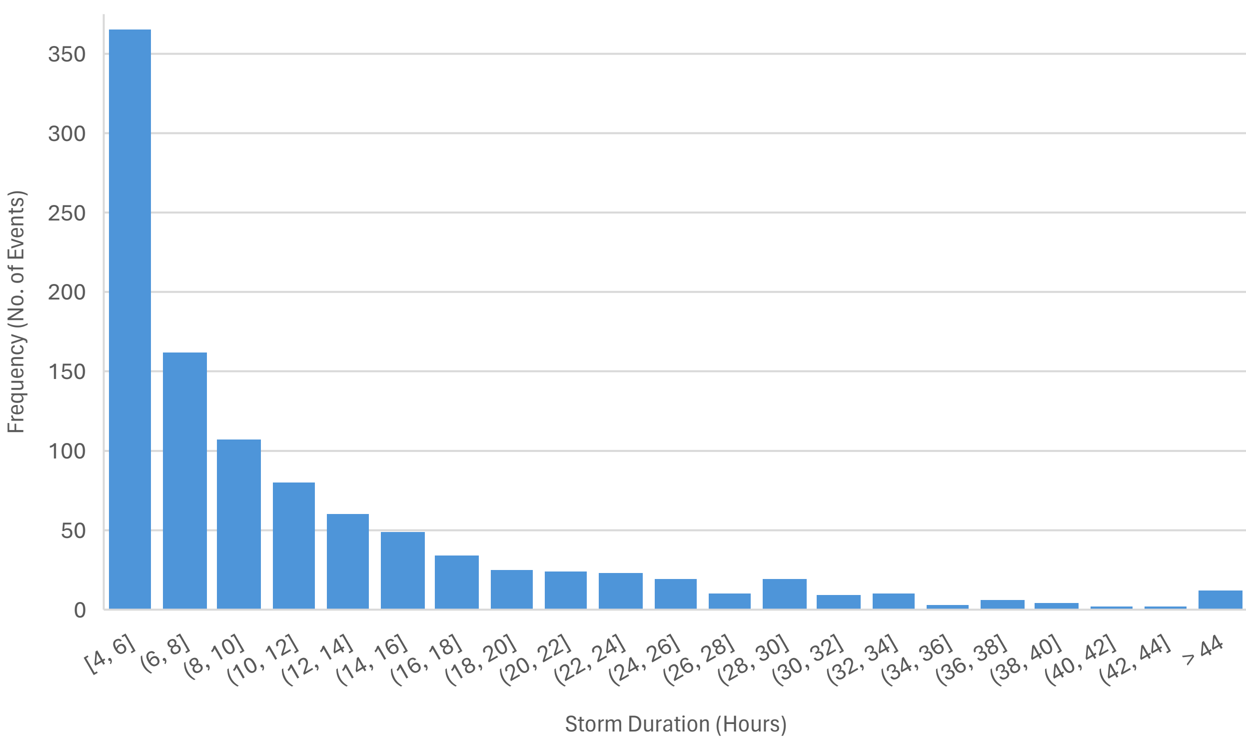

Figure 3. Frequency of storm event duration, shown as incremental (blue) and cumulative (orange) frequencies.

A further subset divides these events by the duration, according to the following criteria: events considered for the 24-hour duration hyetograph were limited to those events with durations ranging from 21- to 27-hours, while events considered for the 6-hour duration hyetograph were limited to those events with durations ranging from 4- to 9-hours.

III. Results

A. Hyetograph Temporal Distribution

The hyetograph temporal distribution can be characterized by 'quartile', defined as the quarter of the storm duration during which the maximum accumulation occurs. Analysis of all 1025 storm events recorded by the KATT rain gauge considered the distribution among the four quartiles to determine which is the most frequent, as shown in Table 2. First quartile storms represent 36 % of storms, thus making the first quartile dominant, followed by the second quartile (28%), the third quartile (21%), and the fourth quartile (15%).

Table 1. Distribution of storm quartiles for all durations

Quartile	Number of Events	Incremental (%)
1	365	36%
2	288	28%
3	216	21%
4	156	15%
Total	**1025**	**100%**

The same analysis was conducted for the 24-hour storm event (Table 3) and the 6-hour storm event (Table 4). The 24-hour storm event has a slightly dominant second quartile at 34%. The third quartile accounts for 26% of the events, while the first and fourth quartiles account for 19 and 21 percent of the events, respectively.

