Pflugerville Water Master Plan

Water Master Plan Report

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Engineer's Certification

I hereby certify that this Report for the Water Master Plan was prepared by Garver under my direct supervision for the City of Pflugerville.

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List of Acronyms

Acronym	Definition
AACE	Association for the Advancement of Cost Engineering
ADD	average day demand
AWWA	American Water Works Association
CCN	certificate of convenience and necessity
CIP	capital improvement plan
DMA	district metered area
EDS	Engineering Design Standard
EPS	extended period simulation
EST	elevated storage tank
FCV	flow control valve
GST	ground storage tank
HGL	hydraulic grade line
HSPS	high-service pump station
LUE	living unit equivalent
MDD	maximum day demand
MGD	million gallons per day
PRV	pressure reducing valve
PS	pump station
SP	standpipe
TCEQ	Texas Commission on Environmental Quality
TxGIO	Texas Geographic Information Office
UDC	Unified Development Code
WMP	Water Master Plan
WSC	Water Supply Corporation

1.0 Introduction

1.1 Scope

The City of Pflugerville (City) provides retail water service to approximately 16,000 active connections within its water certificate of convenience and necessity (CCN). Located to the northeast of Austin, Texas, the City has been growing steadily over the past few decades. The purpose of this Water Master Plan (WMP) is to provide an assessment of the water system and outline infrastructure projects recommended to address deficiencies through buildout of the water CCN. The following items were completed as part of this project and are documented in this report:

- **Population and Demand Analysis:** assessment of historical and current population and demand, and development of population and demand projections for 2030, 2035, and buildout horizons.
- **Hydraulic Model Update:** update of the existing water system hydraulic model.
- **Hydraulic Model Calibration:** development and calibration of extended period hydraulic model scenarios.
- **Water System Assessment:** assessment of the water system against Texas Commission on Environmental Quality (TCEQ) rules and regulations and with the calibrated hydraulic model to identify capital improvements needed at buildout.
- **Capital Improvement Plan:** development of a capital improvement plan (CIP) with project phasing, cost estimates, and detailed project sheets.

1.2 System Overview

The City has three existing sources of supply: a Surface Water Treatment Plant (WTP) located near Weiss Ln and E Pflugerville Pkwy and two wells (Well #6 and Well #7) located in or near the Wells Point subdivision. The wells supply customers in the southwestern corner of the water CCN. The City supplies customers in its water CCN, the Manville Water Supply Corporation (WSC) through two wholesale service connections, and the Windermere Utility Company (Windermere) through a single wholesale service connection.

There are three existing pressure zones. The Central 888 Zone receives water from the WTP via a high-service pump station (HSPS) and contains two elevated storage tanks (ESTs), the Falcon Pointe EST and the North EST. Water is pumped from the Central 888 Zone to the West 960 Zone through the Pfennig Pump Station (PS). The West 960 Zone contains a single EST, the Heatherwilde EST. The third zone, the West 942 Zone, is supplied primarily by Well #6 and Well #7. Water is pumped from the wells to the South Standpipe (SP) through the Well 6 PS and the Chisholm PS. A control valve along Settlers Valley Rd is used to supply the West 942 Zone from the West 960 Zone, if needed. See Figure 1-1 for a system overview map.

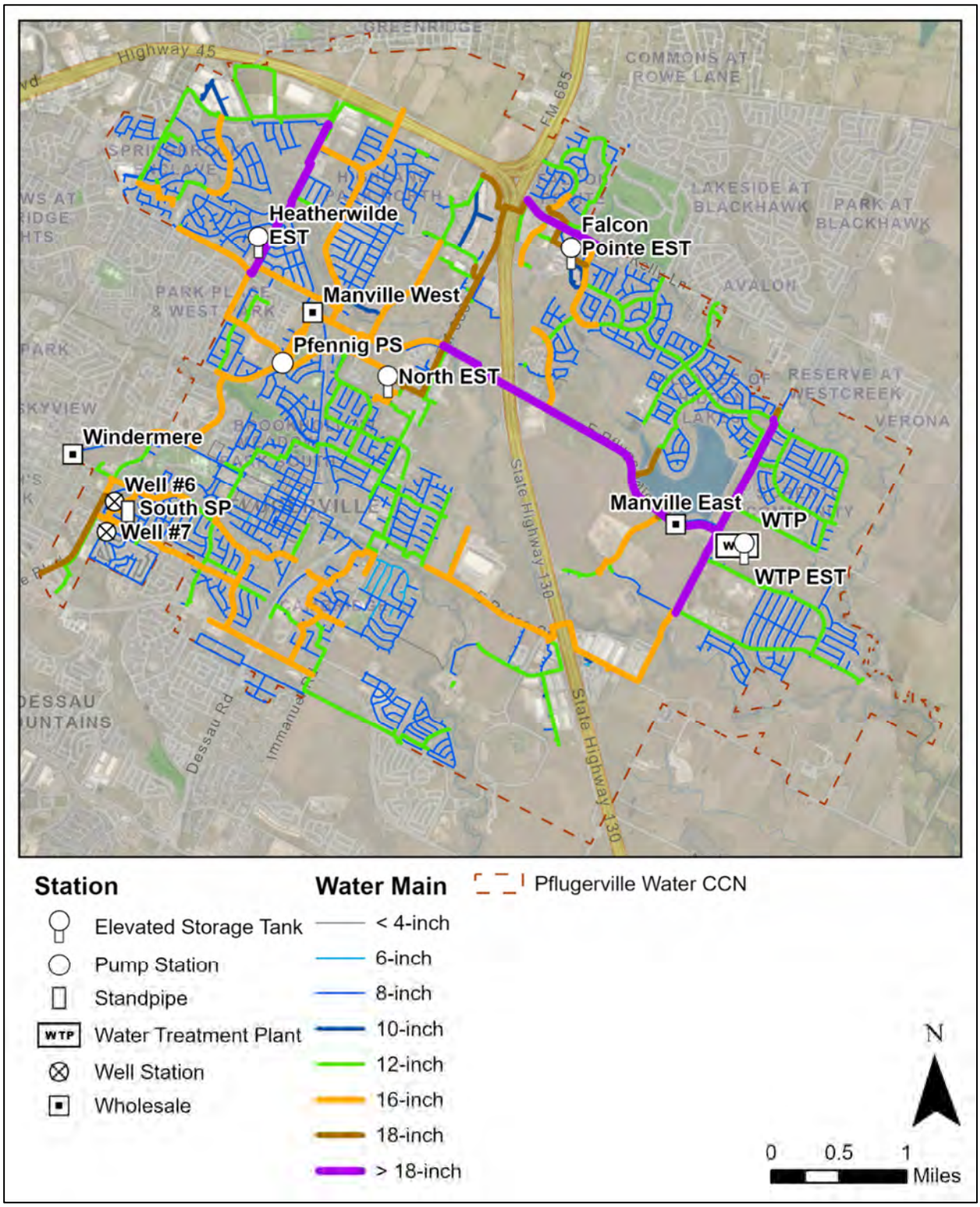


Figure 1-1: System Overview Map

2.0 Population and Demand Analysis

A demand analysis was performed for the City to identify historical trends and determine per connection or per land area demand values for different demand conditions to apply to future development. Upcoming planned development was mapped based on information provided by the City. Remaining future development through buildout was categorized based on the future land use designation from the City's most recent Comprehensive Plan, *Aspire 2040*. Demand projections were made for 2030, 2035, and buildout horizons. A detailed *Population and Demand Analysis Technical Memorandum* was prepared to summarize the demand analysis and can be found in Appendix A. This section summarizes the key results of the demand analysis.

An analysis of historical supply and demand was performed using daily production and wholesale data from January 2013 to August 2024. In 2023, approximately 87% of total demand was for Pflugerville with only 13% of total demand for Manville and Windermere. The greatest maximum day demand (MDD) of 16.6 million gallons per day (MGD) occurred on July 27, 2022 (see Table 2-1). MDD in 2023 was lower at 13.4 MGD (see Table 2-2). Demands from 2022 and 2023 were used as a baseline for projecting future demands to achieve a middle ground between the highest demand on record and recent demand reductions resulting from water conservation measures and decreased wholesale demands in accordance with contractual obligations.

Table 2-1: 2022 Supply and Demand Summary

Demand Condition	Total Supply (MGD)	Wholesale Demand (MGD)				Pflugerville Retail Demand (MGD)
		Manville East	Manville West	Windermere	Total Wholesale	
Min Month	6.72	0.49	0.84	0.00	1.33	5.39
Average	9.40	0.81	1.02	0.22	2.05	7.36
Max Month	13.85	1.25	1.22	0.51	2.98	10.88
Max Day	16.64	2.00	1.45	0.55	4.01	12.63

Table 2-2: 2023 Supply and Demand Summary

Demand Condition	Total Supply (MGD)	Wholesale Demand (MGD)				Pflugerville Demand (MGD)
		Manville East	Manville West	Windermere	Total Wholesale	
Min Month	6.39	0.46	0.76	0.23	1.44	4.95
Average	8.00	0.18	0.60	0.25	1.02	6.98
Max Month	12.03	0.14	0.59	0.32	1.06	10.97
Max Day	13.36	0.62	0.86	0.28	1.77	11.60

An analysis of historical usage was performed using monthly water utility billing data within the water CCN from 2021 through 2023 and using a 2023 water use and loss summary spreadsheet. Approximately 96% of existing connections are single-family residential accounting for 62% of total usage. The next two highest customer types are commercial and apartments at 3% and 0.3% of the existing connections,

respectively, accounting for 15% and 19% of total usage, respectively. Monthly usage by customer type from 2023 is shown in Figure 2-1.

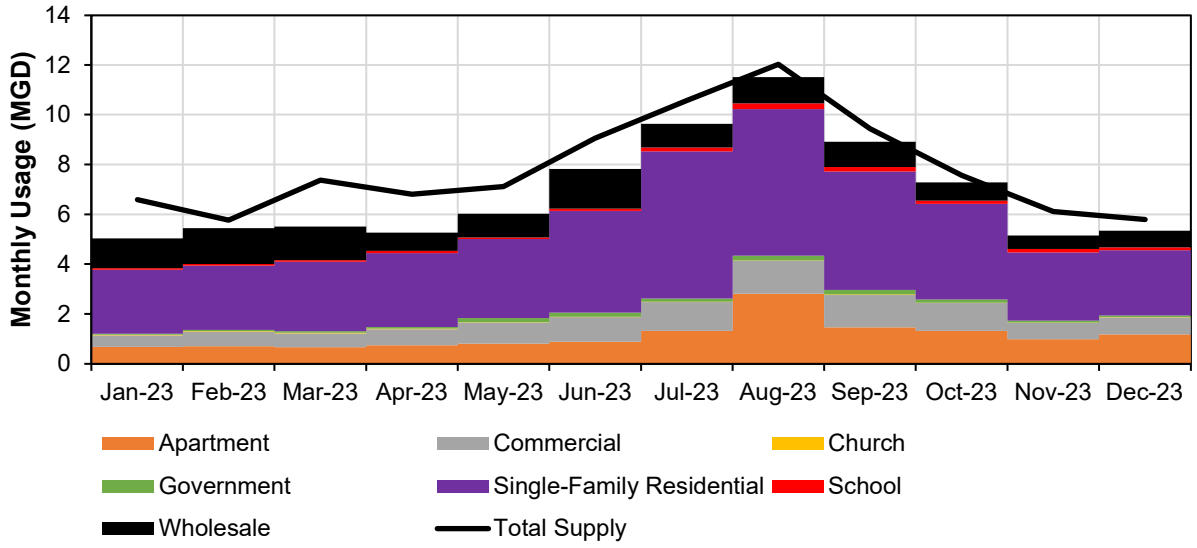


Figure 2-1: 2023 Monthly Usage by Customer Type

Historical usage per single-family residential connection and per commercial land area was visualized in terms of cumulative probability. Average values excluding outliers below the 5th percentile and above the 95th percentile were selected for projecting future demands (see Table 2-3 and Table 2-4). Usage per apartment unit was assumed to be 50% of usage per single-family residential connection.

Table 2-3: Single-Family Residential Usage per Connection

Statistic	Single-Family Residential Usage per Connection (gal/conn/day)		
	Min Month	Average	Max Month
Median	142	216	307
Average Excluding Outliers	148	219	334
Average	177	245	398

Table 2-4: Commercial Usage per Acre

Statistic	Commercial Usage per Acre (gal/acre/day)		
	Min Month	Average	Max Month
Median	382	756	836
Average Excluding Outliers	693	1,079	1,404
Average	1,581	2,568	4,278

Benchmarking of water usage was performed against other local utilities of similar composition and size (see Table 2-5). Pflugerville's average single-family residential water usage in 2023 was the same at approximately 86 gpcd as compared to most other utilities which had average residential water usages of approximately 90 gpcd.

Table 2-5: Usage Benchmarking

City	Year	Average Residential Water Usage (gpcd)	Average Total Water Usage (gpcd)	Source
Cedar Park	2019	91	136	Cedar Park 2019 Water Conservation Plan
Hutto	2021	91 (1)	Not available	City of Hutto Water Master Plan Update
Round Rock	2023	88	146	Utility Profile and Water Conservation Plan
Georgetown	2018	136	187	Georgetown Water Conservation Plan 2019
Pflugerville	2023	86 (2)	130 (3)	

(1) Data reported in terms of gpd per LUE only; assuming 3 people per household based on US Census data.
(2) Assuming 2.85 people per household based information from the City.
(3) Does not included wholesale usage.

Demand projections were made for 2030, 2035, and buildout horizons. Projections through 2030 are based on current planned development. Projections through 2035 and buildout are based on future land use designations from *Aspire 2040.* Overall, the total number of connections within the City's water CCN is projected to be approximately 17,867 in 2030 and 21,076 in 2035 (see Figure 2-2).

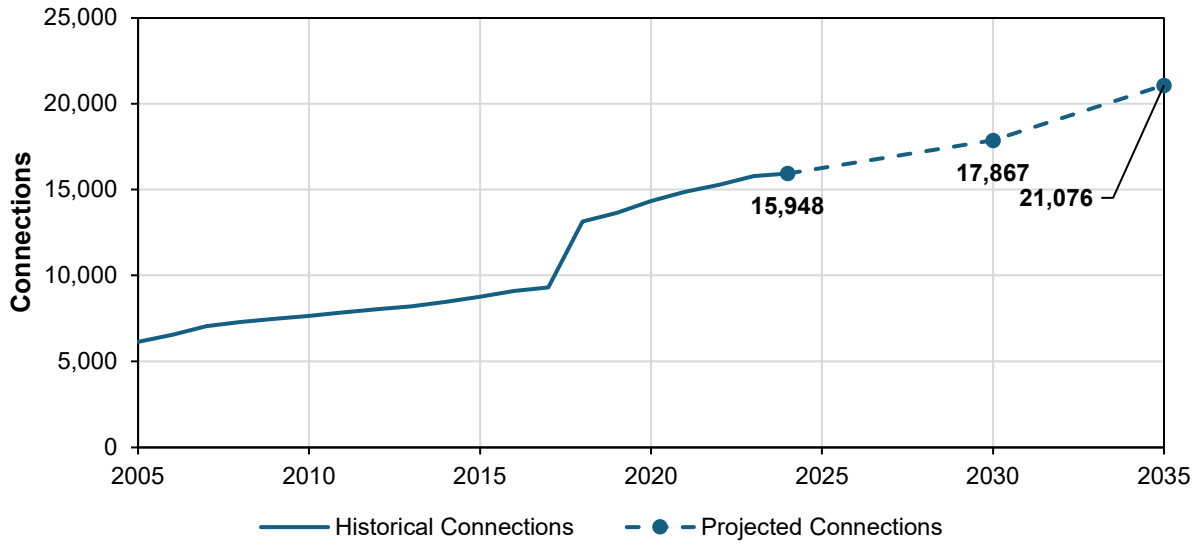


Figure 2-2: Historical and Projected Connections

ADD is projected to be 11.3 MGD, 13.6 MGD, and 15.9 MGD in 2030, 2035, and at buildout, respectively. MDD is projected to be 18.6 MGD, 22.8 MGD, and 27.1 MGD in 2030, 2035, and at buildout, respectively. Demands are projected to increase at approximately the same exponential rate as they have for the past 20 years, at least through 2035. Demand projections are summarized in Table 2-6 and shown in Figure 2-3.

Table 2-6: Demand Projections

Year	Average Day Demand (MGD)			Max Day Demand (MGD)		
	Pflugerville	Wholesale	Total	Pflugerville	Wholesale	Total
Existing [(1)]	7.2	1.5	8.7	12.1	2.9	15.0
2030	10.0	1.3	11.3	17.1	1.5	18.6
2035	12.3	1.3	13.6	21.3	1.5	22.8
Buildout	14.6	1.3	15.9	25.6	1.5	27.1

[(1)] Average of demands from 2022 and 2023.

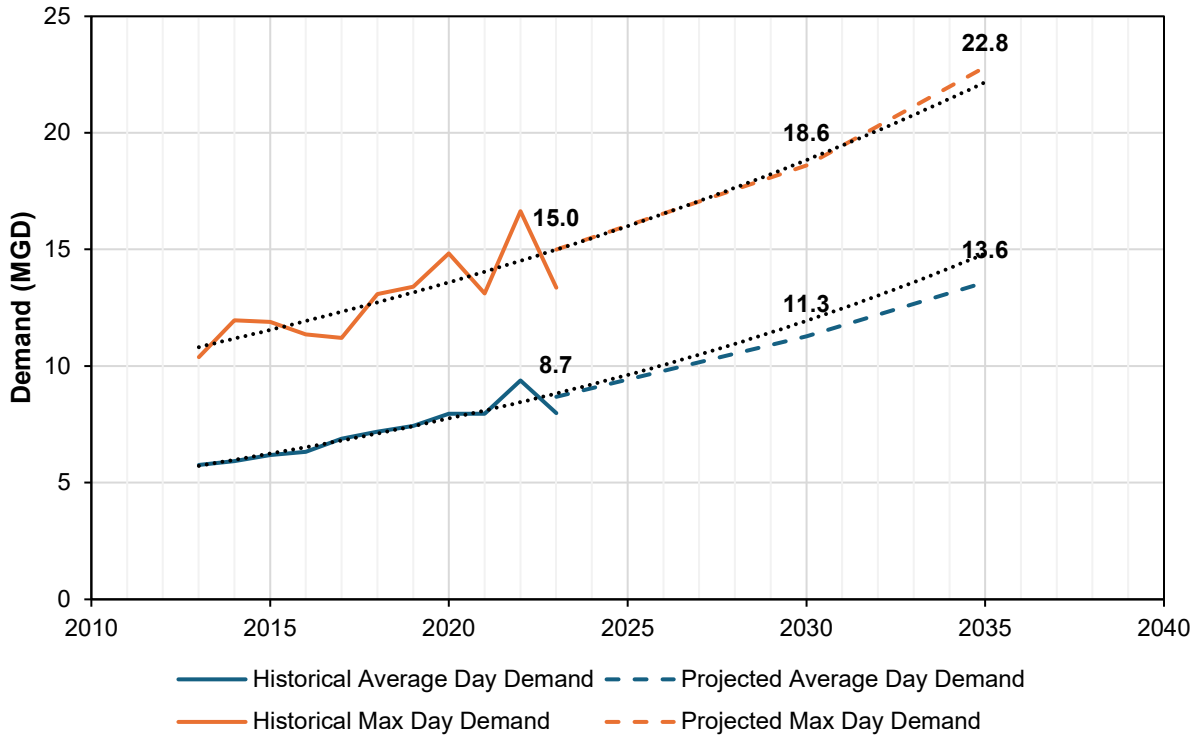


Figure 2-3: Historical and Projected Demand

3.0 Hydraulic Model Update

The existing InfoWater Pro hydraulic model of the water system was updated in collaboration with City staff. The updated model includes new pipes from GIS. Facility attributes were verified against record drawings or field data where available. The following subsections detail the hydraulic model update process, approach, and assumptions.

3.1 Pipe Network Update

Various data sources were used to update the model pipe network as listed in Table 3-1.

Table 3-1: Model Pipe Network Data Sources

Element Type	Data Source(s)
Pipes	• GIS • As-builts
Junctions	• Texas Geographic Information Office elevation raster
Zone Valves, Pressure Reducing Valves, and Control Valves	• GIS • Coordination with City staff

The following steps were taken to update the model pipe network:

- A comparison was made between model pipes and pipes in GIS to identify pipes to import to the model (see Figure 3-1).
- Pipes were imported to the model from GIS using the InfoWater Pro GIS Gateway; pipe diameter and material were mapped during import.
- In addition, plan sets for water line projects currently in design or construction were georeferenced in GIS and imported to the model. These projects are discussed in more detail in *Section 6.0: Capital Improvement Plan*.
- Hazen-Williams roughness factors were assigned to pipes as listed in Table 3-2.

Table 3-2: Hazen-Williams Roughness Factors

Material	Factor
Asbestos Cement	110
Ductile Iron	110
PE	130
PVC	130
Undetermined	110

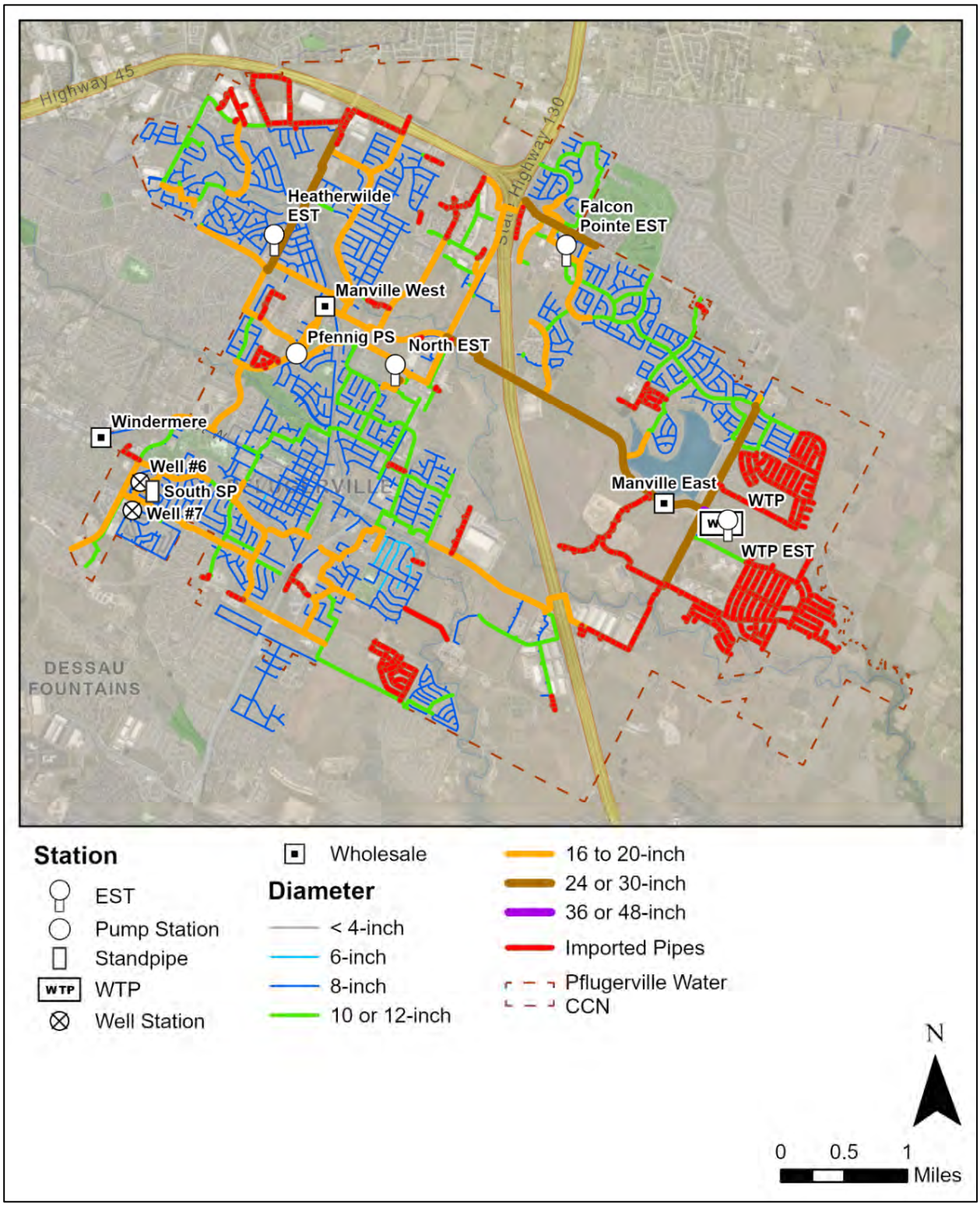


Figure 3-1: GIS Pipes Imported to the Model

- Nodes were appended to pipe endpoints.
- Corrections were made to the pipe network using InfoWater Pro's Network Review and Fix tools:
    - Duplicate pipes were identified and removed.
    - Isolated pipes were identified and then reconnected or removed.
    - Crossing pipes were identified and then verified with the City.
- Diameters and materials for existing (non-imported) pipes within the model were compared to GIS and corrected as needed.
- Junction elevations were extracted from a Texas Geographic Information Office (TxGIO) elevation raster using the InfoWater Pro Elevation Extractor tool.
- All model pipes and junctions were labeled with an existing and future pressure zone.
    - Elements upstream of WTP or well station pumps are labeled as "Source".
    - Elements between ground storage tanks (GSTs) and pumps are labeled as "Station".
- Pressure zone boundaries were determined in coordination with City staff.
    - Zone boundaries are established in the model as closed throttle control valves.
    - Zone boundary valves are labeled with the prefix "ZV" followed by the street name.
    - In total, the model contains 17 existing closed zone valves, including three associated with the new East 794 Zone (see Table 3-3).