For the 6-hour duration event the 1st quartile is clearly the predominant quartile accounting for 39% of all 6-hour duration storm events in the sample period. The second quartile is the second dominant at 29 percent, and the third and fourth quartiles are third and fourth dominant at 21 and 11 percent respectively.

Table 3. Distribution of storm quartiles for 24-hour storm duration

Quartile	Number of Events	Incremental (%)
1	16	21%
2	25	34%
3	19	26%
4	14	19%
Total	**74**	**100%**

Table 4. Distribution of storm quartiles for 6-hour storm duration

Quartile	Number of Events	Incremental (%)
1	227	39%
2	167	29%
3	124	21%
4	66	11%
Total	**584**	**100%**

B. Median Hyetographs

Median hyetographs were developed based on the aforementioned hyetograph temporal distribution for the 50th and 90th percentile events. The 50th percentile event is defined as the event where 50% of storms are more intense than the median and 50% are less intense. The 90th percentile event is defined as the event where 10% of the storms are more intense than the median and 90% are less intense. Analysis of the hourly storm event data identified the median hyetograph for the centered (quartile 2,3) storm event as the temporal distribution or shape displayed in Figure 4 for the 24-hour duration. This analysis accounts for 50% of the 24-hr storm events. While not the most dominant event distribution, the centered quartile is most comparable to synthetic design storm where the peak intensity of the event is placed in the middle of the storm duration. The median hyetograph for the quartile 1 storm event has the temporal distribution or shape displayed in Figure 4 for the 6-hour duration, which accounts for 39% of the overall storm events. This is the most dominant event distribution for the 6-hour duration. These median hyetographs are displayed by plotting cumulative depth versus duration (Figure 4).

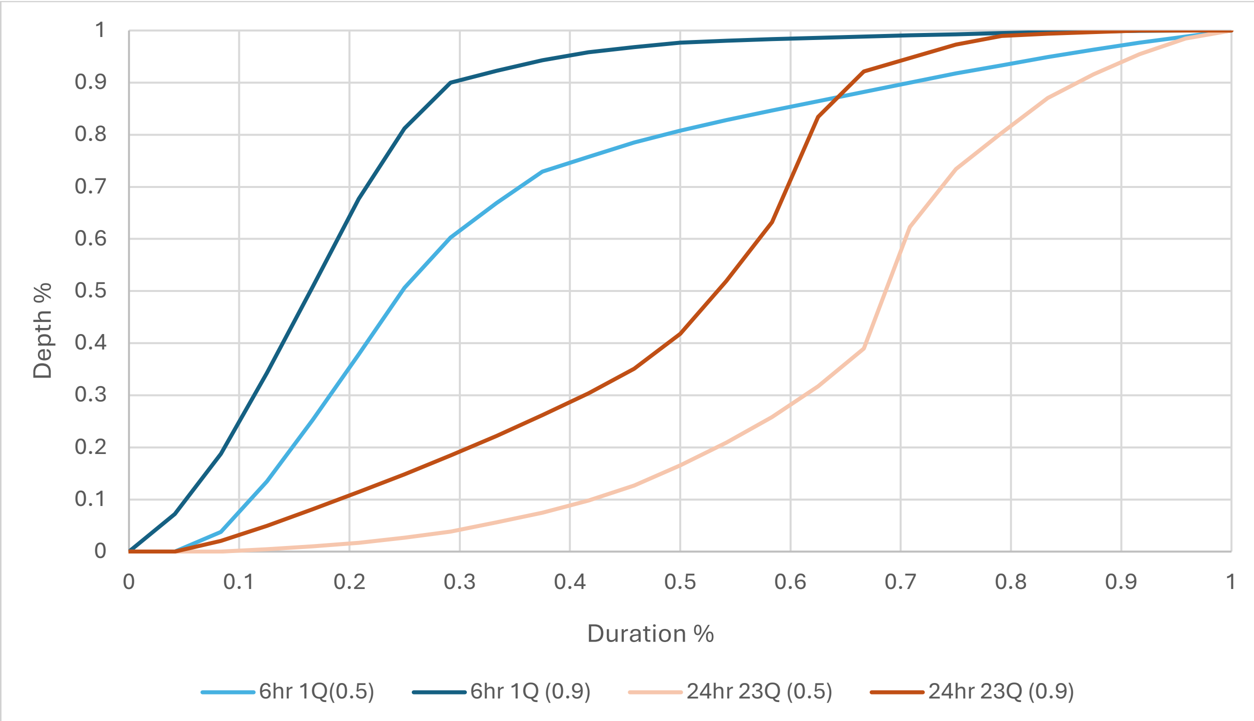

Figure 4. Dimensionless, centered cumulative hyetograph for the 6- and 24-hour duration storm events in Pflugerville.