Table 3-3: Existing Closed Zone Boundary Valves

ID	Description	Upstream Zone	Downstream Zone	Elevation (feet)	Diameter (inch)
ZV_10TH	S 10th St Closed Zone Valve	Central 888	South PRV 1	734	12
ZV_GATLINBURG_1	Gatlinburg Dr Closed Zone Valve	Central 888	Central PRV	663	8
ZV_GATLINBURG_2	Gatlinburg Dr Closed Zone Valve	Central 888	Central PRV	663	6
ZV_IMMANUEL	Immanuel Rd Closed Zone Valve	Central 888	South PRV 1	713	12
ZV_KINGSTON_LACY	Kingston Lacy Blvd Closed Zone Valve	West 960	Central 888	706	10
ZV_OLYMPIC_1	Olympic Dr Closed Zone Valve	West 942	South PRV 1	766	16
ZV_OLYMPIC_2	Olympic Dr Closed Zone Valve	West 960	West 942	796	16
ZV_OLYMPIC_3	Olympic Dr Closed Zone Valve	Central 888	South PRV 1	712	6
ZV_OXFORD	W Oxford Dr Closed Zone Valve	Central 888	South PRV 1	719	16
ZV_PECAN	Pecan St Closed Zone Valve	West 960	Central 888	759	8
ZV_PFENNIG	Pfennig Ln Broken Valve	Central 888	Central 888	724	12
ZV_PIGEON_FORGE	Pigeon Forge Rd Closed Zone Valve	Central 888	South PRV 1	713	6

ID	Description	Upstream Zone	Downstream Zone	Elevation (feet)	Diameter (inch)
ZV_PIONEER_BEND	Pioneer Bend Dr Closed Zone Valve	West 942	South PRV 1	744	8
ZV_SETTLERS_VALLEY	Settlers Valley Dr Closed Zone Valve	Central 888	South PRV 1	733	6
ZV_WEISS_1	Weiss Ln Future Zone Valve	East 794	Central 888	638	24
ZV_WEISS_2	Weiss Ln Future Zone Valve	East 794	Central 888	638	24
ZV_WEISS_3	Weiss Ln Future Zone Valve	East 794	Central 888	614	16

- Pressure reducing valves (PRVs) were updated or added to the model in coordination with City staff.
    - Each PRV includes a description with the location, pressure setting, elevation, diameter, upstream zone, and downstream zone.
    - Notes are included in the description for PRVs that are currently locked in the fully open or fully closed position.
    - In total, the model contains 14 existing PRVs (see Table 3-4).
    - The PRVs along Aventura Ave and Papaveri Way have closed bypass valves.

Table 3-4: Existing Pressure Reducing Valves

ID	Description	Upstream Zone	Downstream Zone	Elevation (feet)	Diameter (inch)	Setting (psi)
PRV_AVALAR	Avalar Ave PRV	Central 888	East PRV	590	8	100
PRV_AVENTURA	Aventura Ave PRV	Central 888	East PRV	628	12	95
PRV_BECKER_FARM	Becker Farm Rd PRV	Central 888	East PRV	637	12	62
PRV_GATLINBURG	Gatlinburg Dr PRV	Central 888	Central PRV	664	2	76
PRV_HIDDEN_LAKE	Hidden Lake Xing PRV - Closed	Central 888	East PRV	664	12	n/a
PRV_IMMANUEL	Immanuel Rd PRV	South PRV 1	South PRV 2	675	12	75
PRV_MOUNTAIN_VIEW	Mountain View Dr PRV - Open	West 942	South PRV 1	757	8	n/a
PRV_PAPAVERI	Papaveri Way PRV	Central 888	East PRV	642	12	85
PRV_PFENNIG_1	Pfennig Ln PRV 1 - Closed	West 960	Central 888	726	6	n/a
PRV_PFENNIG_2	Pfennig Ln PRV 2 - Closed	West 960	Central 888	725	16	n/a
PRV_PIGEON_FORGE	Pigeon Forge Rd PRV	Central 888	Central PRV	724	16	60

ID	Description	Upstream Zone	Downstream Zone	Elevation (feet)	Diameter (inch)	Setting (psi)
PRV_SETTLERS_ VALLEY	Settlers Valley Dr PRV	West 942	Central 888	740	12	35
PRV_SWENSON_ FARMS_1	Swenson Farms Blvd PRV	West 960	West PRV	721	12	57
PRV_SWENSON_ FARMS_2	Swenson Farms Blvd PRV	West 960	West PRV	749	12	45

- The model contains one 16-inch flow control valve (FCV) from the West 960 Zone to the West 942 Zone along Settlers Valley Dr.
    - This valve is used to supply the West 942 Zone when the wells are offline.
- Fill valves with closed bypass valves and check valves are included in the model for the Falcon Pointe EST, North EST, Pfennig GSTs, and Windermere GST.
- A map of all model PRVs, FCVs, and zone valves is provided in Figure 3-2.

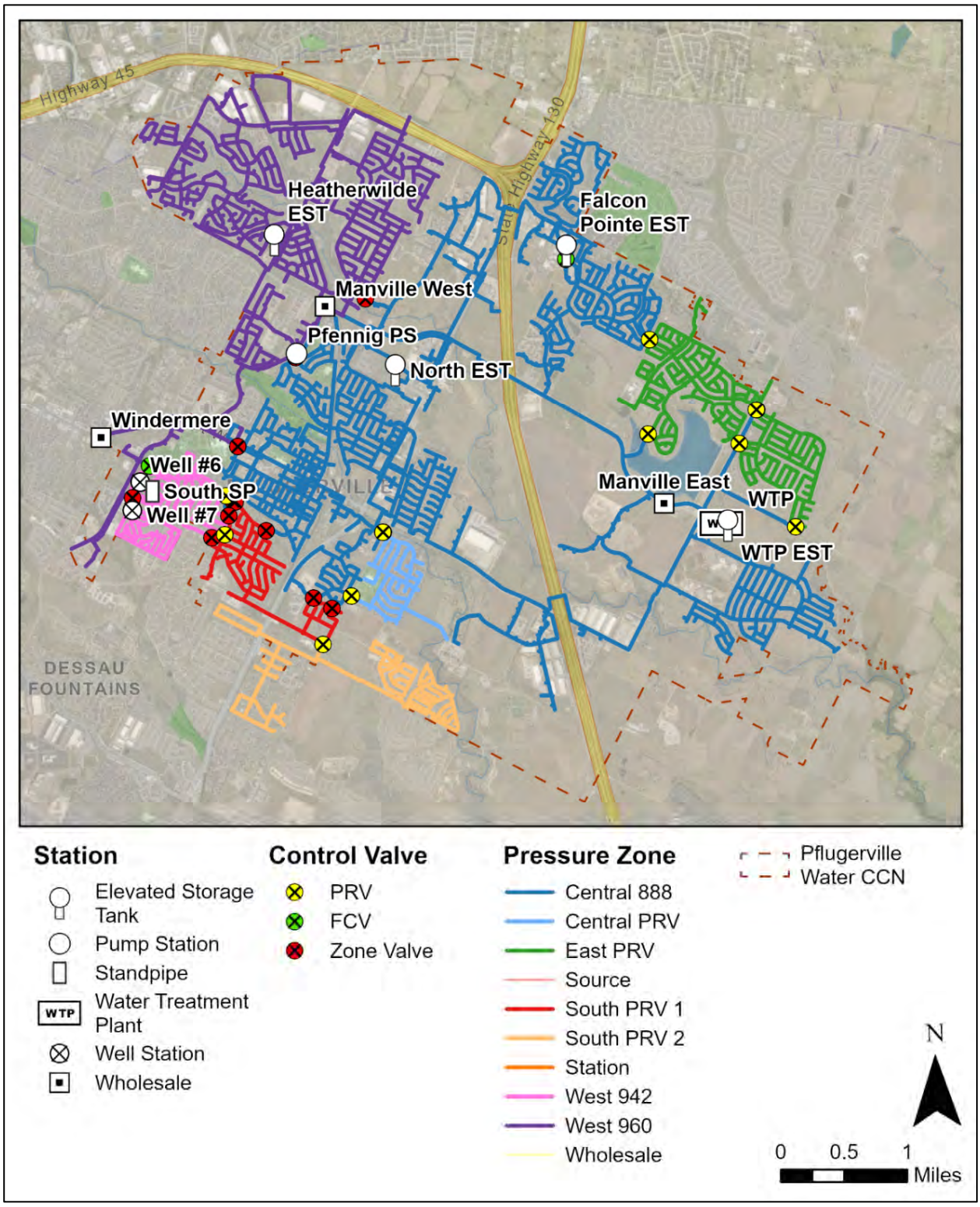


Figure 3-2: Model Valves and Pressure Zones

3.2 Facilities Update

Various data sources and assumptions were used to update the model facilities (see Table 3-5). The following subsections detail the update of facilities by element type. Facility layouts are provided in Appendix B.

Table 3-5: Model Facility Data Sources

Element Type	Data Source(s)
Wells	• SCADA
Pumps	• As-builts • Manufacturer curves • Nameplates • SCADA • TxGIO elevation raster
Tanks	• As-builts • Nameplates • Google Earth aerial • TxGIO elevation raster

3.2.1 Sources

The WTP and wells are modeled as fixed head reservoirs. The finished water clearwell hydraulic grade line (HGL) at the WTP is set to 651.78 feet, which was the average operating HGL observed from SCADA data during the model calibration. The well HGLs are set above the receiving tank overflow. Well flow controls are applied at an FCV.

Table 3-6: Sources

Source	Zone	Hydraulic Grade Line (feet)	Capacity (gpm)
Well 6	West 942	n/a	2,100
Well 7	West 942	n/a	940
WTP	Central 888	651.78	n/a

3.2.2 Pumps

The City's water system contains 14 existing pumps plus two pumps under construction. Most pumps are modeled with multi-point curves. Pump performance data sheets were provided by the City for Pfennig Pumps 2 to 3 and WTP Pumps 1 to 4. Pump curves were pulled from online sources based on the nameplate information for Pfennig Pumps 1 and 4, Well 6 Pump 3, and Chisholm Pump 3. Nameplate information was not readable for Well 6 Pumps 1 to 2, and Chisholm Pumps 1 to 2. Model multi-point curves are shown in Figure 3-3 and provided in Appendix C.

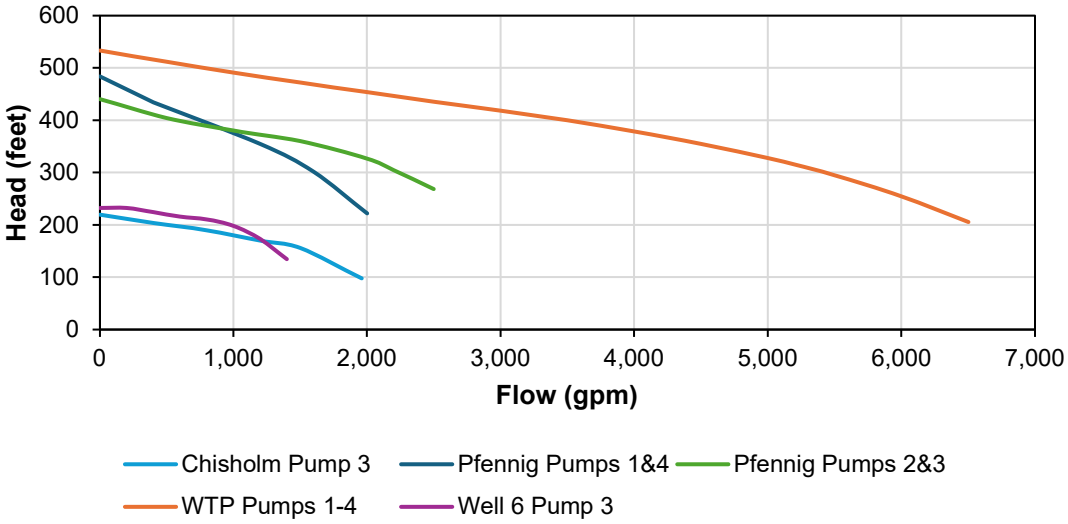


Figure 3-3: Pump Curves

The remaining pumps, Chisholm Pumps 1 to 2, WTP Pumps 5 to 6, and Well 6 Pumps 1 to 2 are modeled with design point curves. The design flows for Chisholm Pumps 1 to 2 and Well 6 Pumps 1 to 2 were estimated by analyzing flow data from SCADA (see Table 3-7).

Table 3-7: Calculated Pump Design Points

Station	Pump	SCADA Average Flow (gpm)
Chisholm	1	775
	2	667
Well 6	1	1,572
	2	1,533

An inventory of pumps is provided in Table 3-8. Model pumps include a description, upstream zone, downstream zone, curve, elevation, design flow, and design head.

Table 3-8: Pump Inventory

Pump	Zone	Elevation (feet)	Design Flow (gpm)	Design Head (feet)	Curve Type	Make	Model
Chisholm Pump 1	West 942	780.84	775	136	Design Point	Unknown	Unknown
Chisholm Pump 2	West 942	780.84	667	136	Design Point	Unknown	Unknown
Chisholm Pump 3	West 942	780.84	1,500	155	Multi Point	Byron Jackson	14GM (2 stage)
Pfennig Pump 1 & Pump 4	West 960	727.75	1,600	302	Multi Point	Goulds	14RJLC (4 stage)
Pfennig Pump 2 & Pump 3	West 960	727.75	2,200	305	Multi Point	Flowserve	15EMM (3 stage)
Well 6 Pump 1	West 942	814.42	1,572	132	Design Point	Unknown	Unknown

Pump	Zone	Elevation (feet)	Design Flow (gpm)	Design Head (feet)	Curve Type	Make	Model
Well 6 Pump 2	West 942	814.42	1,533	128	Design Point	Unknown	Unknown
Well 6 Pump 3	West 942	814.42	1,200	150	Multi Point	Byron Jackson	12GH (3 stage)
WTP Pump 1 – 4	Central 888	646.5	5,208	315.2	Multi Point	Pentair	19A-SS (3 stage)
WTP Pump 5 & 6	East 794	643.5	4,167	130	Multi Point	Flowserve	23EKL (2 stage)

3.2.3 Tanks

The City's water system contains two clearwells, four GSTs, one SP, and four ESTs. The clearwells are modeled as a reservoir at the WTP. All other tanks are modeled as circular. Each tank in the model includes a description, upstream zone, downstream zone, ground elevation, minimum level, maximum level, and diameter. Chisolm and Pfennig Stations both have two GSTs. Each of these stations is modeled with a single, composite volume GST. Otherwise, InfoWater can have computational issues with tanks in proximity and the level oscillating back and forth between them. An inventory of tanks is provided in Table 3-9.

Table 3-9: Tank Inventory

Tank	Year Built	Zone	Ground Elevation (feet)	Minimum Level (feet)	Maximum Level (feet)	Diameter (feet)	Capacity (MG)
Chisholm GST 1	2025 (1)	West 942	781.0	0.0	26.0	56.6	0.25
Chisholm GST 2	2025 (1)	West 942	781.0	0.0	26.0	56.6	0.25
Falcon Pointe EST	2001	Central 888	725.0	129.0	166.0	50.0	0.50
Heatherwilde EST	2019	West 960	779.5	140.5	180.5	86.0	1.50
North EST	2021	Central 888	760.0	91.5	131.5	104.0	2.50
Pfennig GST 1	2008	West 960	720.5	0.0	20.8	90.5	0.50
Pfennig GST 2	2015	West 960	720.5	0.0	20.8	90.5	0.50
South Standpipe	2022 (1)	West 942	815.0	0.0	120.0	46.0	1.60
Well 6 GST	2021 (1)	West 942	791.2	0.0	44.0	44.0	0.50
Windermere GST	2025 (1)	Wholesale	813.0	0.0	20.0	20.0	0.07
WTP EST	2025	East 794	640.5	113.5	153.5	96.4	2.00
(1) Indicates the most recent year of rehabilitation							

3.3 Demand Allocation

Several steps of data processing were required to allocate demands in the model:

- Compiled usage per customer per billing cycle from 2023.
- Determined the minimum month, average, and maximum month usage per customer in 2023.
- Compiled a unique list of customer service addresses.
- Geocoded customer service addresses.
- Manually located customer service addresses that could not be geocoded.
- Imported geocoded customer service addresses into the model.
- Created demand sets for minimum month, average, and maximum month.
- Allocated customer usage to the nearest pipe.
- Distributed unmetered usage evenly across junctions.
- Developed diurnal demand patterns and a demand peaking factor to calculate maximum day demands.

Data from February 2023 and August 2023 was used for the minimum month and maximum month demand sets, respectively. The last 12 months of data was used for the average demand set. Monthly and average demands from 2023 are shown in Figure 3-4.

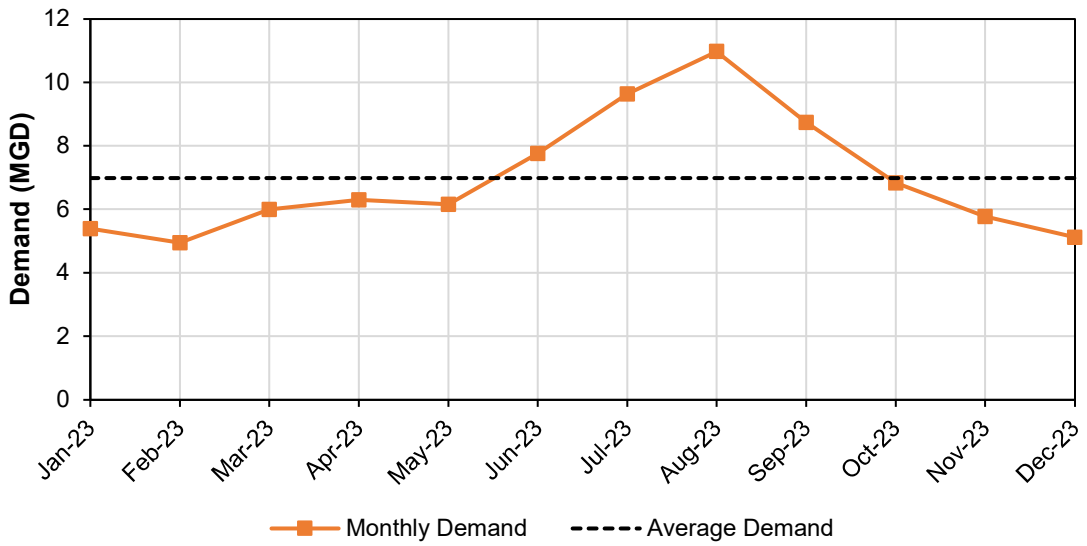


Figure 3-4: Monthly and Average Demands from 2023

The allocated usage from billing was compared to the total supply (see Table 3-10). Unmetered usage was applied evenly across junctions so that the total demand in the model matches the total supply. Maximum day usage was estimated from maximum month usage by multiplying by a factor of 1.06. The maximum day demand set is approximately 11.6 MGD. Customer usage from billing was allocated to the nearest pipe. Unmetered usage is applied evenly across junctions (see Figure 3-5).

Table 3-10: Demand Allocation Summary

Parameter	Min Month (MGD)	Average (MGD)	Max Month (MGD)	Max Day (MGD)
Usage from Billing	3.67	5.41	9.92	10.49
Unmetered Usage	1.28	1.57	1.05	1.11
Total Supply and Demand	4.95	6.98	10.97	11.60

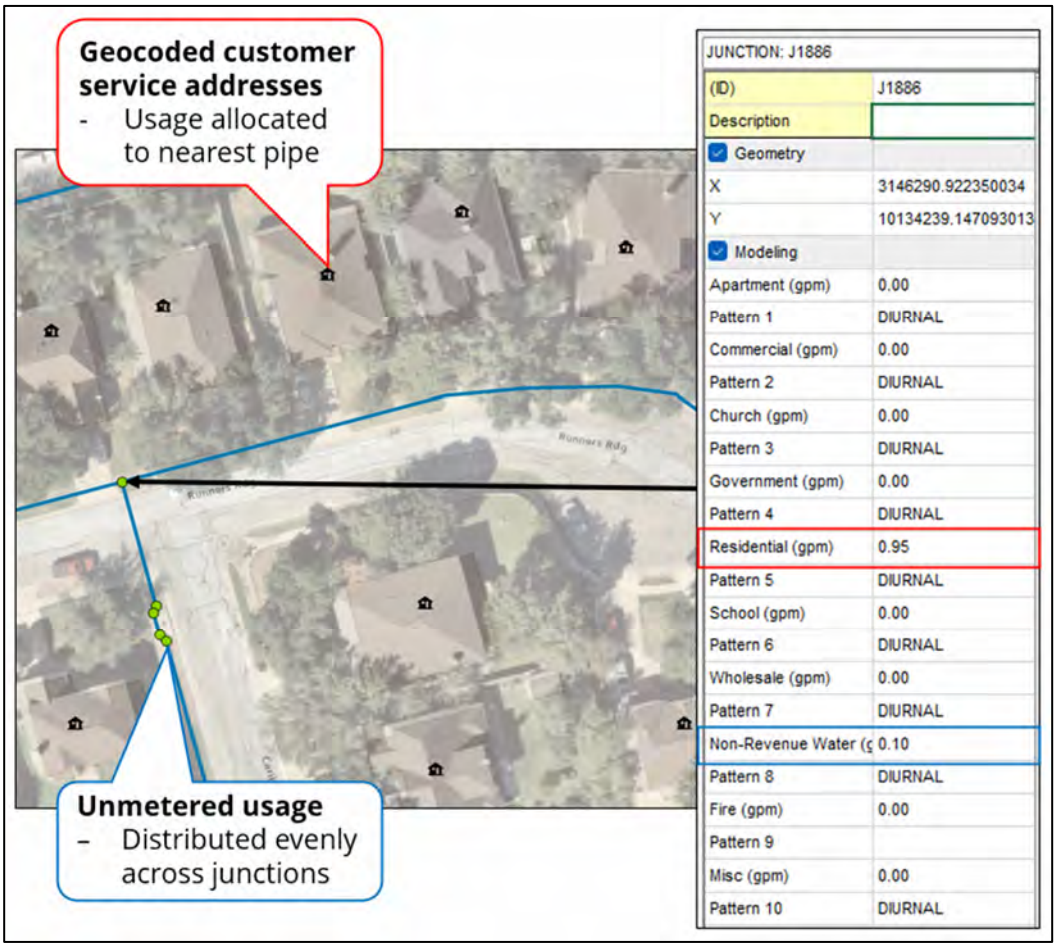


Figure 3-5: Demand Allocation Distribution

Diurnal demand patterns were developed using SCADA data from August 2024 to approximate variations in demand throughout the day for summer demand conditions. Diurnals were developed for each day of the week (see Figure 3-6) and for weekdays versus weekends (see Figure 3-7). Two peaks occur during the day: one around six in the morning and one around nine in the evening. Demand is less variable throughout the day during weekends. The weekday diurnal was used in the model as it contains higher peaks. The overall peak hour factor is 1.4. The diurnal curves were used for extended period simulations (EPS) and in capturing hydraulic conditions at peak hour.

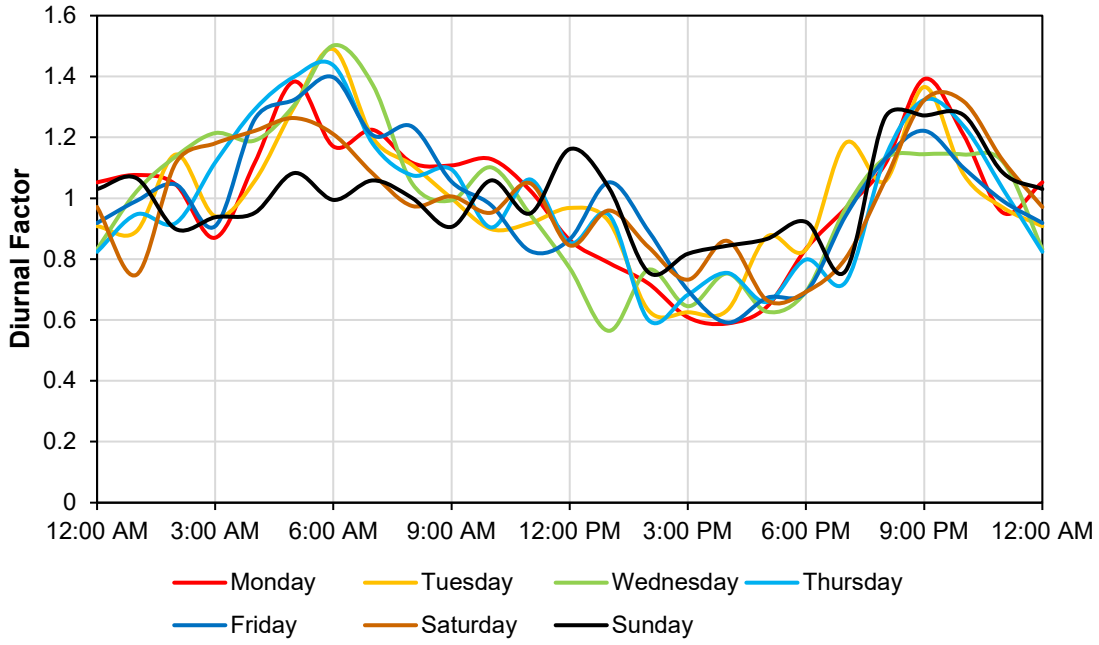


Figure 3-6: Day of Week Diurnal Curves

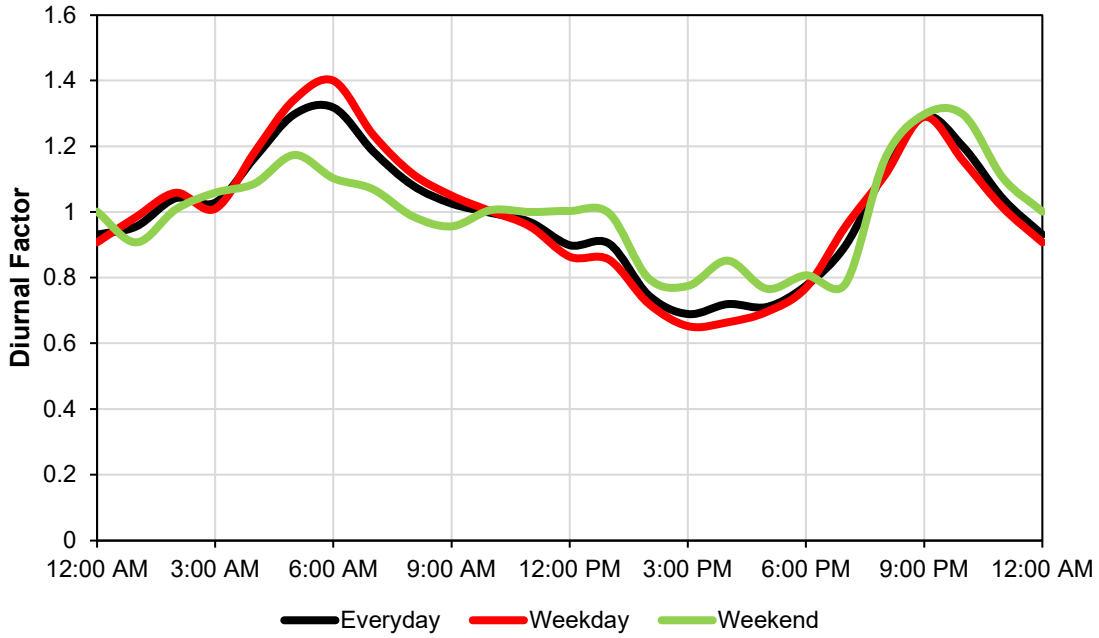


Figure 3-7: Weekday and Weekend Diurnal Curves

Flows to the Manville East and West delivery points were allocated based on average daily billed volumes during the model calibration window in early September 2024 (see Table 3-11). These demands are applied as constant values at flow control valves upstream of fixed head reservoirs.

Table 3-11: Flow to Manville East and West

Date	Manville West (gpd)	Manville East (gpd)	Manville West (gpm)	Manville East (gpm)
9/2/2024	846,010	469,440	588	326
9/3/2024	835,220	454,760	580	316
9/4/2024	920,020	592,010	639	411
Average	867,083	505,403	602	351

The Windermere delivery point is modeled with a fill valve that opens and closes to fill the GST and a FCV downstream of the GST with a set flow pattern that discharges to a fixed head reservoir (see Figure 3-8 and Figure 3-9).

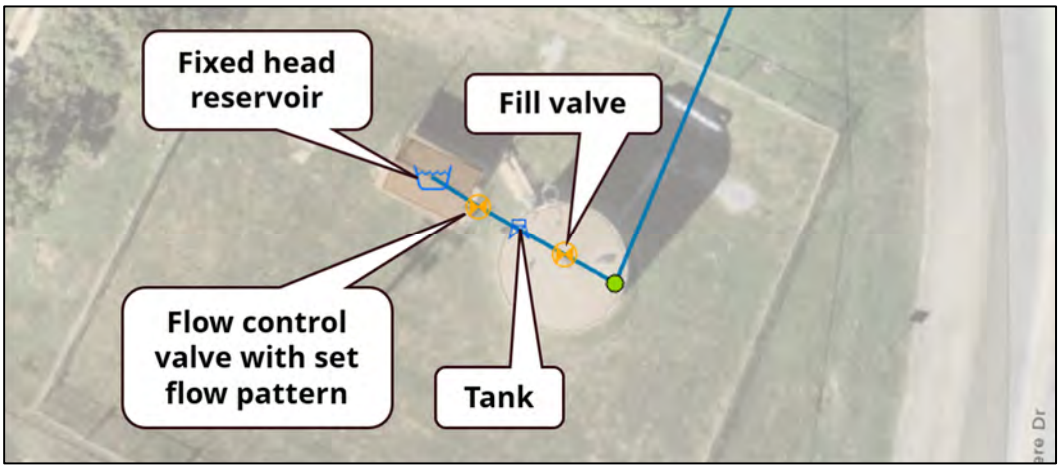


Figure 3-8: Windermere Model Setup

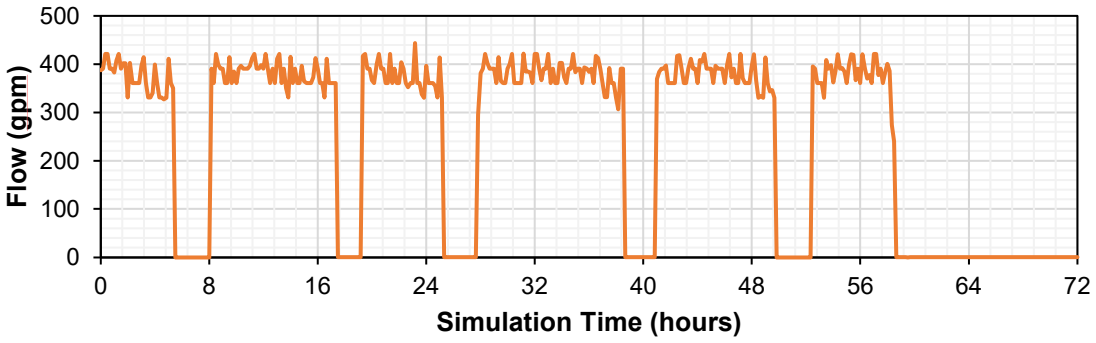


Figure 3-9: Modeled Flow to Windermere

4.0 Hydraulic Model Calibration

A 72-hour extended period simulation (EPS) was developed in the model and calibrated against data from pressure loggers and SCADA. The following subsections describe the data used for calibration and provide an overview of the calibration results.

4.1 Calibration Data

Three types of data were collected, processed, and utilized for model calibration: pressure logger data, SCADA controls, and SCADA data.

4.1.1 Pressure Logger Data

To assist in model calibration, pressure logger data at 1-minute intervals was collected over a one-week period from August 29th, 2024, through September 5th, 2024. Pressure loggers were installed on the hydrants listed in Table 4-1 and shown in Figure 4-1.

Table 4-1: Hydrant Pressure Logger Locations

No.	Location	Zone	Hydrant	Elevation (feet)	Notes
4	103420 N Railroad Ave	West 960	42094	724	Manville West take point
5	6712 Covina Lane	Central 888	110733	601	Lowest elevation in system
6	3301 Taylor Falls Dr	East PRV	23298	663	Highest elevation in East PRV Zone
7	18317 Moreto Loop	West 960	68971	840	Highest elevation in system
9	701 Point Run Cove	West 942	19267	810	Well 6

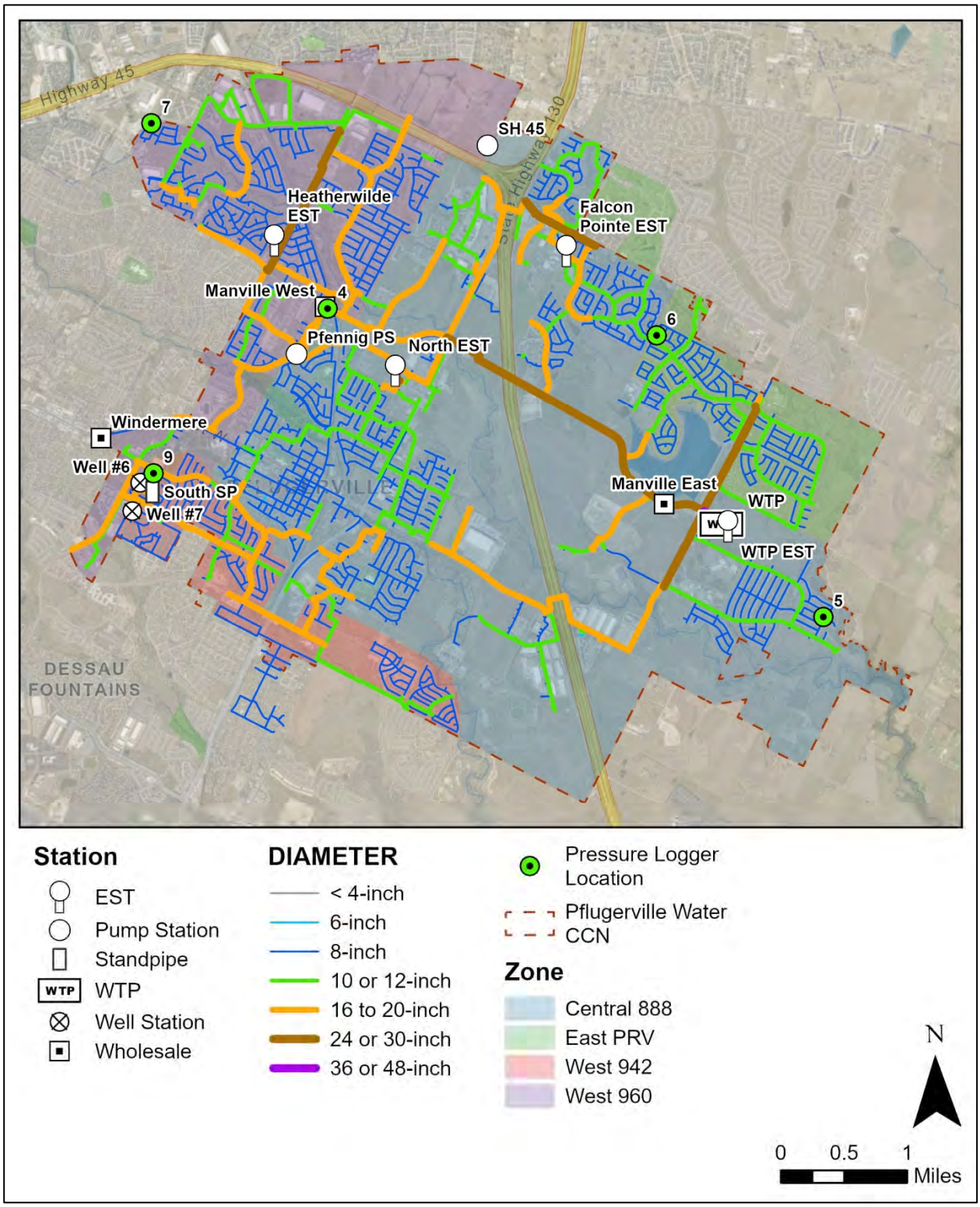


Figure 4-1: Pressure Logger Locations

Logger data is shown in Figure 4-2 in terms of HGL. HGL is highest for locations 4 and 7 which are in the West 960 Zone. HGL is slightly lower for location 9 in the West 942 Zone. HGLs are lowest for locations 5 and 6 which are in the Central 888 Zone and East PRV Zone, respectively. The data is discussed in further detail later in this section.

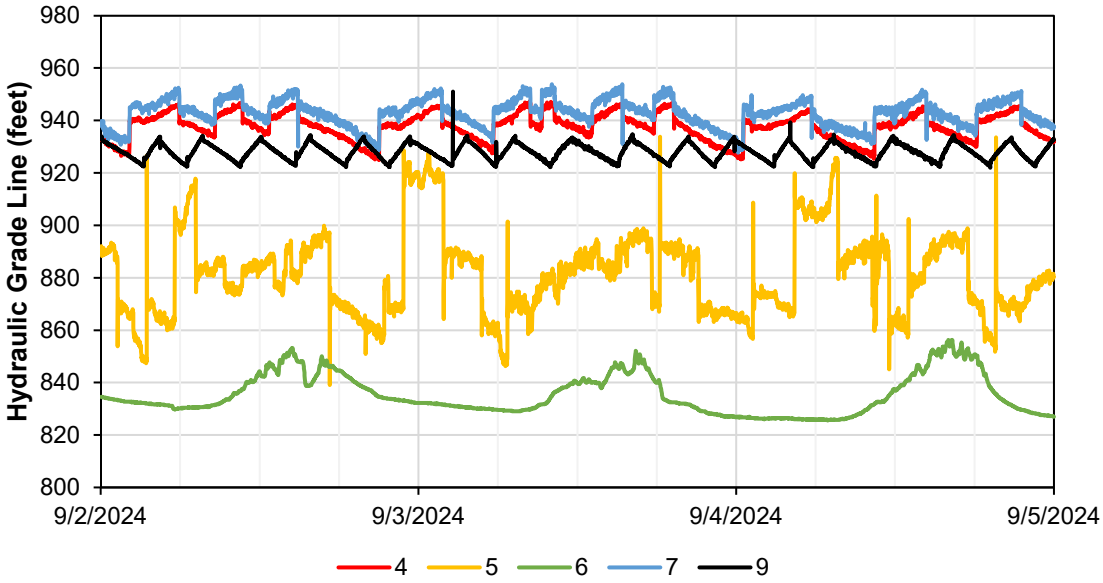


Figure 4-2: Pressure Logger Data

4.1.2 SCADA Controls

Controls were added to the model according to SCADA screens. Model controls are listed in Table 4-2. Well flow controls are applied at FCVs and are based on actual flow from SCADA. Pump controls are simple on-off controls based on tank levels. Fill valves for GSTs and ESTs are modeled to close when the tank level is above the high-level set point and reopen when the tank level is below the low-level set point. For ESTs, a bypass check valve allows water to exit the EST when the fill valve is closed. Fill valves include a head loss versus flow curve.

Table 4-2: Model Controls

Element	Controlled By	Setting	Set Points
Chisholm Pump 1	South SP	On	110 feet
		Off	115 feet
Chisholm Pump 2	South SP	On	110 feet
		Off	115 feet
Chisholm Pump 3	South SP	On	110 feet
		Off	115 feet
Falcon Pointe EST Fill Valve	Falcon Pointe EST	Open	140 feet
		Closed	150 feet

Element	Controlled By	Setting	Set Points
North EST Fill Valve	North EST	Open	None
		Closed	
Pfennig GST Fill Valve	Pfennig GST	Open	16 feet
		Closed	20 feet
Pfennig Pump 1	Heatherwilde EST	On	150 feet
		Off	165 feet
Pfennig Pump 2	Heatherwilde EST	On	150 feet
		Off	165 feet
Pfennig Pump 3	Heatherwilde EST	On	150 feet
		Off	160 feet
Pfennig Pump 4	Heatherwilde EST	On	150 feet
		Off	160 feet
Well 6	Well 6 GST	2,100 gpm	10 feet
		Off	20 feet
Well 6 Pump 1	South SP	On	110 feet
		Off	115 feet
Well 6 Pump 2	South SP	On	110 feet
		Off	115 feet
Well 6 Pump 3	South SP	On	110 feet
		Off	115 feet
Well 7	Chisolm GST	940 gpm	15 feet
		Off	20 feet
Windermere Fill Valve	Windermere GST	Open	12 feet
		Closed	17 feet
WTP Pump 1	North EST	On	115 feet
		Off	125 feet
WTP Pump 2	North EST	On	110 feet
		Off	115 feet
WTP Pump 3	North EST	On	95 feet
		Off	105 feet
WTP Pump 4	North EST	On	90 feet
		Off	95 feet

4.1.3 SCADA Data

Historical time-series data from SCADA was provided at ten-minute intervals from August 1st, 2023 through September 5th, 2024. Data included well flow rates, tank levels, pump flow rates, pump status, pump station discharge pressure, and system pressure. A summary of the type of data available for each station or location is provided in Table 4-3. System pressure data includes pressure logger data and SCADA data.

Table 4-3: Model Calibration Data

Zone	Station / Location	Well Flow	Tank Level	Pump Flow	Pump Status	Discharge Pressure	System Pressure
Central 888	WTP HSPS		✓	✓	✓	✓	
	Falcon Pointe EST		✓				
	North EST		✓				
	Lowest Elevation						✓
East PRV	Taylor Falls Dr						✓
West 942	Chisolm (Well 7)	✓	✓	✓	✓	✓	
	Well 6	✓	✓	✓	✓	✓	
	Point Run Cv						✓
	Settlers Valley Rd Control Valve						✓
West 960	Pfennig PS		✓		✓	✓	
	Heatherwilde EST		✓				
	Highest Elevation						✓
	Manville West						✓
	Settlers Valley Rd Control Valve						✓

4.2 Calibration Results

A 72-hour EPS was calibrated against pressure logger data and SCADA data from September 2nd, 2024 through September 4th, 2024. Calibration sheets for each major pressure zone are provided on the following pages. Each sheet contains an overview map of the zone with stations, control valves, pipes colored by diameter, and zone boundaries. Subplots are included that show a comparison between the model output in blue and the field data in orange. Please note that all information is relevant for the calibration window in September 2024.

4.2.1 Central 888 Zone

The Central 888 Zone is supplied by the WTP HSPS and contains two ESTs, the Falcon Pointe EST and North EST. The WTP HSPS operates to maintain the level in the North EST between 110 and 125 feet. The Falcon Pointe EST fill valve closes at 150 feet and reopens at 140 feet. During the calibration period, one or two pumps at the HSPS were on. A single pump flows at approximately 6,000 gpm and two pumps in parallel flow at approximately 12,000 gpm. HGL downstream of the WTP ranges from 850 feet when the HSPS is off to 930 feet when two pumps at the HSPS are on. There is approximately 10 feet of head loss from the WTP to the North EST when one pump is on and about 30 to 40 feet of head loss when two pumps are on. In general, the model is well calibrated to the field data for the first 24 hours of the simulation, after which a time offset occurs. This is caused by slight mass balance discrepancies between the field and model resulting in shifted operations of the pumps which operate based on EST levels.

Model pump flows and pressure ranges are within an acceptable limit of field data. See Figure 4-3 for Central 888 Zone calibration results.

4.2.2 East PRV Zone

The East PRV Zone is currently supplied from the Central 888 Zone through PRVs at Avalar Ave, Aventura Ave, Becker Farm Rd, Hidden Lake Xing, and Papaveri Way. Pressure is very stable within the zone. In the near future, the East PRV Zone will become the East 794 Zone with the addition of a HSPS and EST at the WTP. See Figure 4-4 for East PRV Zone calibration results.

4.2.3 West 942 Zone

The West 942 Zone is supplied by Well 6 and Well 7 and contains one SP, the South SP. Well 6 flows at approximately 2,100 gpm and is controlled by the level in the Well 6 GST. The Well 6 pumps operate to maintain the level in the South SP between 110 and 115 feet. The three Well 6 pumps rotate operation. Well 6 Pump 3 has the lowest flow rate of approximately 1,050 gpm and Well 6 Pumps 1 and 2 flow at approximately 1,560 gpm and 1,460 gpm, respectively. As described in *Section 3.2.2,* the design points for Well 6 Pump 1 and 2 were adjusted to match the flow rates observed from SCADA. Only one of the Well 6 pumps is modeled rather than rotating operation between all three.

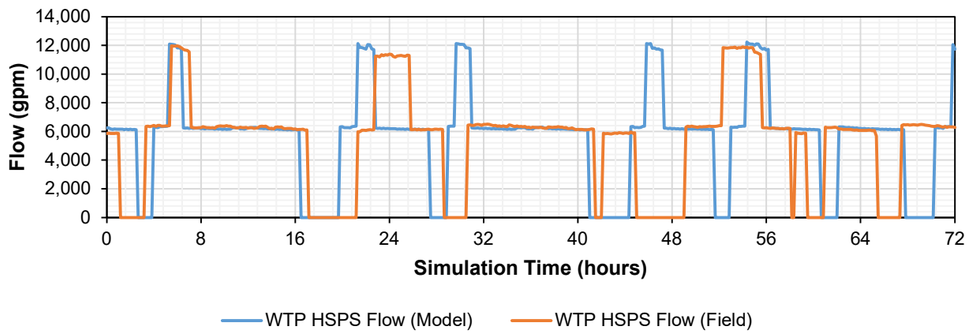
Well 7 flows at approximately 940 gpm and is controlled by the level in the Chisholm GST. The Chisholm pump controls are the same as the Well 6 pump controls. The Chisholm pumps operate to maintain the level in the South SP between 110 and 115 feet. The three Chisholm pumps also rotate operation. Chisholm Pump 3 has the highest flow rate of approximately 1,550 gpm and Chisholm Pumps 1 and 2 have lower flow rates of approximately 820 gpm and 700 gpm, respectively. The design points for Chisholm Pump 1 and 2 were adjusted to match the flow rates observed from SCADA. Only one of the Chisholm pumps is modeled rather than rotating operation between all three. HGL throughout the West 942 Zone generally ranges from 925 to 935 feet. Model pump flows and pressure ranges are within an acceptable limit of field data. See Figure 4-5 and Figure 4-6 for West 942 Zone calibration results.

4.2.4 West 960 Zone

The West 960 Zone is supplied by Pfennig PS and contains one EST, the Heatherwilde EST. The Pfennig GSTs are filled from the Central 888 Zone through a fill valve that cycles the Pfennig GSTs between 16 and 20 feet. A head loss versus flow curve from the manufacturer was applied to the fill valve. During the calibration window, Pfennig pump flow data was not available and Pfennig pump status and discharge pressure data was used instead. Two pumps at Pfennig PS operate together to maintain the level in the Heatherwilde EST between 150 and 165 feet. When two pumps are on at Pfennig PS, there is approximately 20 feet of head increase at the PS discharge. The fill and drain rates for the Heatherwilde EST are similar between the model and field data, however a time offset occurs eight hours into the simulation. HGL throughout the West 960 Zone generally ranges between 920 and 960 feet. Small variations in pressure are due to the opening and closing of the fill valve for the Windermere GST. Up to a 5-psi or 10-foot pressure drop occurs when the Windermere GST Fill Valve opens. As described in *Section 3.3,* the Windermere delivery point is modeled with a fill valve that opens and closes to fill the GST, and a FCV downstream of the GST with a set flow pattern that discharges to a fixed head reservoir. See Figure 4-7 and Figure 4-8 for West 960 Zone calibration results.