Precipitation depths for specific duration and return frequency events were obtained from NOAA Atlas 14 (Percia et al., 2018). These depths represent the annual maxima series for the center of Pflugerville. Table 5 represents tabular rainfall depths for the 6- and 24-hour durations, with the 2- and 5-year return frequencies.

Table 5. NOAA Atlas 14 Precipitation frequency depth (in) for the 6- and 24-hour storm duration in Pflugerville

Duration	Return Frequency	
	2-yr Depth (in)	*5-yr Depth (in)*
6-hr	3.10	4.06
24-hr	4.04	5.31

c. Design Storm Recommendations

Dimensionless hyetographs for the 6-hour event were combined with the depth duration frequencies for the 5-year event from NOAA Atlas 14 to obtain depth-duration curves for the 5-year, 6-hour event (Figure 5). Incremental rainfall for this event is also presented in tables 7 and 8.

This analysis uses rainfall data from KATT in combination with NOAA Atlas 14 precipitation frequency depth to obtain a better design storm than using NOAA Atlas 14 or the NOAA Technical Paper number 40 – Rainfall Frequency Atlas (TP40) alone. Both NOAA Atlas 14 and TP40 have significant data gaps in the Pflugerville area compared to the merged KATT dataset that was used for this analysis. NOAA Atlas 14 was last updated in 2017, which means the KATT dataset has 7 more years of data. TP40 has not been updated since the early 2000's and is even less complete than NOAA Atlas 14.

Combining these two sources gives the most accurate description of the 6-hour, 5-year event which is recommended for use as a design storm in Pflugerville Texas.

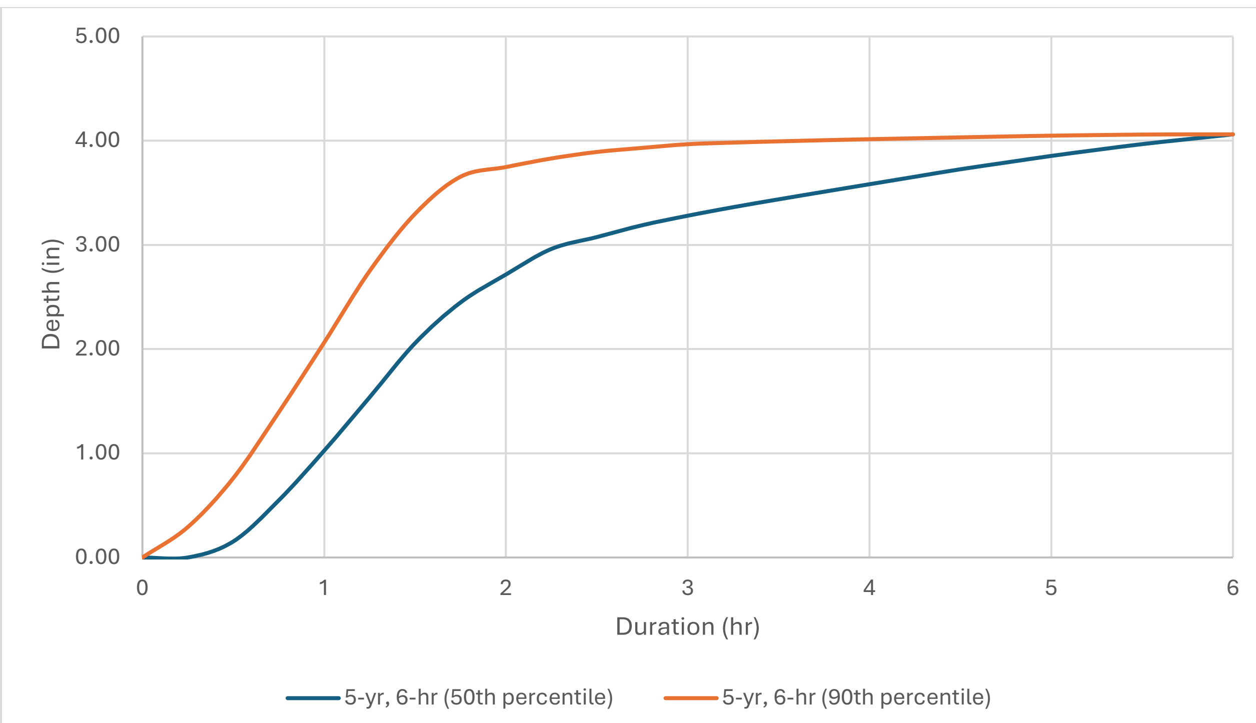

Figure 5. 5-year, 6-hour design storms (50th and 90th percentile)

d. StormBuilder

The StormBuilder interface enables the user to develop a gridded, dynamic design storm by selecting a dimensionless hyetograph and associated rainfall event duration and depth (Vieux & Vieux, 2011). Storm movement within a target area is controlled to follow the median velocity and direction (Table 6), with the target location of the storm and storm event start/end times set by the user. The interface functionality provides the user with the ability to produce a design storm consistent with storm motion and hyetograph shape characteristics developed from this study.