Figure 4-3. Central 888 Zone (HGL) Calibration Plots and Map

1



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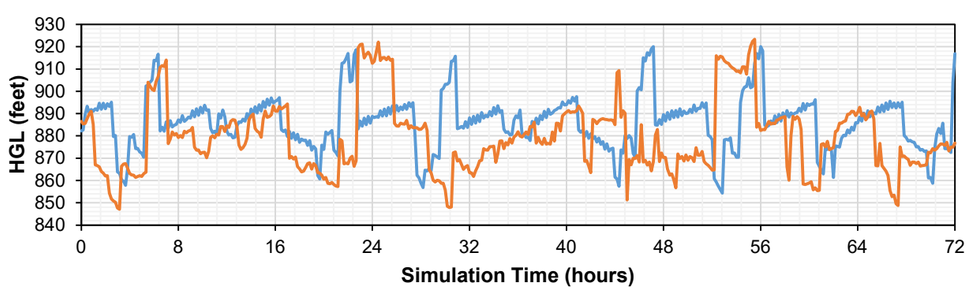

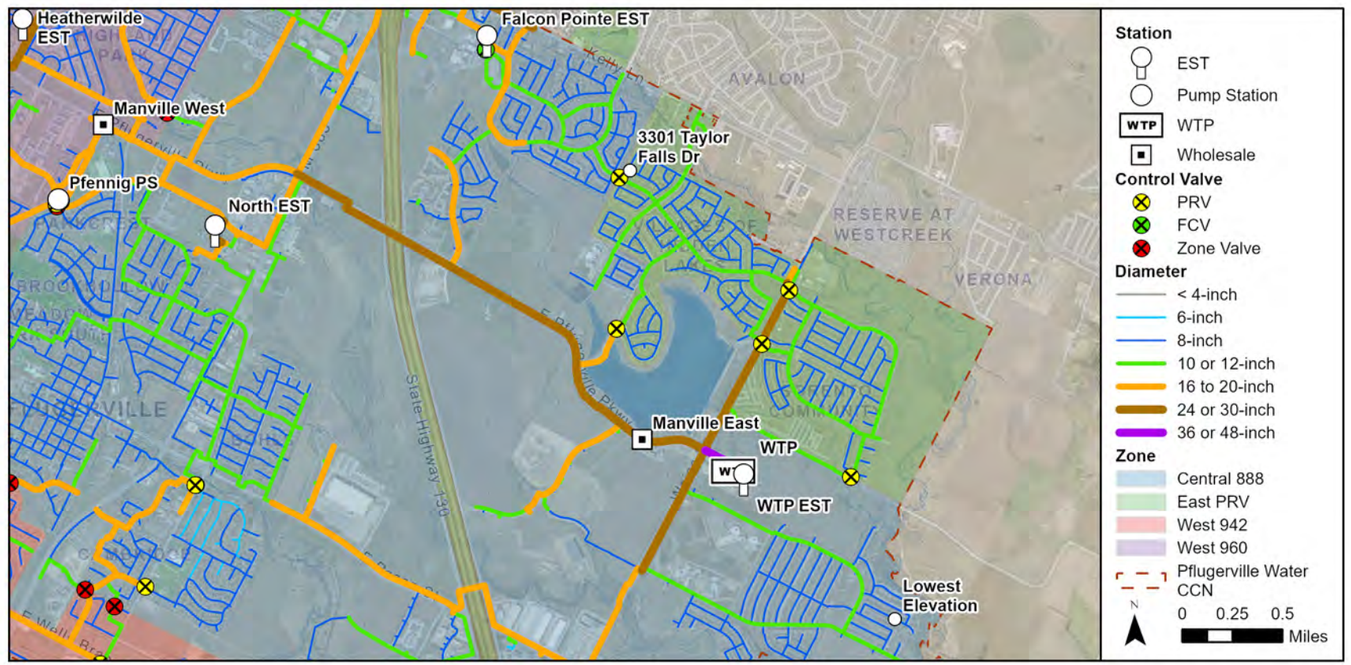

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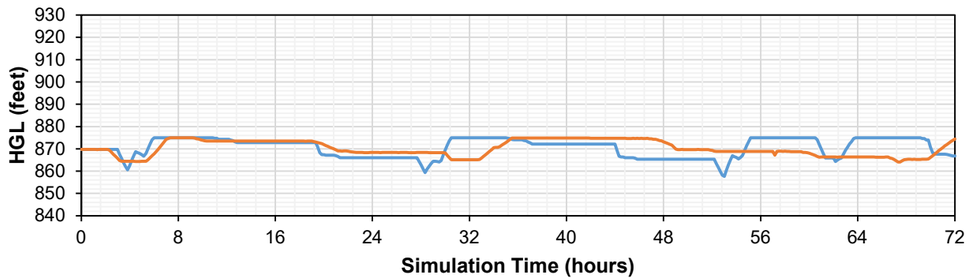

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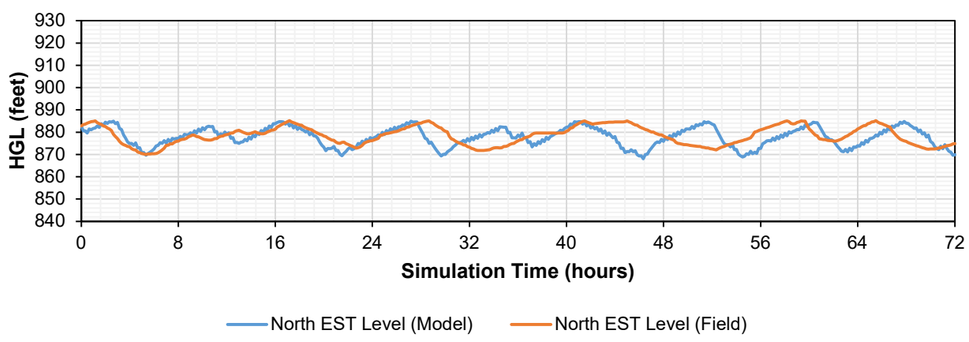

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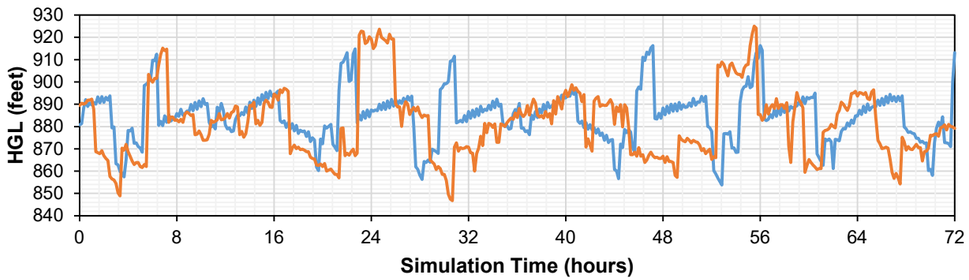
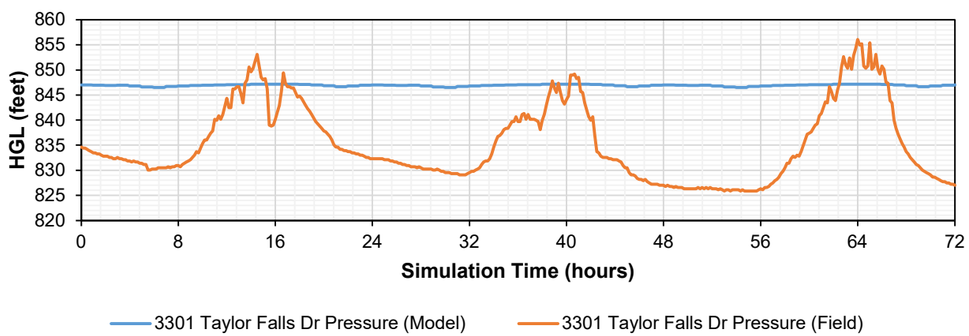


Figure 4-4. East 794 Zone (HGL) Calibration Plots and Map

1



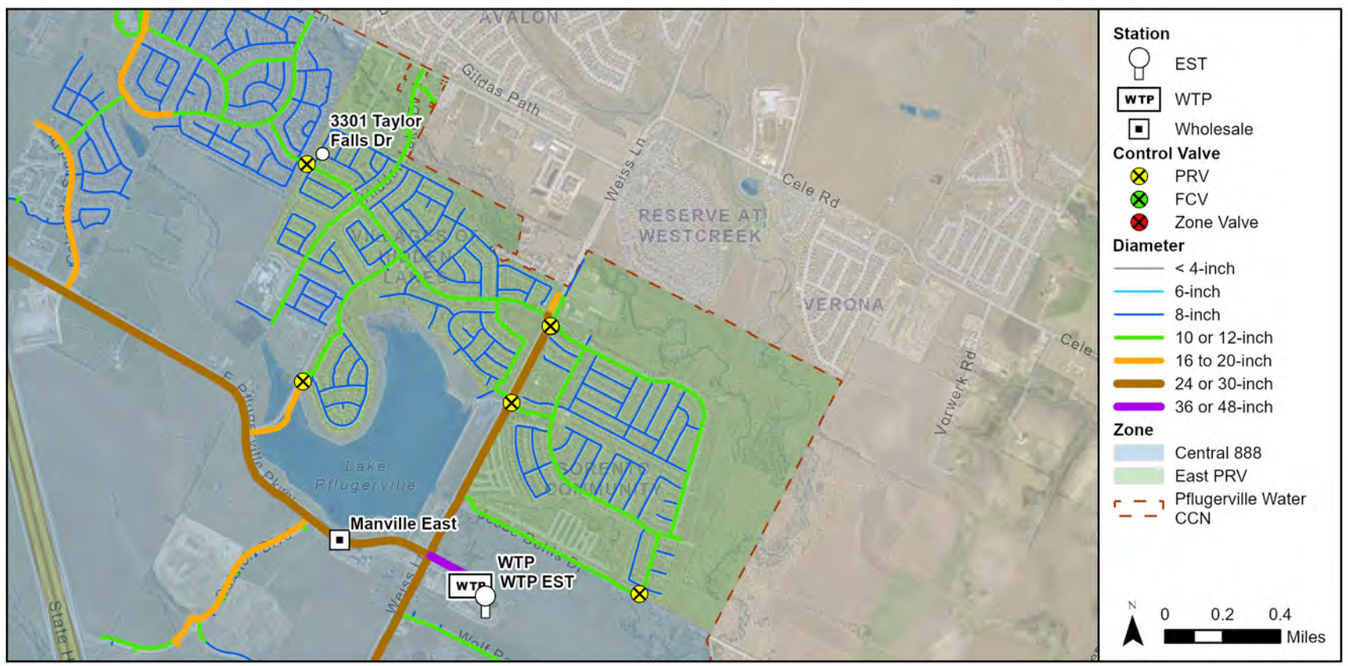
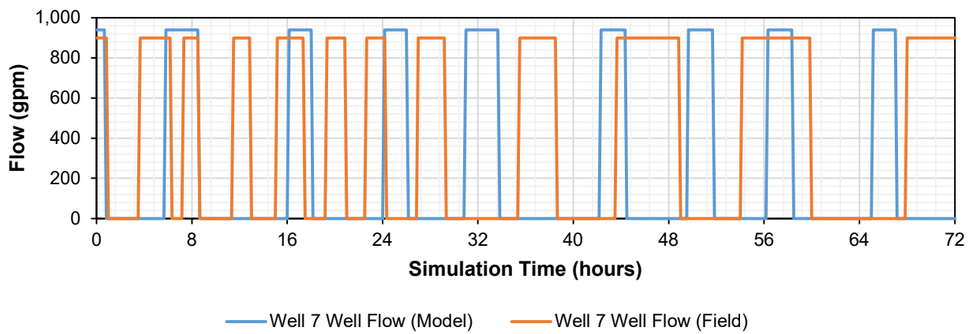


Figure 4-5. West 942 Zone (1)(HGL) Calibration Plots and Map

1



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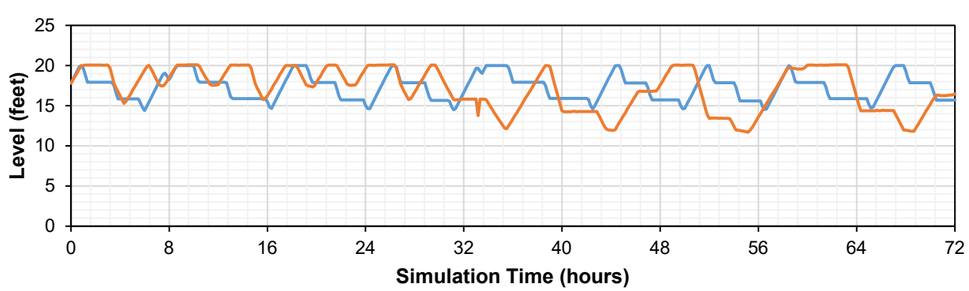

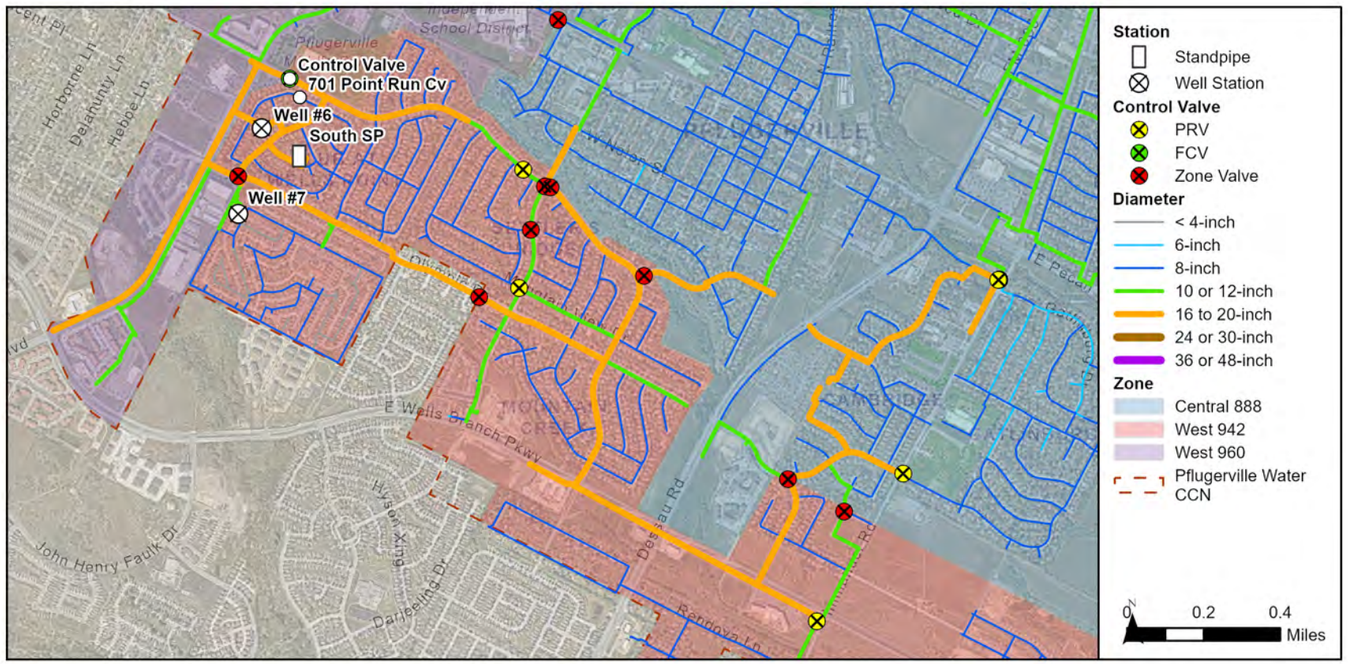

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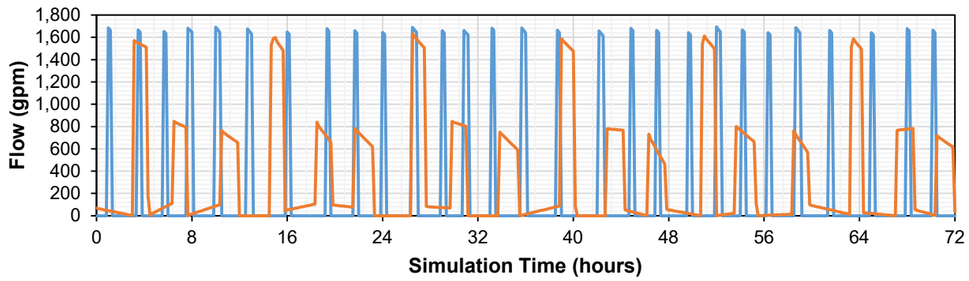

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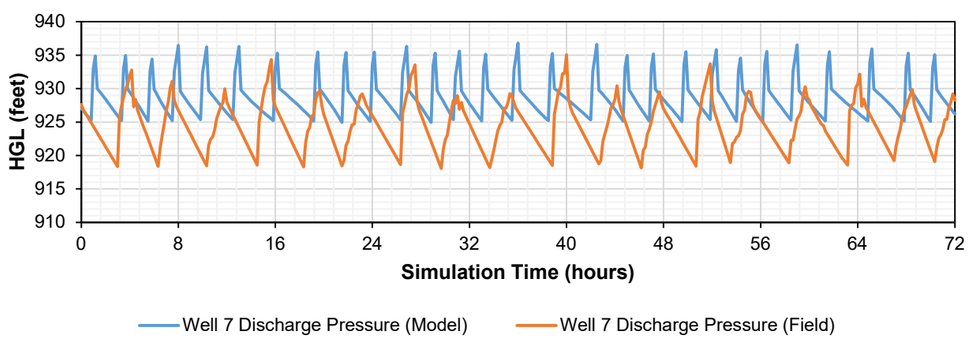

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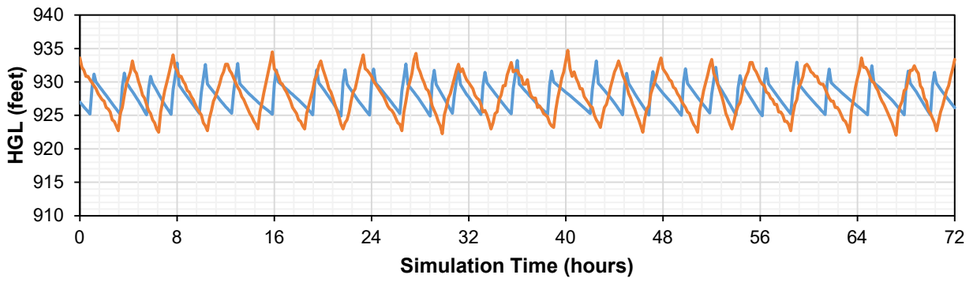

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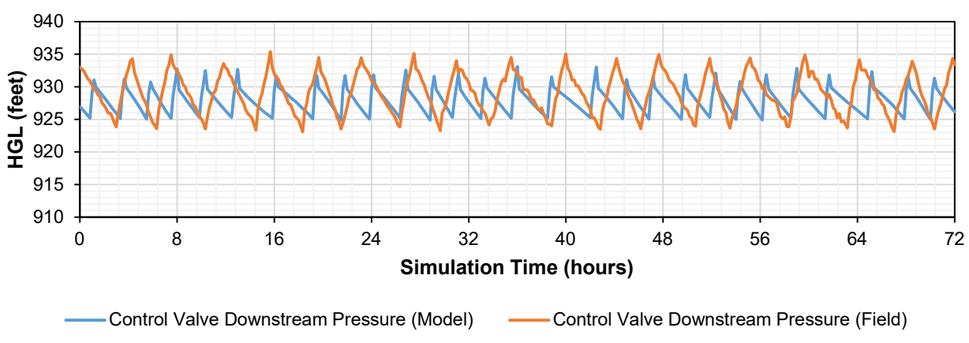
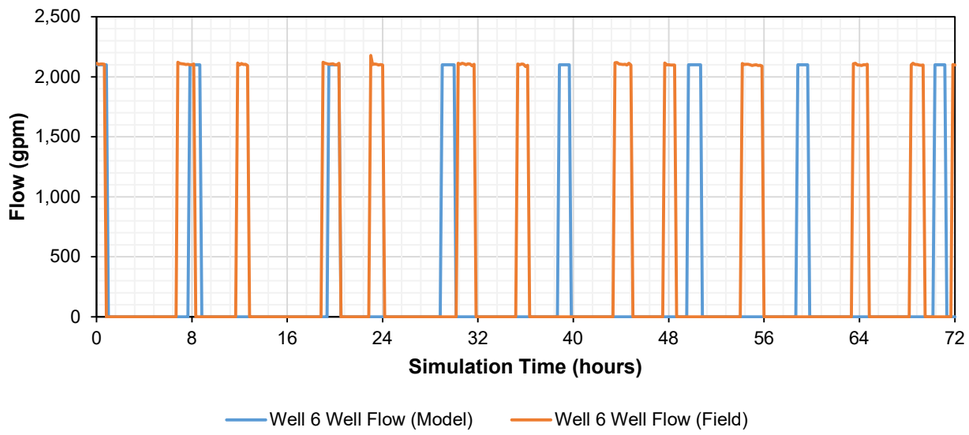


Figure 4-6. West 942 Zone (2)(HGL) Calibration Plots and Map

7



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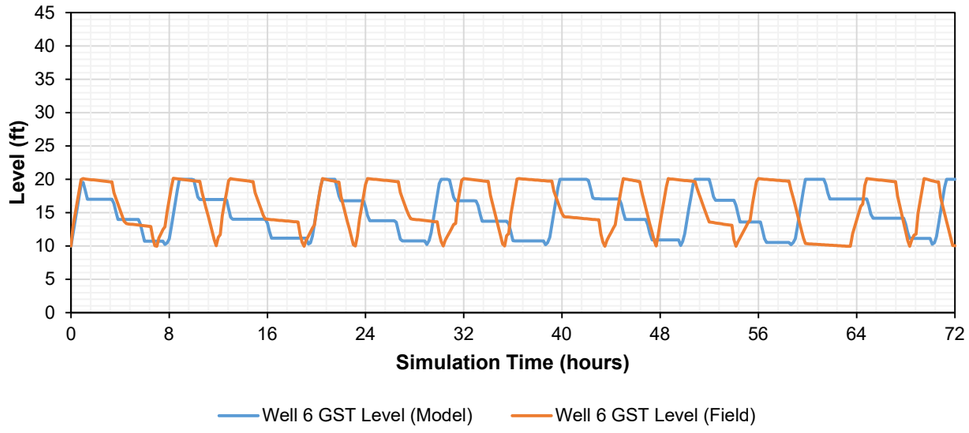

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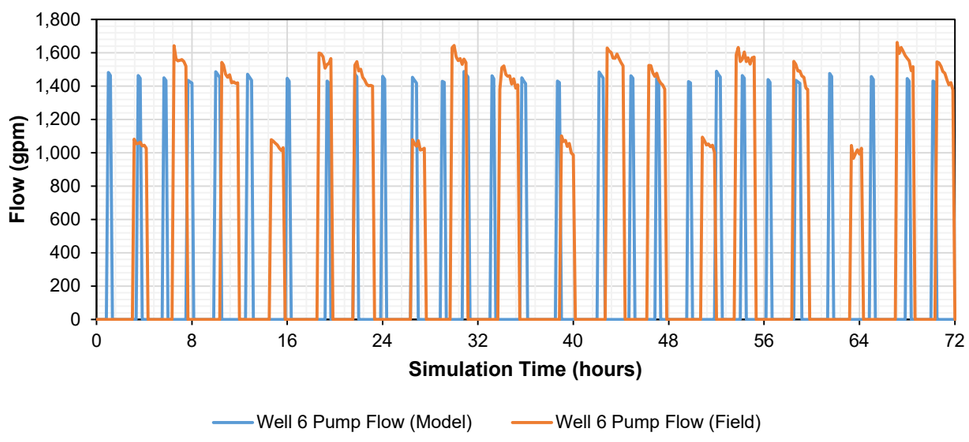

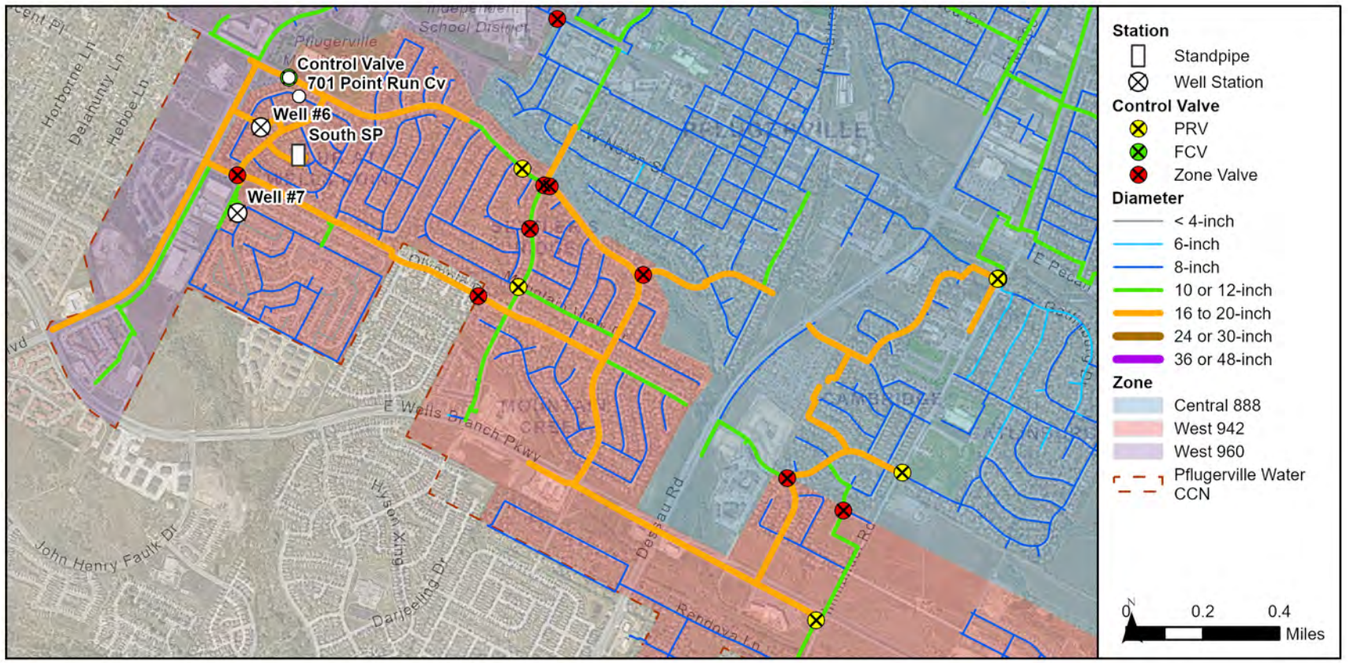

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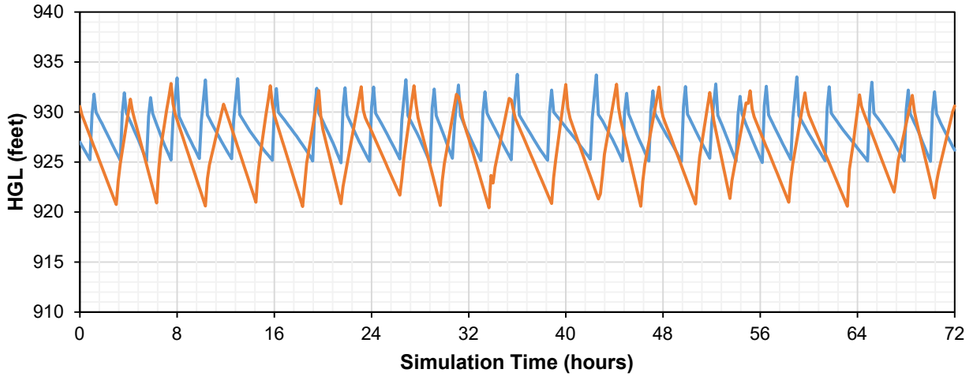
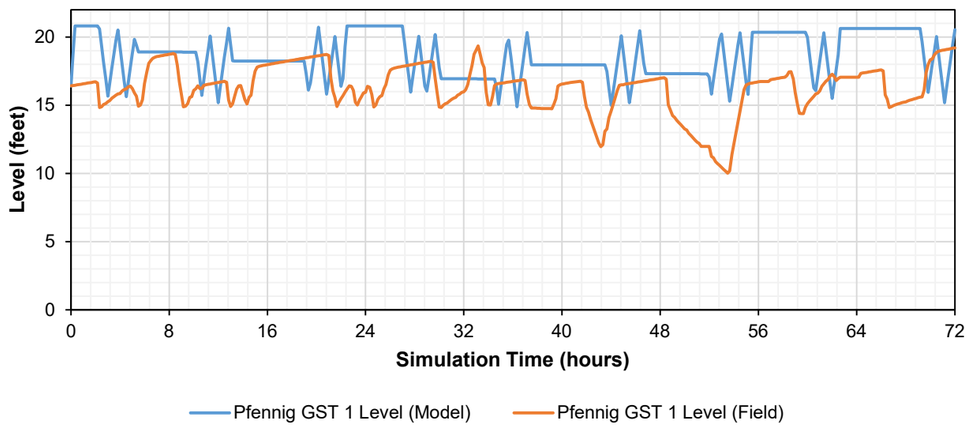


Figure 4-7. West 960 Zone (1)(HGL) Calibration Plots and Map

1



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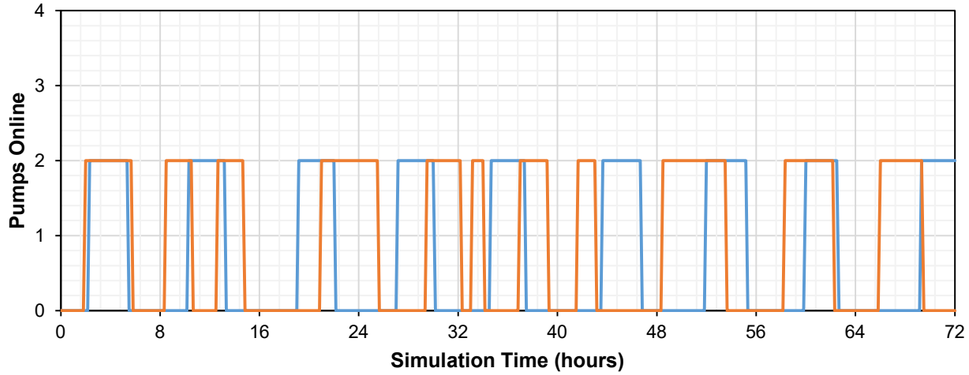

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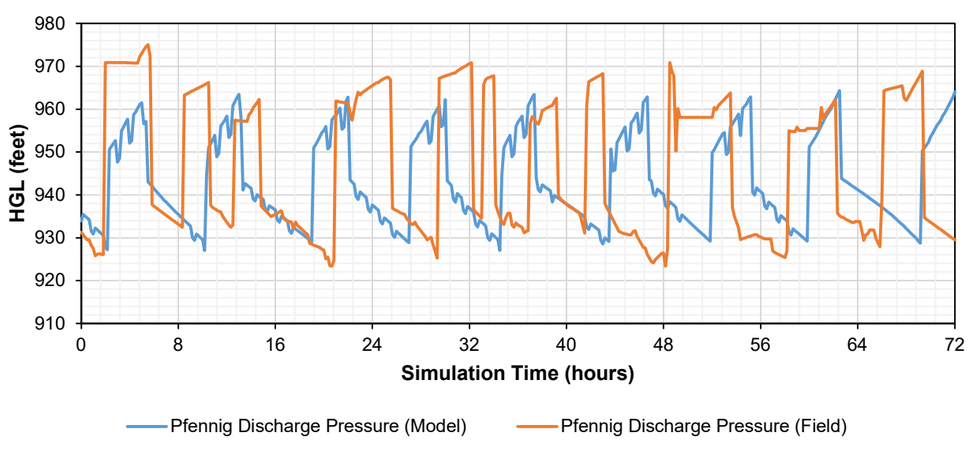

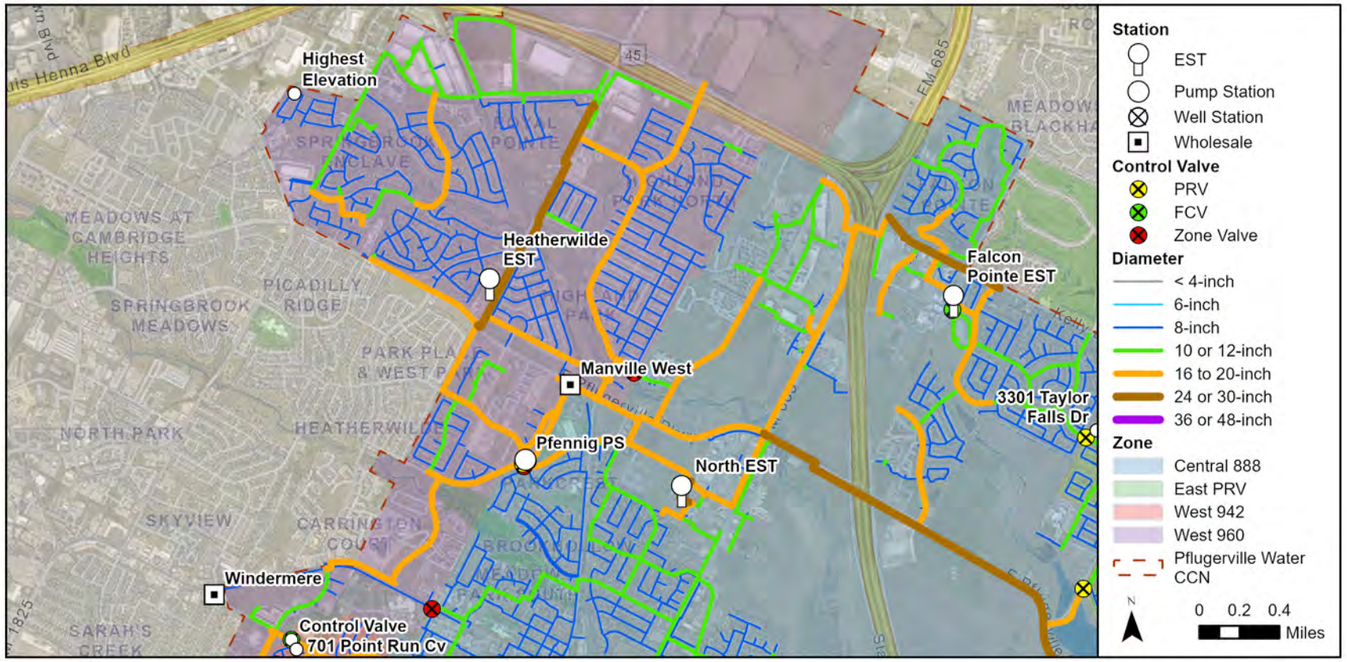

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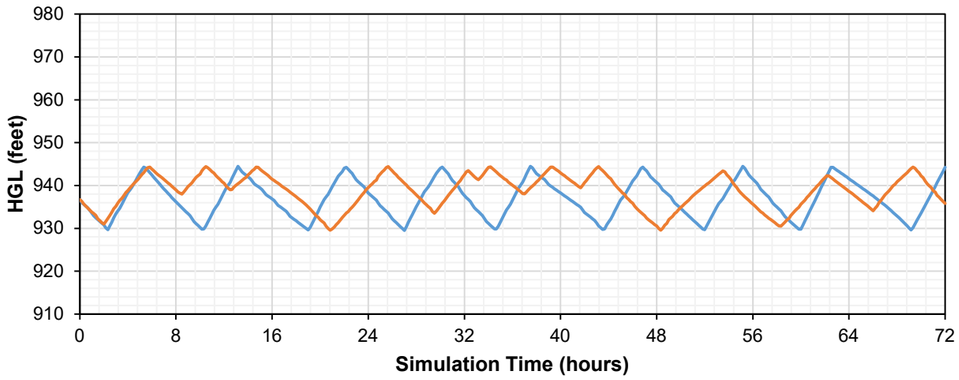

Figure 4-8. West 960 Zone (2)(HGL) Calibration Plots and Map

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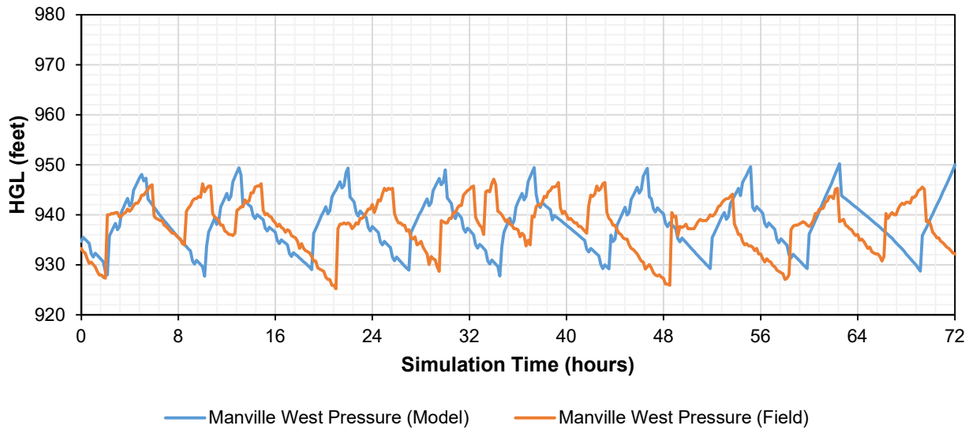

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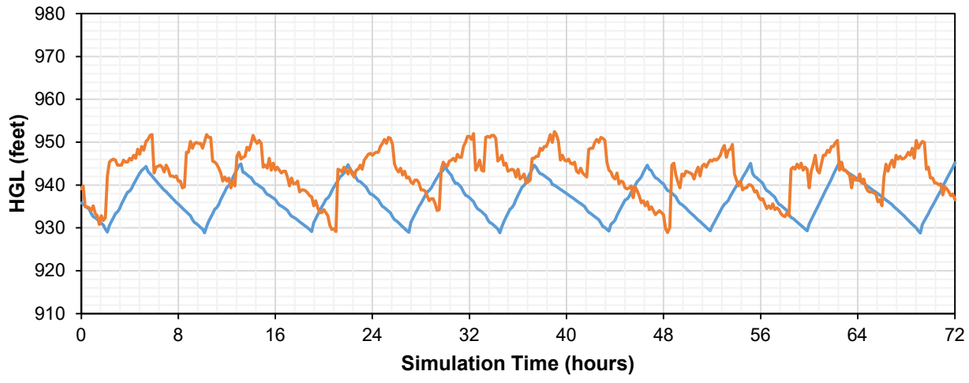

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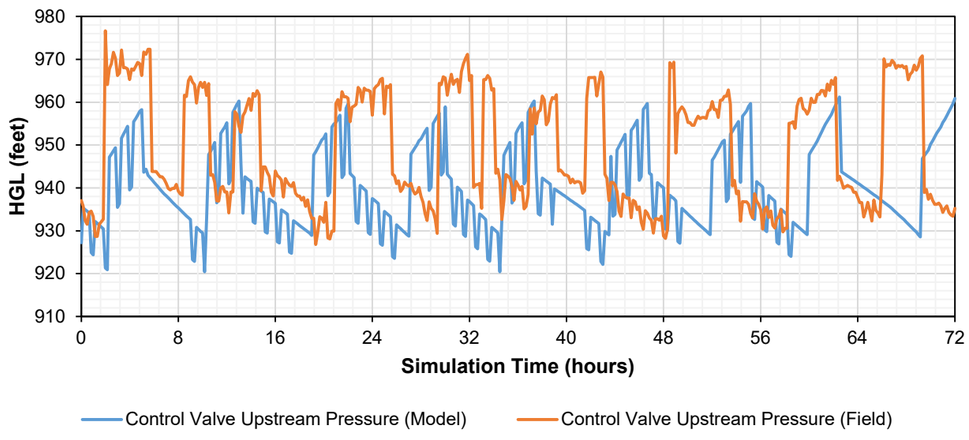

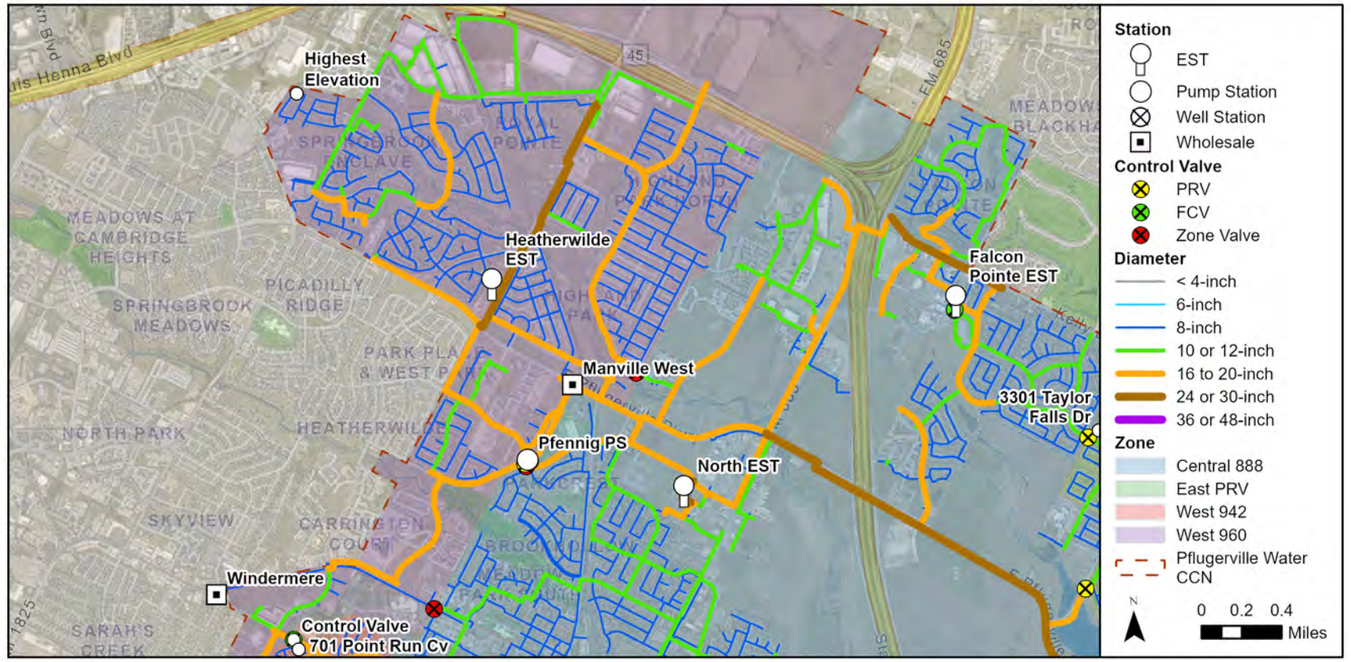

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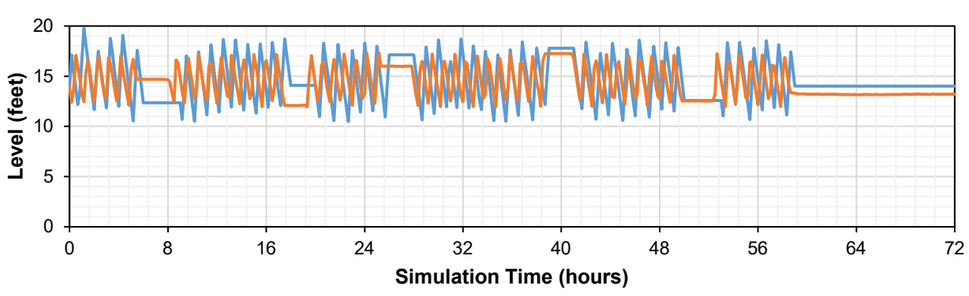

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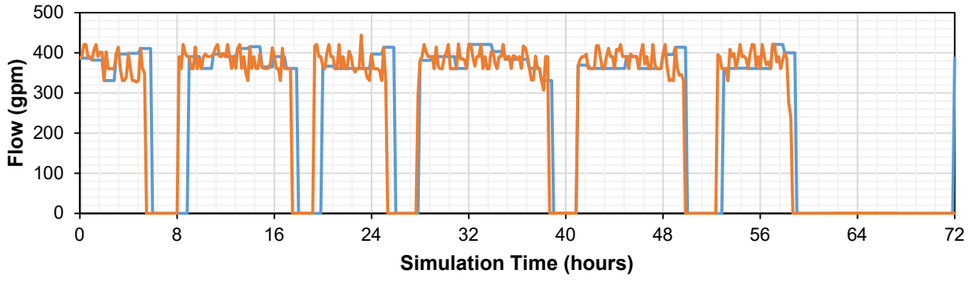

5.0 Water System Assessment

Assessments of the water system against TCEQ rules and regulations were made. Based on the results of the assessments, the calibrated hydraulic model was used to identify the capital improvements needed at buildout.

5.1 Capacity Assessment

A capacity assessment was performed for each major pressure zone relative to TCEQ requirements for elevated storage capacity, total storage capacity, pumping capacity, and supply. Evaluations were completed for existing connections and for projected living unit equivalents (LUEs) at 2030, 2035, and buildout horizons.

5.1.1 Living Unit Equivalent Assumptions

LUE conversion factors were derived based on the City's Engineering Design Standard (EDS) and Unified Development Code (UDC) (see Table 5-1). The EDS explicitly states the LUEs for apartments, single-family homes, and townhomes. However, based on direction from the City, townhomes were assumed to be one LUE each rather than a half an LUE as stated in the EDS. The basis for commercial LUEs/acre is discussed later in this subsection.

Future development LUE conversion factors are listed in terms of LUEs/acre as the specific number of future apartments, single-family homes, or townhomes is not currently known. Future development LUE conversion factors for low to medium density residential and medium to high density residential were provided by the City as three LUEs/acre and five LUEs/acre, respectively. Future development LUE conversion factors for mixed use areas are based on maximum densities as listed in Table 4.4.4 of the UDC of 20 units/acre, 75 units/acre, and 90 units/acre for zoning types of CL-3, CL-4, and CL-5, respectively. These values were divided in half since one apartment unit is considered to be half an LUE. Future employment areas utilize the commercial LUE conversion factor of 3.5 LUEs/acre.

Table 5-1: Living Unit Equivalent Conversion Factors

Timeline	Type	LUE Conversion Factor	Units
Planned	Apartment	0.5	LUEs/unit
	Commercial	3.5	LUEs/acre
	Single-Family	1	LUE/home
	Townhome	1	LUE/unit
Future	Low to Med Density Res	3	LUEs/acre
	Med to High Density Res	5	LUEs/acre
	Mixed Use (CL-3)	10	LUEs/acre
	Mixed Use (CL-4)	37.5	LUEs/acre
	Mixed Use (CL-5)	45	LUEs/acre
	Employment (CL-4)	3.5	LUEs/acre
	Employment (CL-5)	3.5	LUEs/acre

The commercial LUE/acre conversion factor was determined based on the floor area ratios of planned commercial developments. Floor area ratios were calculated for the planned commercial developments listed in Table 5-2 by taking the building area from the site plan and dividing by the total lot area. The floor area ratios were then visualized in terms of cumulative probability (see Figure 5-1) and the median, average, and 75th percentile values were determined (see Table 5-3).