The StormBuilder interface and associated features for developing a design storm are shown in Figure 6. There are three main sections on the left-side panel of the StormBuilder interface which define individual Storm Characteristics: Storm Structure, Target Location, and Storm Motion. The Storm Structure can be defined via the drop-down button by either the 6-hr or 24-hr duration dimensionless hyetograph, shown previously in Figure 4. Dimensionless, centered cumulative hyetograph for the 6- and 24-hour duration storm events in Pflugerville. The associated rainfall frequency depths associated with each duration storm event can be loaded by selecting the Rainfall Frequency Depths button and selecting an individual rainfall depth from the Current conditions (Table 5). Alternatively, the rainfall depth and duration can be entered manually in the boxes to the right of the Duration and Depth labels. The Target Location, specified in the center map of Figure 6 by the cross/circle symbol with a black line through the center, may be specified graphically by using the Selection Tool button and clicking on the desired area on the central map for the storm to pass through. Alternatively, the coordinates for the target location may be entered manually in the boxes to the right of X and Y under Target Location. Finally, the Storm Motion parameters are indicated in the boxes to the right of Velocity and Direction with default values for each parameter set equivalent to those in Table 6. The beginning and end of the storm relative to the target area is defined by specifying the storm speed of movement, and the time before and after the start of the event.