Table 5-2: Planned Commercial Development Floor Area Ratios

ID	Name	Lot Area (acres)	Building Area (sf)	Floor Area Ratio
1	Springbrook South Commerce Center	25.6	301,510	27%
2	Skybox Data Centers, Pflugerville Business Park, and Kenney Fort Extension	20.4	565,920	64%
3	Skybox	10.1	130,075	30%
9	Crux Climbing Center	3.0	30,595	24%
14	Retail Strip Center	1.4	10,097	17%
18	Shops at Kelly Lane & Villages of Hidden Lake Commercial	67.7	25,844	1%
21	Austin Achieve High School	18.2	57,675	7%
22	Baylor Scott and White Medical Center	26.4	146,414	13%
23	Quik Trip 4180	1.7	5,312	7%
24	HEB	22.1	151,075	16%
30	Wash N' Roll	4.8	12,722	6%
36	Lakeside Meadows Corporate Campus	96.2	867,506	21%
39	BASIS Charter School	11.3	66,026	13%
40	Wells Branch Retail	12.9	11,188	2%
43	SH130 Commerce Center	24.4	162,284	15%
45	Pecan Crossing Industrial	104.8	1,672,294	37%
50	Cameron Rd Industrial	148.7	1,027,500	16%

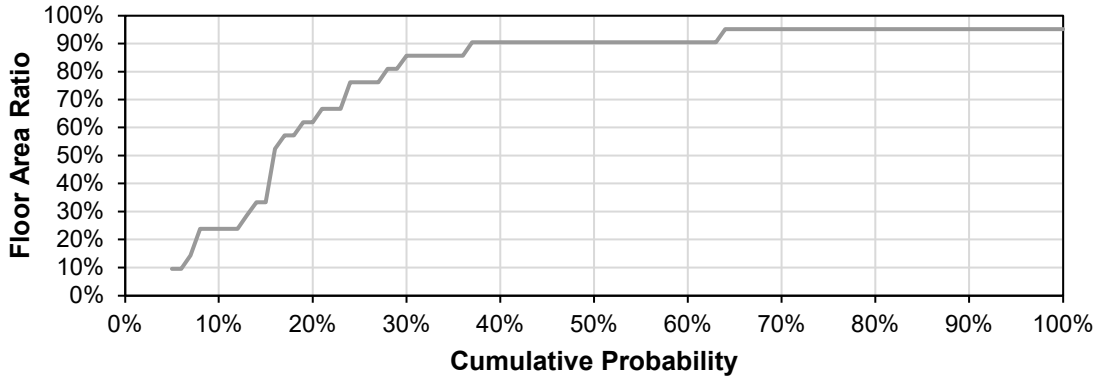

Figure 5-1: Cumulative Probability of Planned Commercial Development Floor Area Ratio

Table 5-3: Planned Commercial Development Floor Area Ratio

Percentile	Floor Area Ratio
Median	16%
Average	19%
75%	24%

The 75th percentile floor area ratio value of 24% was selected and used to derive a commercial LUE density of 3.5 LUEs/acre assuming that 3,000 sf of office space equates to one LUE per the City's EDS (see Equation 1).

Equation 1: Commercial Living Unit Equivalent Density Derivation

$$\frac{43{,}560\ sf}{acre} \times \frac{1\ LUE}{3{,}000\ sf} \times 24\% = 3.5\ LUEs/acre$$

5.1.2 Capacity Requirements

TCEQ requirements depend on the number of connections served or, in the case of pumping, the peak hour demand (PHD). TCEQ capacity requirements are summarized in Table 5-4.

Table 5-4: TCEQ Capacity Requirements

Parameter	Requirement	Regulation
Elevated Storage Capacity	100 gal/conn	290.45(b)(1)(D)(iv)
Total Storage Capacity	200 gal/conn	290.45(b)(1)(D)(ii)
Supply	0.6 gpm/conn	290.45(b)(1)(D)(i)
Firm Pumping Capacity	0.6 gpm/conn [(1)] or peak hour demand [(2)]	290.45(b)(1)(D)(iii)
Total Pumping Capacity	2 gpm/conn [(3)]	290.45(b)(1)(D)(iii)
[(1)] If elevated storage capacity is greater than 200 gal/conn. [(2)] If total pumping capacity is greater than 1,000 gpm. [(3)] If elevated storage capacity is less than 200 gal/conn and total pumping capacity is less than 1,000 gpm.		

5.1.3 Elevated Storage Capacity Assessment

Elevated storage capacity was evaluated for each pressure zone. Elevated storage includes SPs and ESTs that provide a minimum of 35 psi to the highest served elevation within the pressure zone under normal operating conditions. Elevated storage capacity must cover connections in the primary zone and in dependent reduced pressure zones served by PRVs:

- Storage within the Central 888 Zone must cover connections for the Central 888 Zone and downstream PRV zones.
- Storage within the East 794 Zone must cover connections for the East 794 Zone.

- Storage within the West 942 Zone must cover connections for the West 942 Zone and downstream PRV zones.
- Storage within the West 960 Zone must cover connections for the West 960 Zone.

Tank capacities are listed in Table 5-5. The Falcon Pointe EST, North EST, WTP EST, South SP, and Heatherwilde EST contribute to both elevated storage and total storage. GSTs and clearwells only contribute to total storage. The planned WTP EST for the East 794 Zone and SH 45 GST for the West 960 Zone were included in this evaluation.

Table 5-5: Existing and Previously Planned Storage Capacities

Tank	Elevated Storage	Zone	Capacity (gal)	Horizon
Falcon Pointe EST	Yes	Central 888	500,000	Existing
North EST	Yes		2,500,000	Existing
WTP Clearwell 1	No		1,000,000	Existing
WTP Clearwell 2	No		3,000,000	Existing
WTP EST	Yes	East 794	2,000,000	2025
Chisolm GST 1	No	West 942	250,000	Existing
Chisolm GST 2	No		250,000	Existing
South SP	Yes		1,600,000 (1)	Existing
Well 6 GST	No		500,000	Existing
Heatherwilde EST	Yes	West 960	1,500,000	Existing
Pfennig GST 1	No		500,000	Existing
Pfennig GST 2	No		500,000	Existing
SH 45 GST	No		1,250,000	2030
(1) Has an effective elevated storage capacity of 428,667 gal to maintain at least 35 psi for the highest served elevation in the zone.				

At buildout, existing elevated storage capacity is above the TCEQ requirement of 100 gal/conn but below the 200 gal/conn threshold for reduced pumping for the Central 888 Zone, West 942 Zone, and West 960 Zone (see Table 5-6). New 2.5-MG and 1.5-MG ESTs are recommended for the Central 888 Zone and West 960 Zone, respectively, by 2035. Replacement of the existing 0.5-MG Falcon Pointe EST with a new 2.5-MG EST is recommended for the Central 888 Zone. Installation of a 1.5-MG EST at the SH 45 PS is recommended for the West 960 Zone. A portion (0.5 MG) of the new elevated storage for the West 960 Zone is applied to the Central 888 Zone as water stored in the West 960 Zone can flow down gradient to the Central 888 Zone. Overall, this results in a future elevated storage capacity for the Central 888 Zone of 5.5 MG and 205 gal/conn, and for the West 960 Zone of 2.5 MG and 227 gal/conn. No elevated storage improvements are recommended for the East 794 Zone or West 942 Zone.

Table 5-6: Buildout Elevated Storage Capacity Assessment

Zone	Buildout Connections	Existing Elevated Storage Capacity		Future Elevated Storage Capacity	
		gal	gal/conn	gal	gal/conn
Central 888	26,837	3,000,000	112	5,500,000 (1)	205
East 794	6,401	2,000,000	312	2,000,000	312
West 942	3,332	428,667	129	428,667	129
West 960	11,029	1,500,000	136	2,500,000 (1)	227
(1) 0.5 MG from the new elevated storage in the West 960 Zone is applied to the Central 888 Zone and not included for the West 960 Zone.					

5.1.4 Total Storage Capacity Assessment

Total storage capacity was evaluated for each pressure zone. Total storage includes all clearwells, GSTs, ESTs, and SPs. Total storage must cover connections in the primary zone and dependent reduced pressure zones served by PRVs. All tanks listed in Table 5-5 contribute to total storage. At buildout, existing total storage capacity is above the TCEQ requirement of 200 gal/conn for all zones (see Table 5-7). The future total storage capacities listed in Table 5-7 include the proposed 2.5-MG Falcon Pointe EST and 1.5-MG SH 45 EST.

Table 5-7: Buildout Total Storage Capacity Assessment

Zone	Buildout Connections	Existing Total Storage Capacity		Future Total Storage Capacity	
		gal	gal/conn	gal	gal/conn
Central 888	26,837	7,000,000	261	9,500,000 (1)	354
East 794	6,401	2,000,000	312	2,000,000	312
West 942	3,332	2,600,000	780	2,600,000	780
West 960	11,029	3,750,000	340	4,750,000 (1)	431
(1) 0.5 MG from the new elevated storage in the West 960 Zone is applied to the Central 888 Zone and not included for the West 960 Zone.					

5.1.5 Pumping Capacity Assessment

Pumping capacity requirements differ from storage capacity requirements. Pumping capacity must also cover connections for downstream zones:

- Pumping for the Central 888 Zone must cover connections for the Central 888 Zone, West 942 Zone, West 960 Zone, and downstream PRV zones.
    - In the event that groundwater is not available, supply to the West 942 Zone will come from the WTP via the HSPS, Pfennig PS, and the FCV along Settlers Valley Rd.
- Pumping for the East 794 Zone only has to cover connections for the East 794 Zone.
- Pumping for the West 942 Zone must cover connections for the West 942 Zone and downstream PRV zones.

- Pumping for the West 960 Zone must cover connections for the West 960 Zone, West 942 Zone, and downstream PRV zones.
    - In the event that groundwater is not available, supply to the West 942 Zone will come from the WTP via the HSPS, Pfennig PS, and the FCV along Settlers Valley Rd.

Pumping capacity is evaluated in terms of total capacity into the zone or excluding the largest pump into the zone (known as firm capacity). TCEQ pumping capacity requirements depend on elevated storage capacity, total pumping capacity, and PHD. Each zone must have a minimum of two pumps. If the elevated storage capacity is greater than 200 gal/conn, 0.6 gpm/conn of firm pumping capacity is required. If the elevated storage capacity is less than 200 gal/conn and the total pumping capacity is greater than 1,000 gpm, firm pumping capacity to meet PHD is required. If the elevated storage capacity is less than 200 gal/conn and the total pumping capacity is less than 1,000 gpm, 2 gpm/conn total pumping capacity is required. If conditions are met, the least stringent of these three requirements can be applied.

Pump station total and firm capacities are listed in Table 5-8. The planned WTP HSPS to the East 794 Zone and SH 45 PS to the West 960 Zone were included in this evaluation.

Table 5-8: Existing and Previously Planned Pumping Capacities

Pump Station	Zone	Total Capacity (gpm)	Firm Capacity (gpm)
WTP HSPS (Central)	Central 888	20,832	15,624
WTP HSPS (East)	East 794	8,333	4,167
Chisholm	West 942	2,942	1,442
Well 6		4,305	2,733
Pfennig	West 960	7,600	5,400
SH 45		6,944	3,472

At buildout, existing firm pumping capacity is below the TCEQ requirement of 0.6 gpm/conn for the Central 888 Zone and is borderline for the East 794 Zone. By 2035, at least two additional high-service pumps are recommended for the Central 888 Zone, and one additional high-service pump is recommended for the East 794 Zone. The new WTP HSPS that pumps to the East 794 Zone can be expanded to include these proposed pumps. Addition of these new pumps results in a future firm pumping capacity for the Central 888 Zone of 26,040 gpm (0.63 gpm/conn) and for the East 794 Zone of 8,333 gpm (1.30 gpm/conn). No pumping improvements are recommended for the West 942 Zone or West 960 Zone.

Table 5-9: Buildout Pumping Capacity Assessment

Zone	Buildout Connections	Existing Firm Pumping Capacity		Future Firm Pumping Capacity	
		gpm	gpm/conn	gpm	gpm/conn
Central 888	41,198	15,624	0.38	26,040	0.63
East 794	6,401	4,167	0.65	8,333	1.30

Zone	Buildout Connections	Existing Firm Pumping Capacity		Future Firm Pumping Capacity	
		gpm	gpm/conn	gpm	gpm/conn
West 942	3,332	5,675	1.70	5,675	1.70
West 960	14,361	11,072	0.77	11,072	0.77

5.2 Transmission Assessment

Hydraulic evaluations were completed for buildout maximum day demand of 27.1 MGD to assess transmission capacity in terms of system pressures and pipe velocities. Existing transmission mains are insufficient; three major areas within the water system have maximum velocities above 5 ft/s, with maximum velocities in two of the areas approaching 10 ft/s (see Figure 5-2).

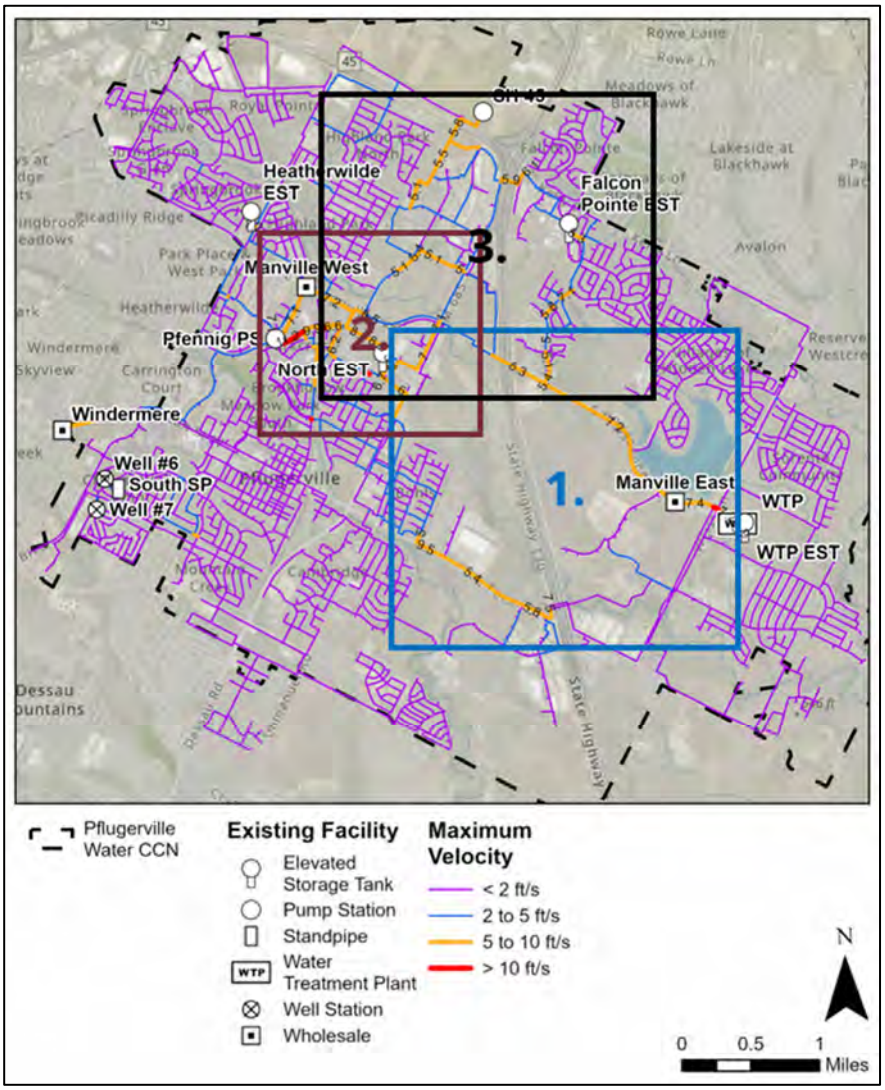

Figure 5-2: Maximum Velocities at Buildout without Transmission Improvements

High velocities result in minimum pressures below 35 psi near SH 45, Pfennig PS, and the westernmost portion of the Central 888 Zone (see Figure 5-3). The low minimum pressures in the westernmost portion of the Central 888 Zone are caused by the high velocities in the two transmission mains from the WTP in Area 1.

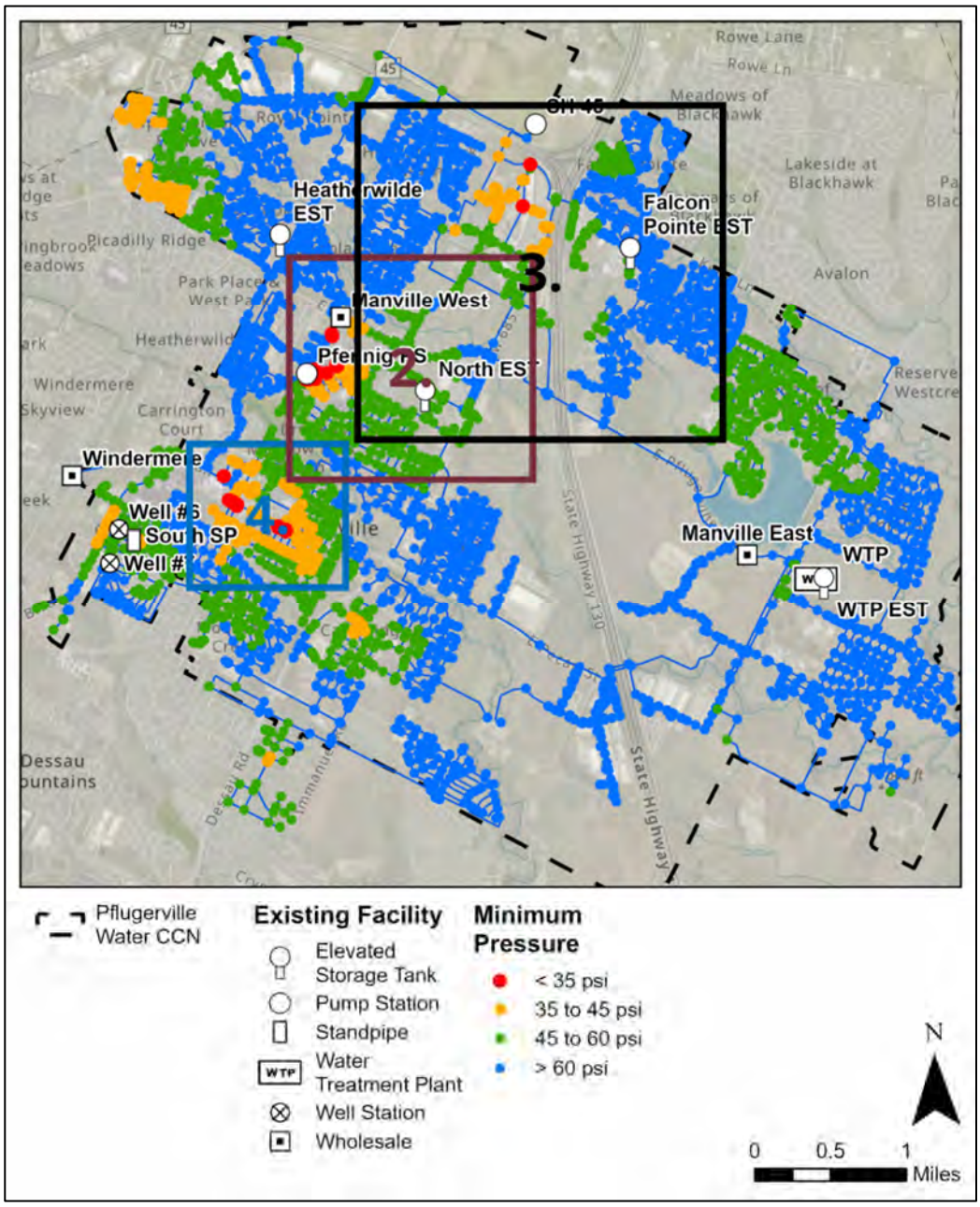

Figure 5-3: Minimum Pressures at Buildout without Transmission Improvements

Velocity through the existing 30-inch water line along Pflugerville Pkwy is above 7 ft/s and velocity through the existing 16-inch water line along E Pecan St is above 5 ft/s. To reduce pipe velocities to below 5 ft/s, the following water lines are proposed: a new 12-inch water line through future developments on the east side of SH 130, a new 16-inch water line along the future Pfennig Ln, a new 30-inch water line along the future Old Austin-Hutto Rd, and a new 42-inch water line along the west side of SH 130 (see Figure 5-4).

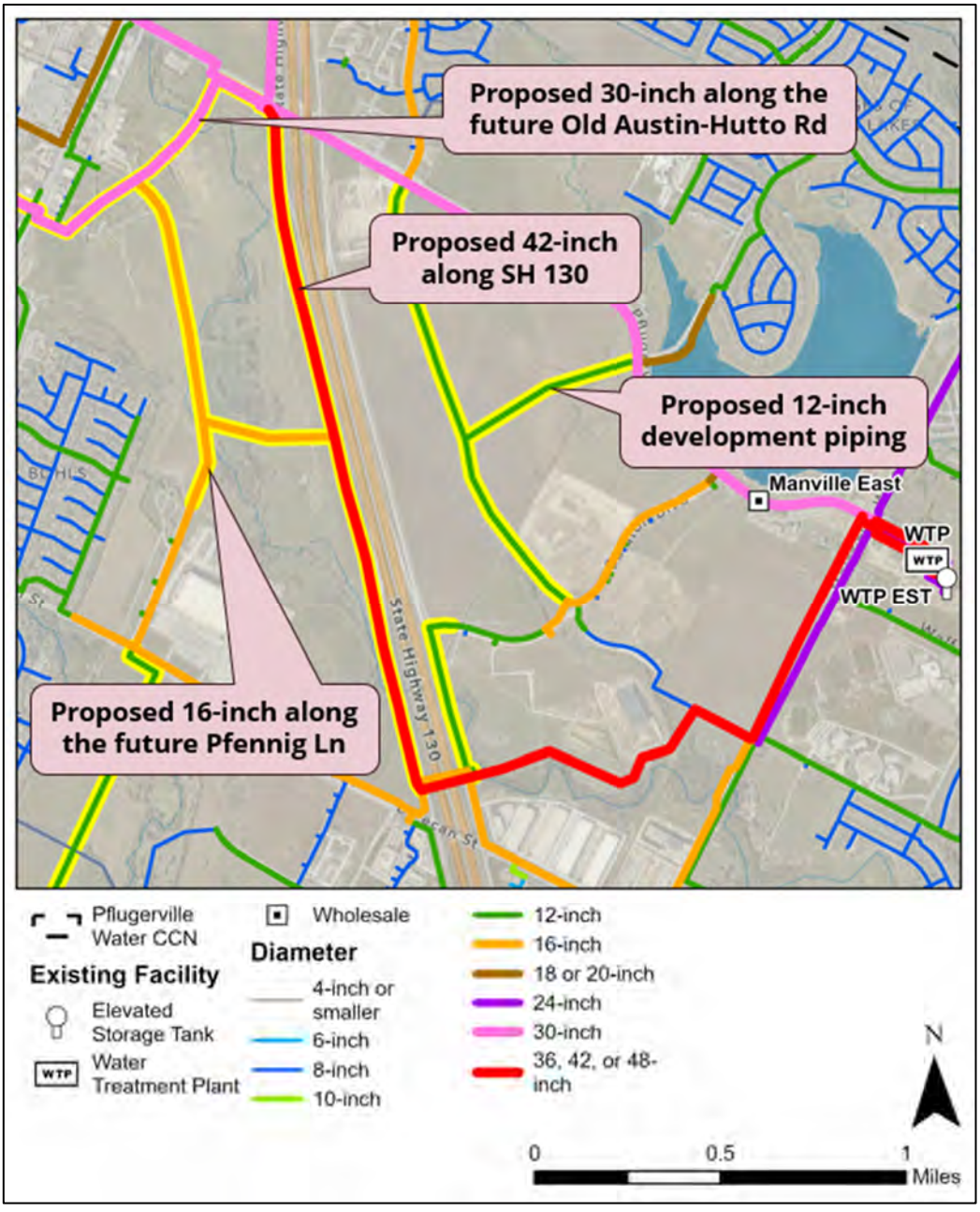

Figure 5-4: Area 1 Transmission Improvements

Water line alignments along the future Pfennig Ln and future Old Austin-Hutto Rd are based on proposed roadway projects presented in the Transportation Master Plan (see Appendix D).

Velocity through the existing 16-inch water line along W Pfennig Ln is above 10 ft/s. A new 30-inch water line is proposed along W Pfennig Ln from the North EST to Pfennig PS (see Figure 5-5). This water line will be a dedicated transmission main with no intermediate connection points.

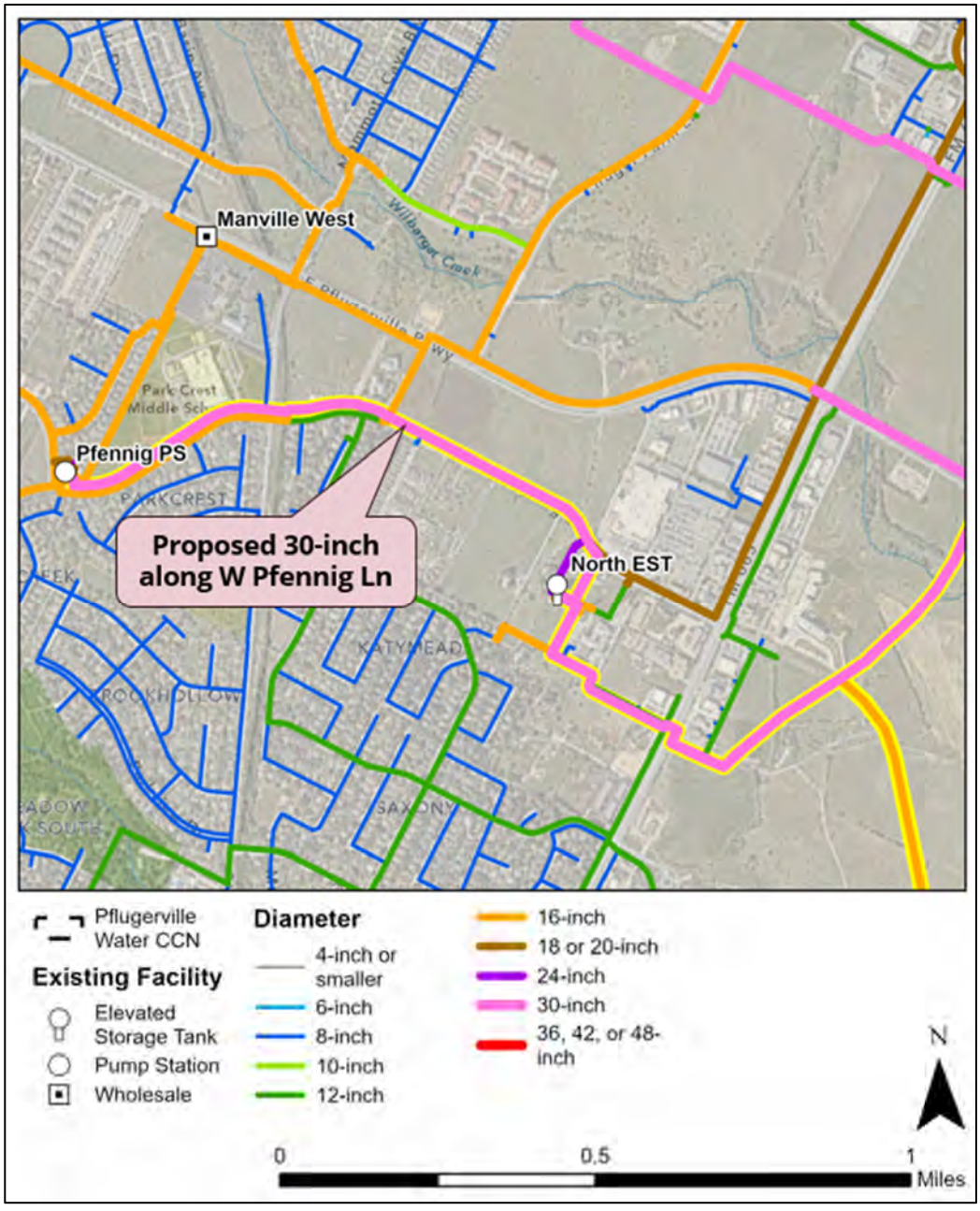

Figure 5-5: Area 2 Transmission Improvements

Velocities through portions of the proposed 30-inch water line to SH 45 and other existing water lines in the area are above 5 ft/s. A 16-inch water line has already been designed and is currently in construction to connect the existing 16-inch water line along Colorado Sand Dr. Upsizing of a proposed water line through Lifestyle Communities to 18-inch is recommended to provide a continuous 18-inch loop (see Figure 5-6).

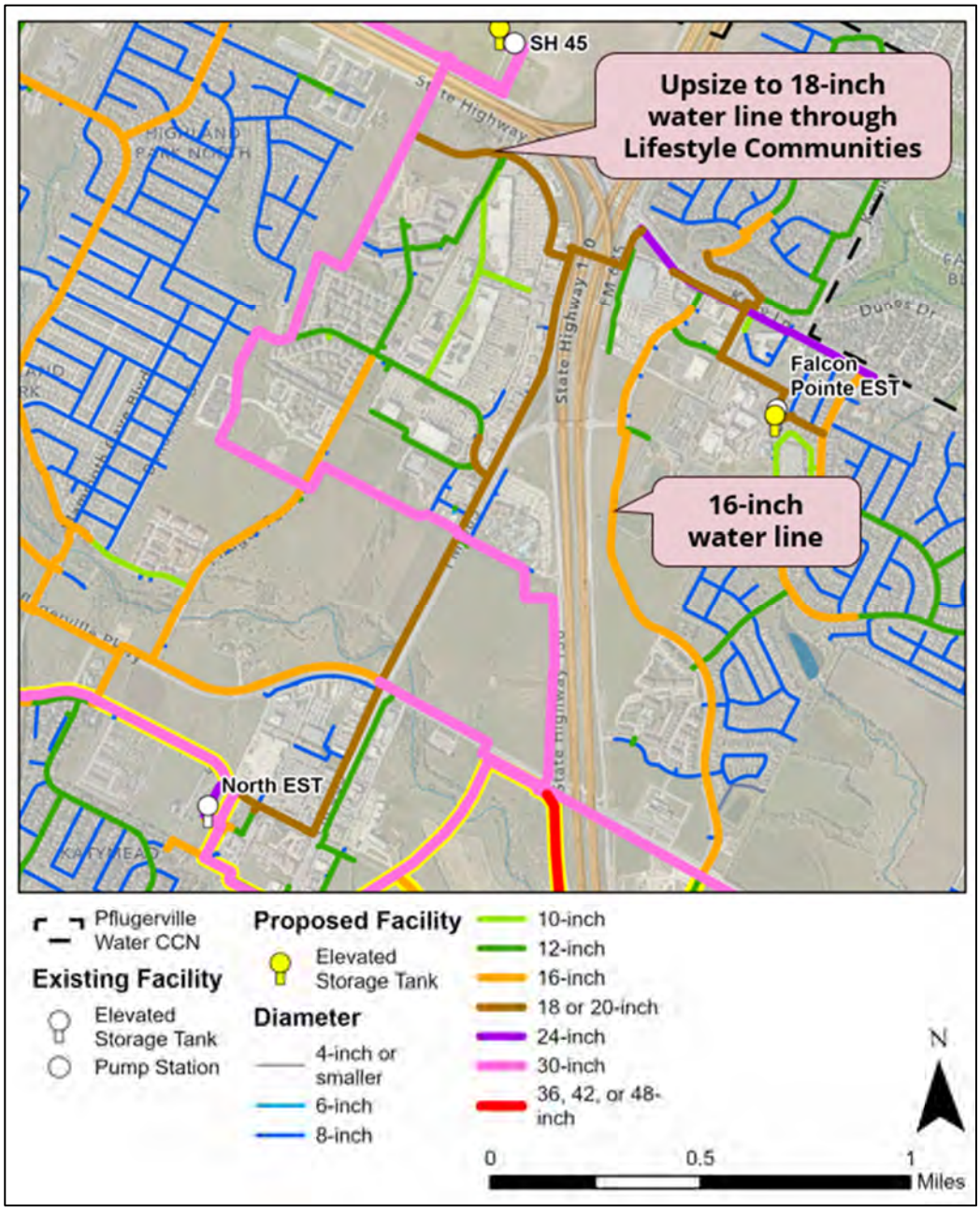

Figure 5-6: Area 3 Transmission Improvements

Two 12-inch loops are proposed for the southern portion of the water system to serve future development (see Figure 5-7). The proposed loop to the west in Figure 5-7 extends south along the future Pfennig Ln and west through the Lisso Subdivision. The proposed loop to the east along E Pecan St, Cameron Rd, and the east side of SH 130 in Figure 5-7 is proposed to serve Pecan Crossing Industrial.

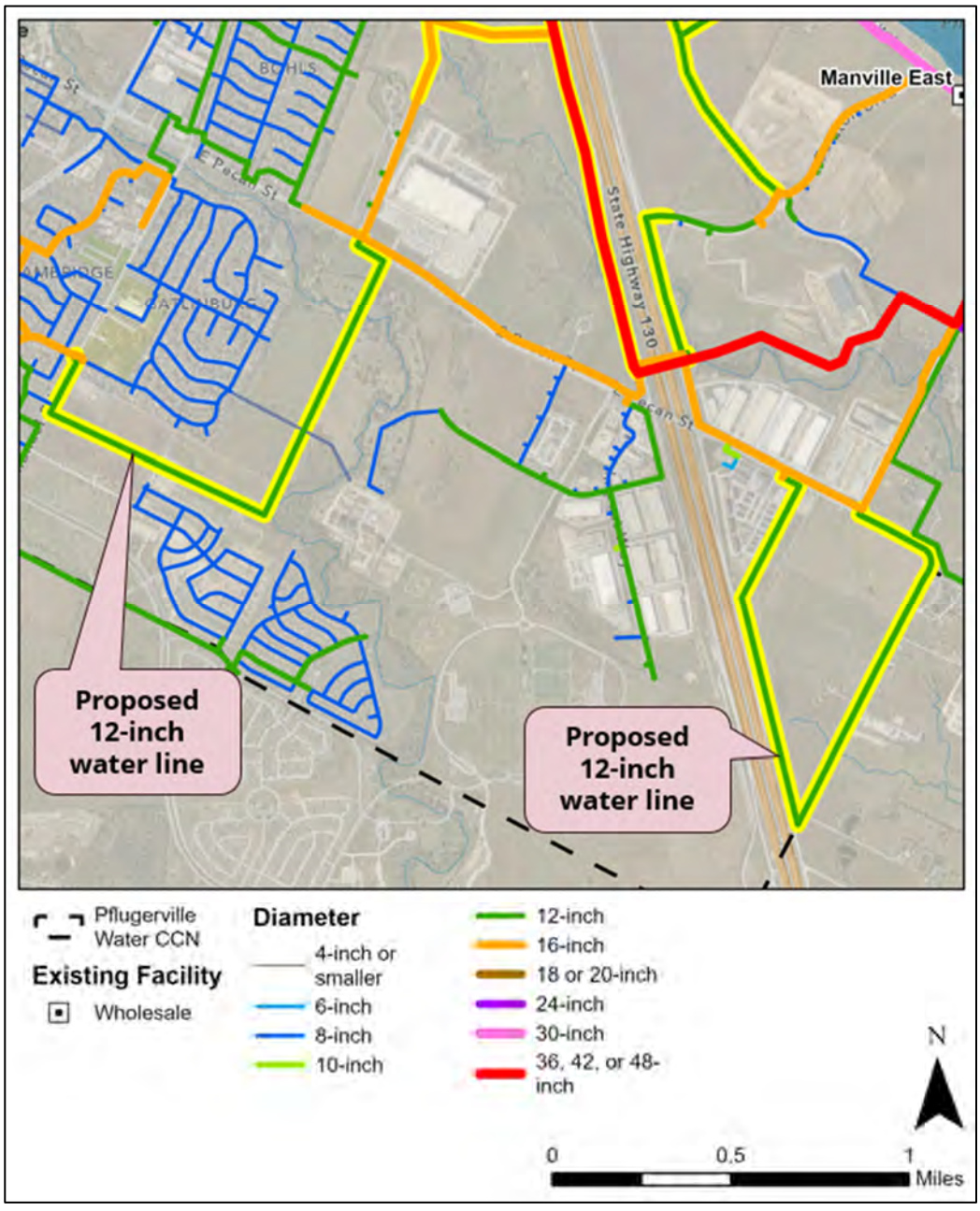

Figure 5-7: Developer Improvements

Maximum pressures are above 120 psi for portions of the Central 888 Zone due to low elevation (see Figure 5-8).

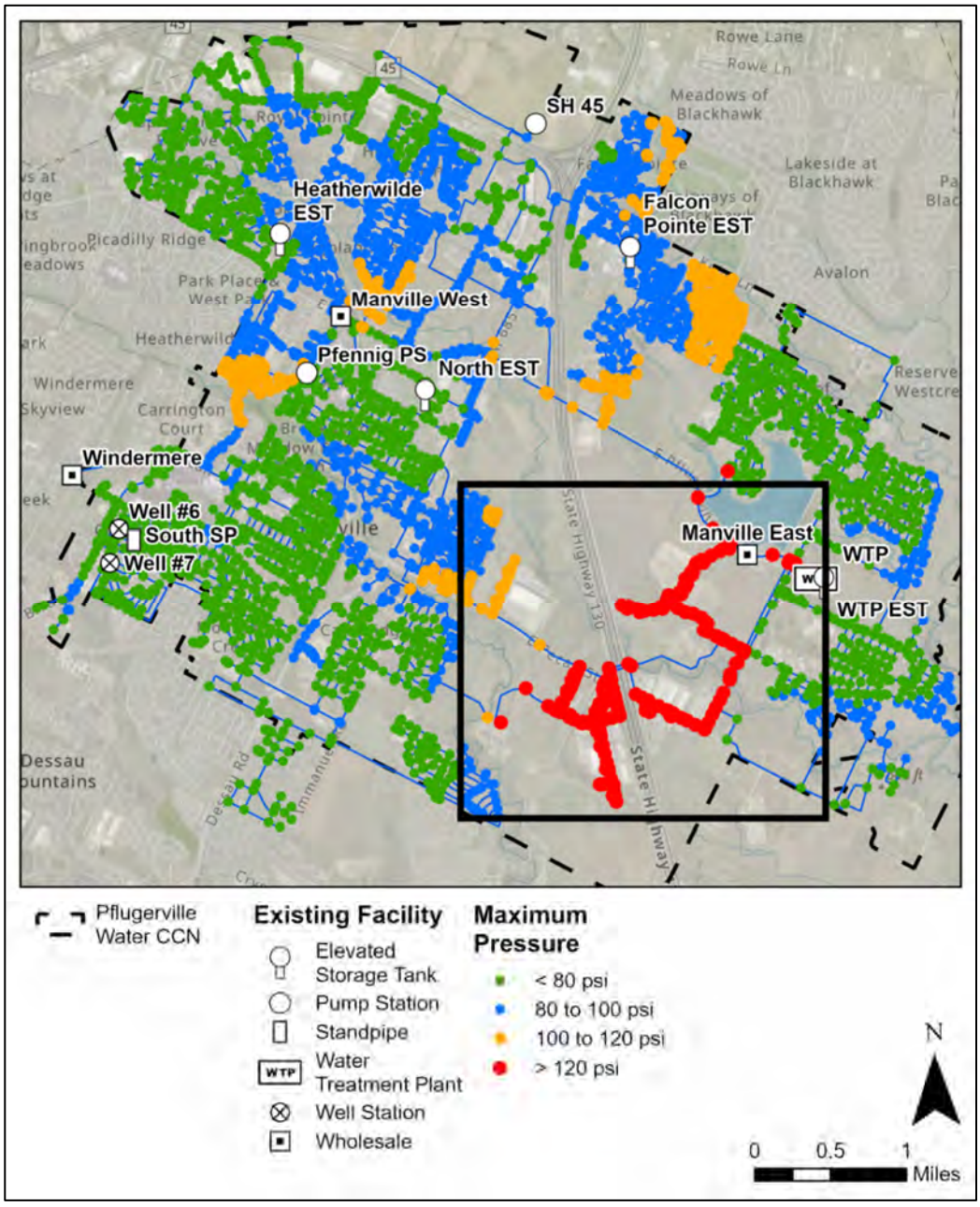

Figure 5-8: Maximum Pressures at Buildout without Transmission Improvements

To reduce high pressures within the Central 888 Zone, eight new PRVs are proposed to establish two new reduced pressure zones. The proposed PRV locations are shown in Figure 5-9 and listed in Table 5-10.

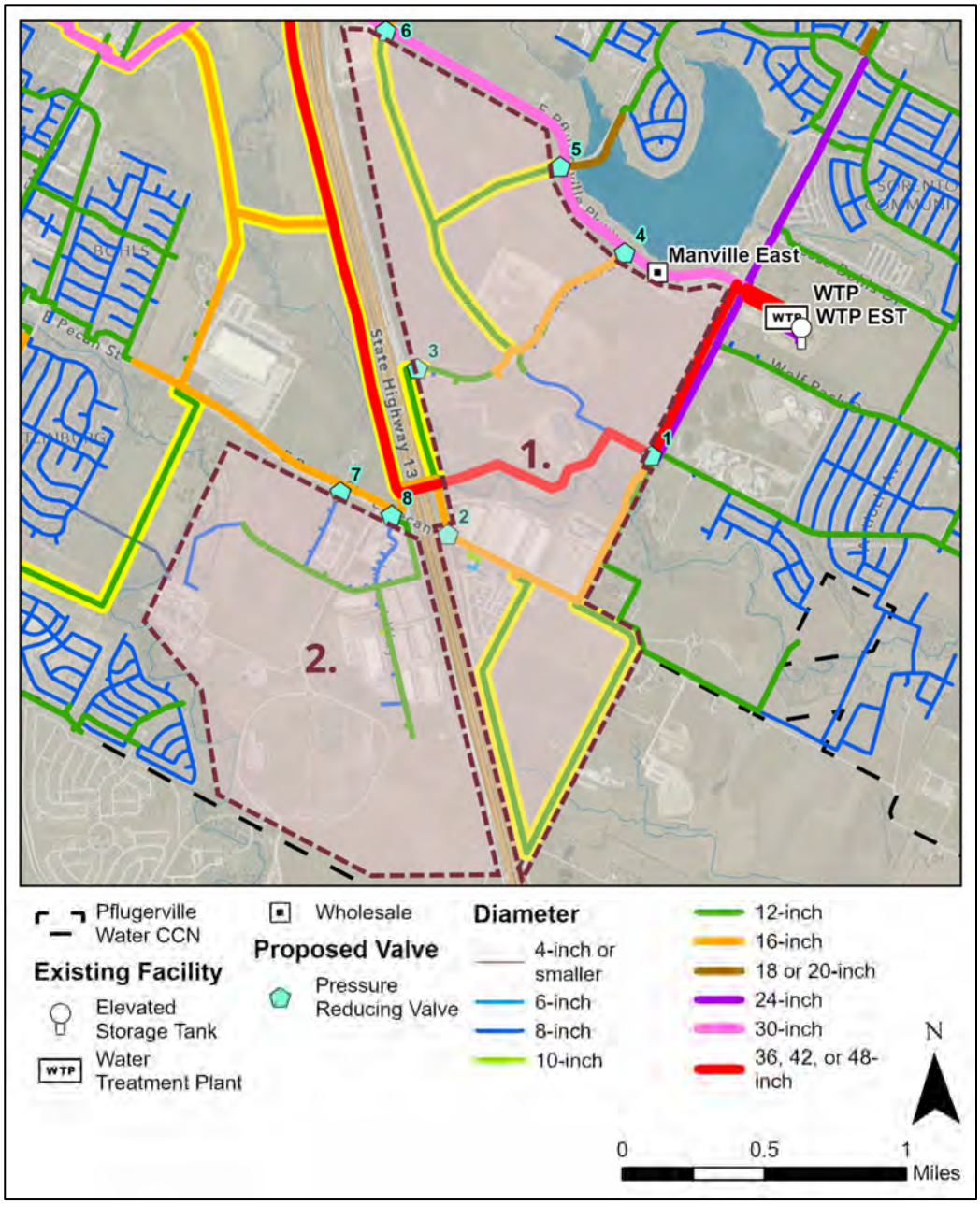

Figure 5-9: Central 888 Zone Pressure Reducing Improvements

Table 5-10: Proposed Central 888 Zone Pressure Reducing Valves

No.	Location	Elevation (feet)	Target Hydraulic Grade Line (feet)	New Reduced Pressure Zone
1	Weiss Ln & Pleasanton Pkwy	614	779	1
2	E Pecan St & SH 130	649		
3	Balaton Blvd & SH 130	637		
4	Balaton Blvd & Pflugerville Pkwy	652		
5	Becker Farm Rd & Pflugerville Pkwy	638		
6	Colorado Sand Dr & Pflugerville Pkwy	684		
7	Biltmore Ave & E Pecan St	662	779	2
8	Impact Way & E Pecan St	656		

PRVs one through six would supply the first reduced pressure zone between Pflugerville Pkwy, Weiss Ln, Cameron Rd, and SH 130. PRVs seven and eight would supply the second reduced pressure zone between E Pecan St, SH 130, the water CCN boundary to the south, and the future Pfennig Ln.

Set point adjustments are recommended for two existing PRVs that reduce pressure from the West 942 Zone to existing South PRV Zones 1 and 2 as listed in Table 5-11. The locations of the existing PRVs and reduced pressure zone are shown in Figure 5-10.

Table 5-11: Existing Pressure Reducing Valve Set Point Adjustments

Location	Current Set Point (psi)	Proposed Set Point (psi)	Resulting Pressure Range for the Zone (psi)	Reduced Pressure Zone
Mountain View Dr	Open	50	45 to 80	South PRV 1
Immanuel Rd	75	70	45 to 95	South PRV 2

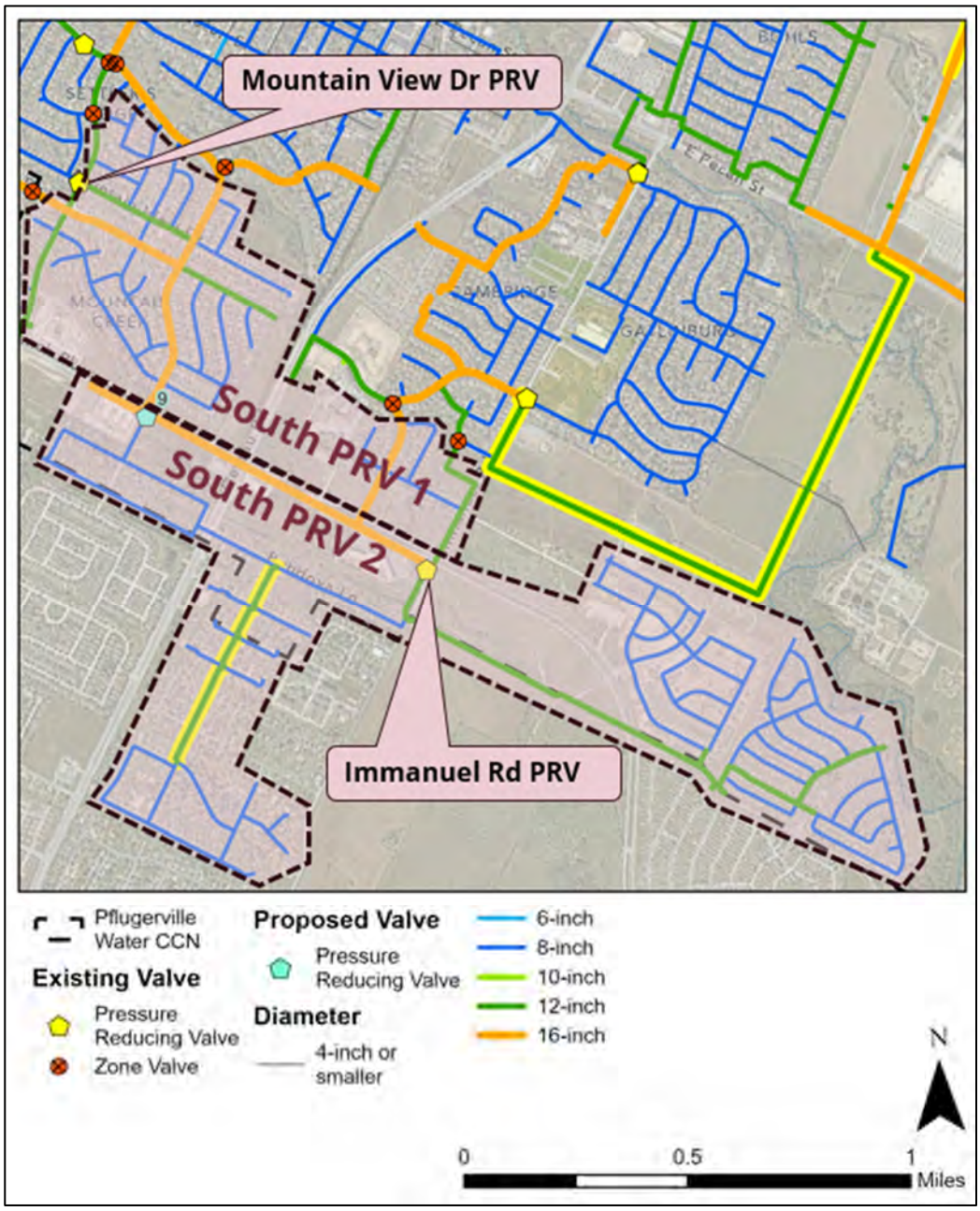

Figure 5-10: Existing Pressure Reducing Valves with Recommended Set Point Adjustments

Maximum pressures above 100 psi were also identified for the West 960 Zone within the Swenson Farms Subdivision. Two existing PRVs along Swenson Farms Blvd reduce pressure for a portion of the subdivision. An 8-inch connection is proposed between the existing 8-inch water lines along White Poplar Path and Warm Springs Dr to expand the area supplied by the existing PRVs. Existing FCVs at Pfennig Ln and Legacy Dr and Pfennig Ln and Beechtree Ln will need to be closed (see Figure 5-11).