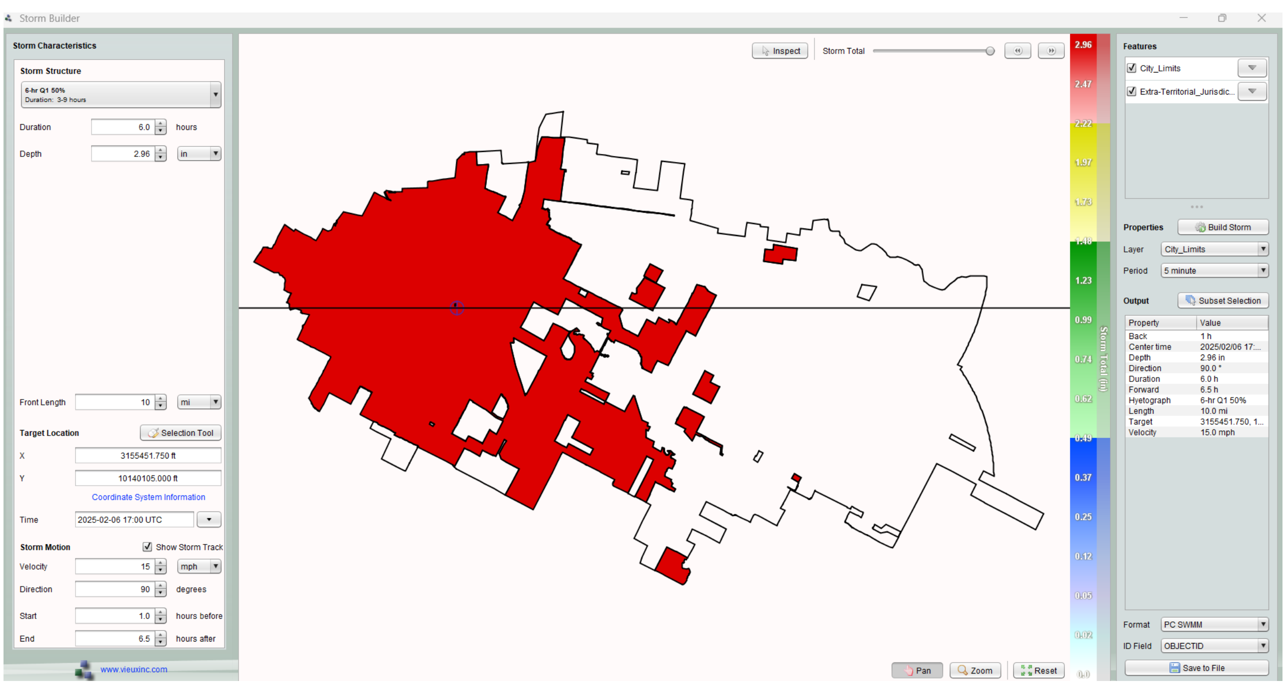

Figure 6. A screenshot of the StormBuilder interface for Pflugerville, Texas

IV. Summary

This technical memorandum describes the development and analysis of a set of dimensionless hyetographs for select design storms, and incorporation of this data into the StormBuilder tool to assist with hydraulic/hydrologic modeling, design, and planning studies in Pflugerville, Texas. Dimensionless hyetographs for two storm durations (6-hr and 24-hr) were developed. Precipitation depths for current rainfall conditions were applied to the 5-year, 6-hr; 2-yr, 24-hr; and 5- year, 24-hr frequency events. Finally, this information was compiled into StormBuilder, which is configured to apply design storm characteristics developed herein for creating gridded, moving design storms for Pflugerville, Texas.

V. References

Perica, S.; Pavlovic, S.; St. Laurent, M.; Trypaluk, C.; Unruh, D.; and Wilhite, O. (2018). NOAA Atlas 14 Volume 11 Version 2, Precipitation-Frequency Atlas of the United States, Texas. NOAA, National Weather Service, Silver Spring, MD.

Vieux, B.E. and Vieux, J.E., 2011. Design StormBuilder: Development of Representative Design Storms. Proceedings of the Water Environment Federation, 2011(5), pp.504-514.

VI. Appendix

Incremental Hyetographs

Table 7. Incremental Hyetograph for the 50% percentile

50th Percentile Events					
5-yr, 6-hr		2-yr, 24-hr		5-yr, 24-hr	
Duration (hr)	Depth (in	Duration (hr)	Depth (in	Duration (hr)	Depth (in
0	0.00	0	0.00	0	0.00
0.25	0.00	1	0.00	1	0.00
0.5	0.15	2	0.00	2	0.00
0.75	0.55	3	0.02	3	0.02
1	1.02	4	0.04	4	0.05
1.25	1.54	5	0.07	5	0.09
1.5	2.06	6	0.11	6	0.14
1.75	2.45	7	0.16	7	0.20
2	2.72	8	0.23	8	0.30
2.25	2.96	9	0.30	9	0.39
2.5	3.07	10	0.40	10	0.52
2.75	3.19	11	0.51	11	0.67
3	3.28	12	0.67	12	0.88
3.25	3.36	13	0.84	13	1.11
3.5	3.44	14	1.04	14	1.37
3.75	3.51	15	1.28	15	1.69
4	3.58	16	1.58	16	2.07
4.25	3.65	17	2.52	17	3.31
4.5	3.73	18	2.97	18	3.90
4.75	3.79	19	3.25	19	4.27
5	3.85	20	3.52	20	4.62
5.25	3.91	21	3.70	21	4.86
5.5	3.97	22	3.86	22	5.07
5.75	4.01	23	3.98	23	5.23
6	4.06	24	4.04	24	5.31

Table 8. Incremental Hyetograph for the 90% percentile

90th Percentile Events					
5-yr, 6-hr		2-yr, 24-hr		5-yr, 24-hr	
Duration (hr)	Depth (in	Duration (hr)	Depth (in	Duration (hr)	Depth (in
0	0.00	0	0.00	0	0.00
0.25	0.29	1	0.00	1	0.00
0.5	0.76	2	0.08	2	0.11
0.75	1.39	3	0.20	3	0.26
1	2.06	4	0.33	4	0.43
1.25	2.75	5	0.46	5	0.61
1.5	3.30	6	0.60	6	0.79
1.75	3.65	7	0.75	7	0.98
2	3.75	8	0.90	8	1.18
2.25	3.83	9	1.06	9	1.39
2.5	3.89	10	1.23	10	1.61
2.75	3.93	11	1.42	11	1.86
3	3.97	12	1.69	12	2.22
3.25	3.98	13	2.10	13	2.76
3.5	3.99	14	2.55	14	3.36
3.75	4.00	15	3.37	15	4.43
4	4.01	16	3.72	16	4.89
4.25	4.02	17	3.83	17	5.03
4.5	4.03	18	3.93	18	5.17
4.75	4.04	19	4.00	19	5.26
5	4.05	20	4.02	20	5.28
5.25	4.05	21	4.03	21	5.29
5.5	4.06	22	4.04	22	5.31
5.75	4.06	23	4.04	23	5.31
6	4.06	24	4.04	24	5.31