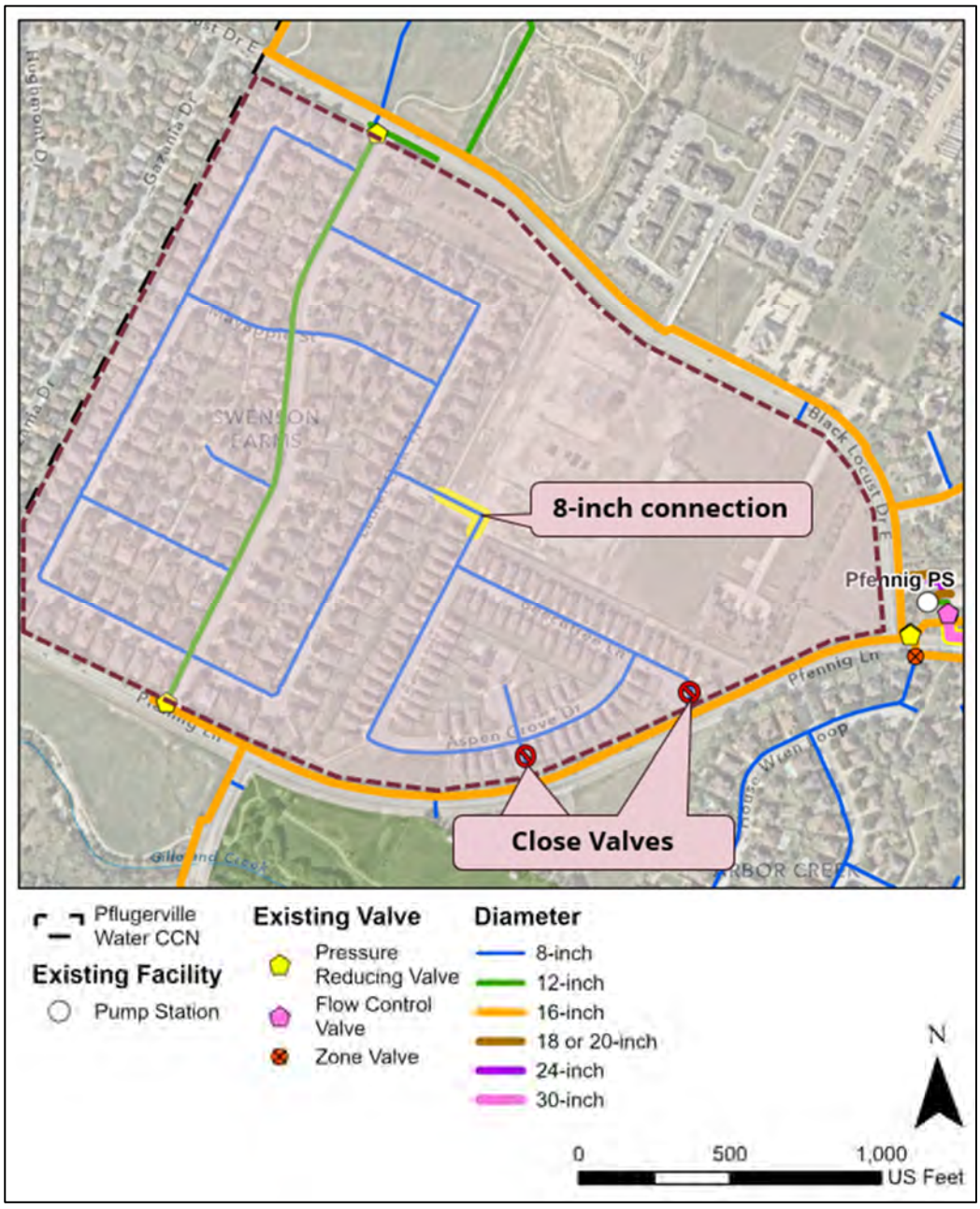

Figure 5-11: West 960 Zone Pressure Reducing Improvements

With all improvements in place, maximum velocities are below 5 ft/s for all but a few water lines (see Figure 5-12), minimum pressures are above 35 psi (see Figure 5-13), and maximum pressures are below 120 psi except through the proposed 42-inch Weiss Ln transmission main (see Figure 5-14).

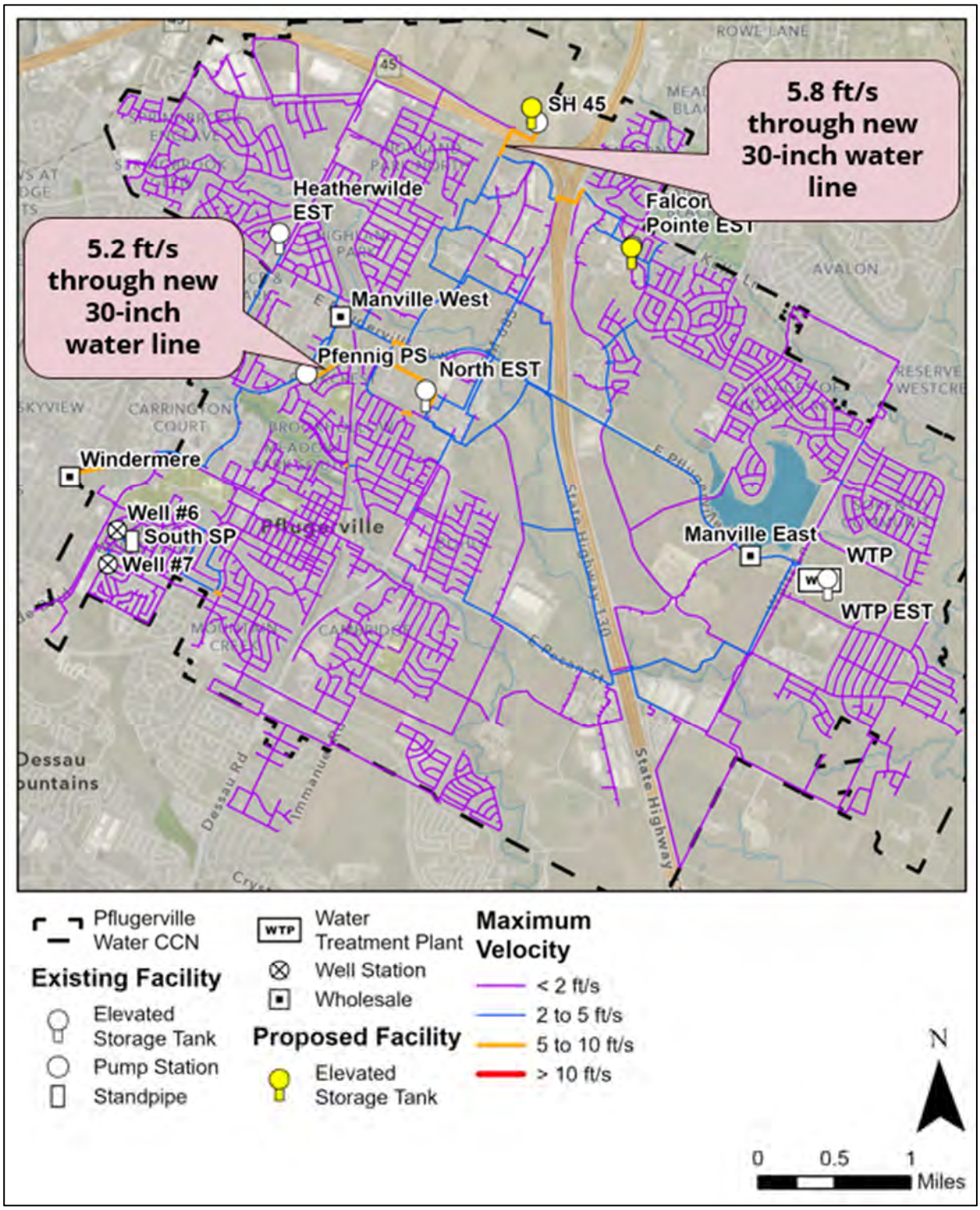

Figure 5-12: Maximum Velocities at Buildout with Transmission Improvements

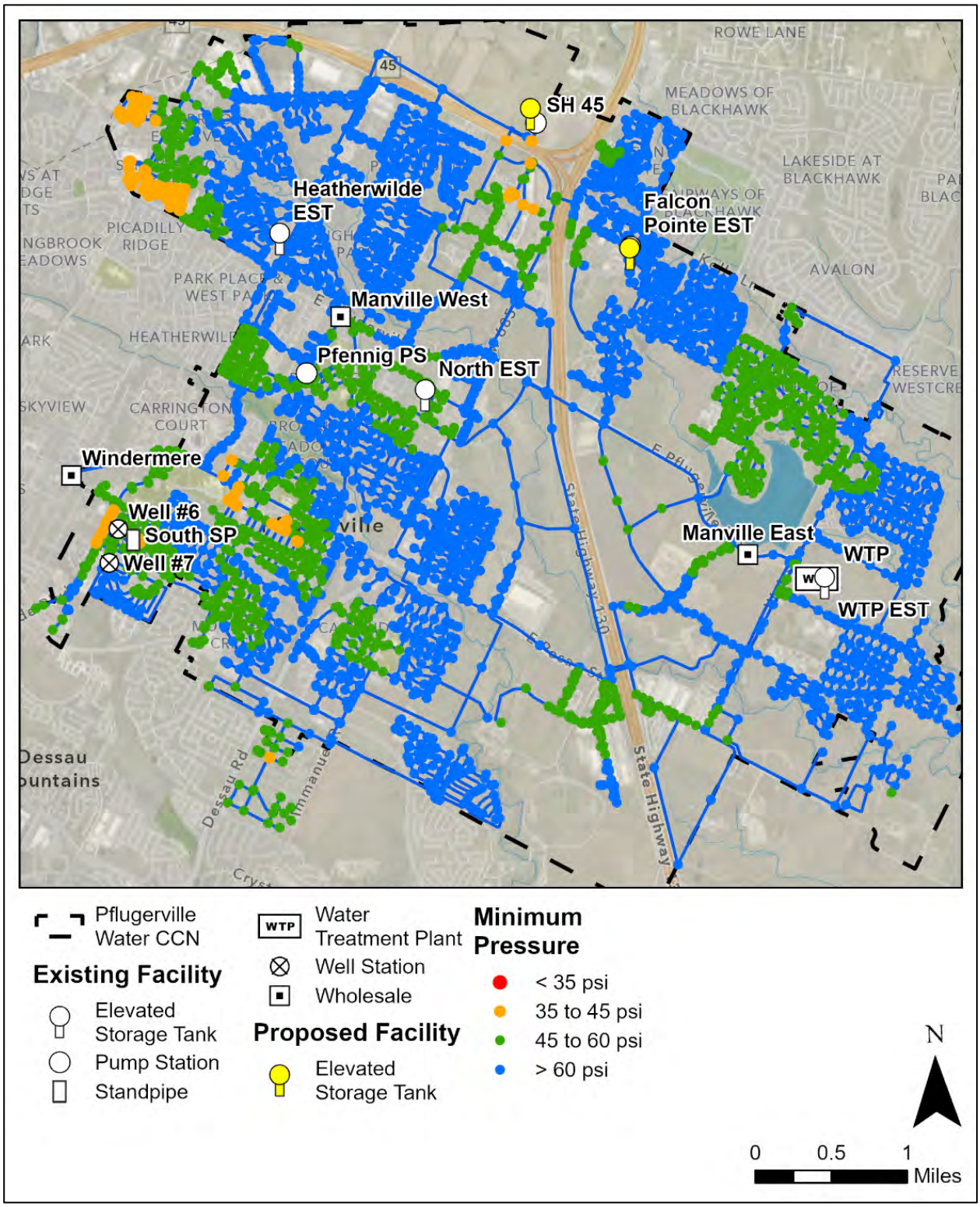

Figure 5-13: Minimum Pressures at Buildout with Transmission Improvements

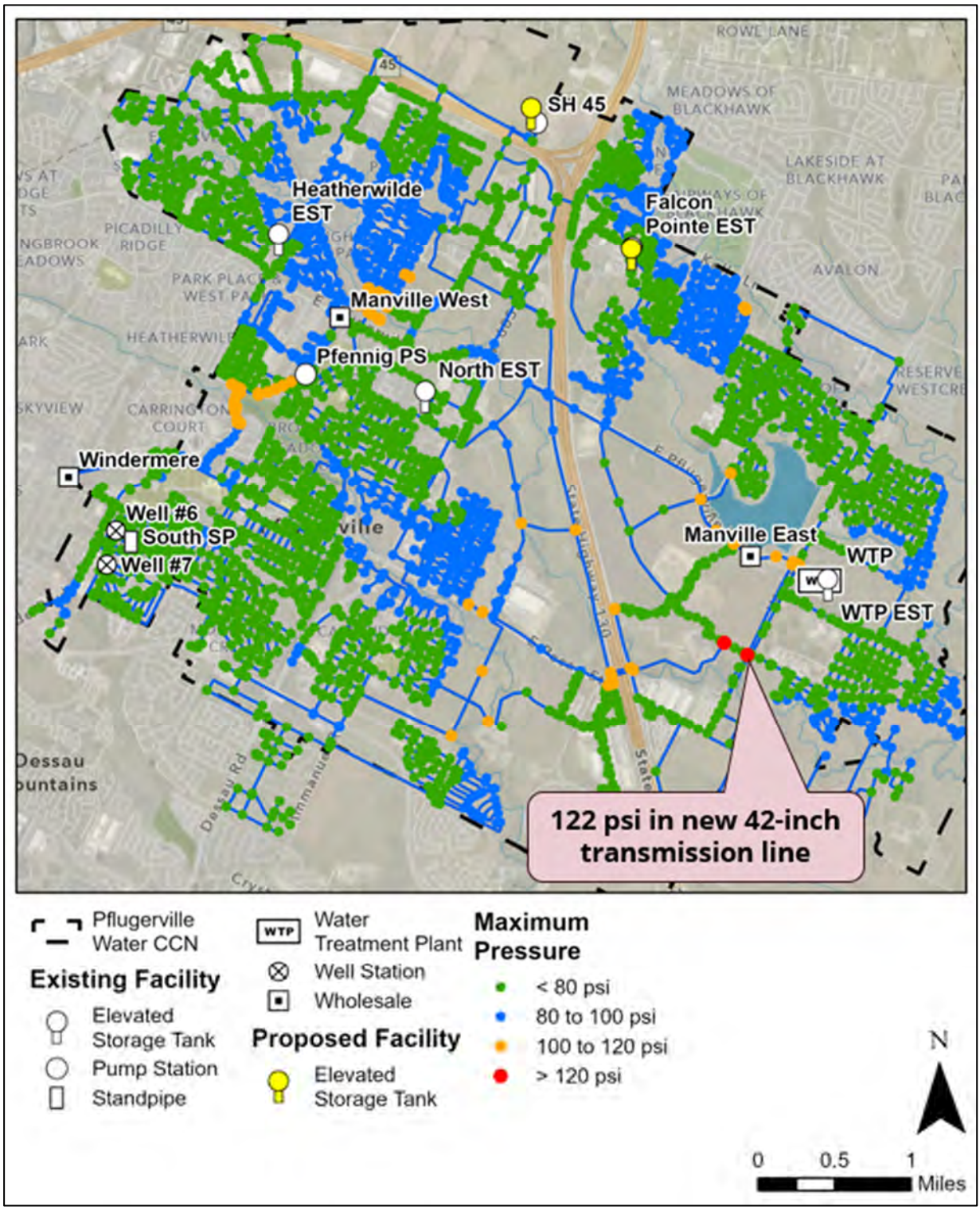

Figure 5-14: Maximum Pressures at Buildout with Transmission Improvements

5.3 Fire Flow Assessment

A fire flow assessment was completed to identify areas with insufficient available fire flow. The City requires at least 1,000 gpm of fire flow for residential areas. Available fire flow is greater than 1,000 gpm across the water system, except for in Pflugerville Estates (see Figure 5-15).

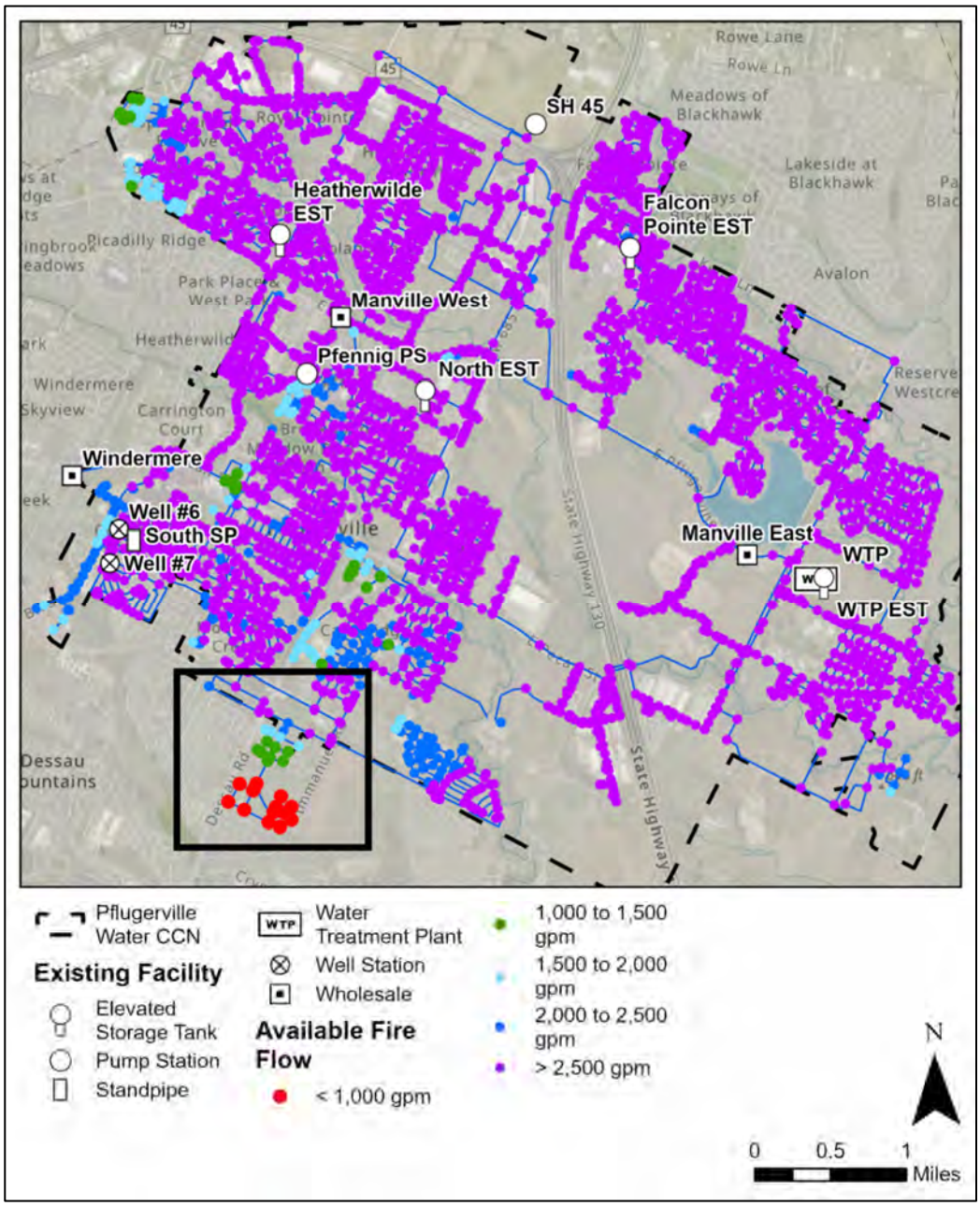

Figure 5-15: Fire Flow at Buildout without Fire Flow Improvements

Replacement of the existing 8-inch water line along Zanzibar Ln with a 12-inch water line is proposed to increase fire flow for Pflugerville Estates to above 1,000 gpm (see Figure 5-16).

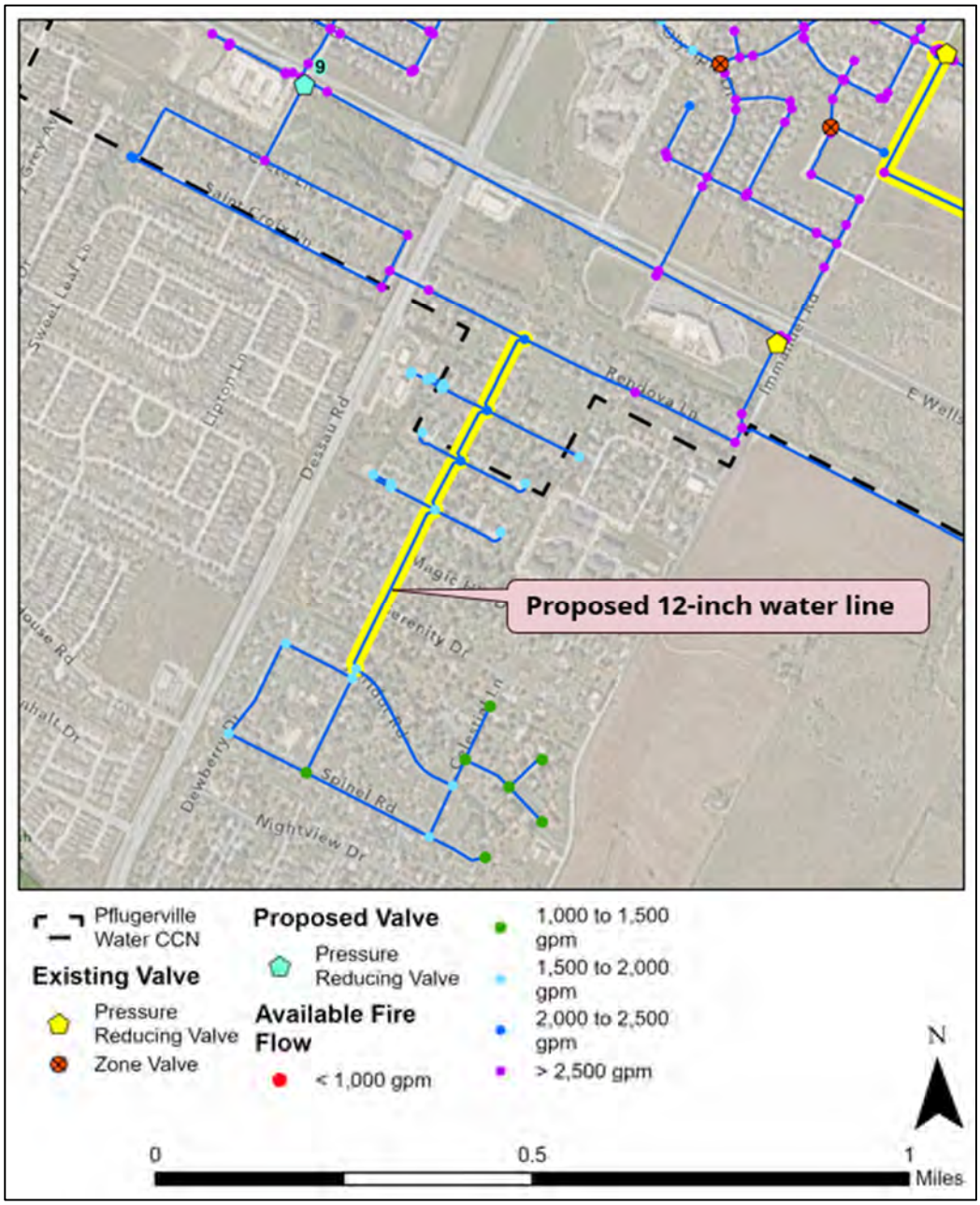

Figure 5-16: Fire Flow Improvement

5.4 District Metered Area Evaluation

District metered areas (DMAs) use flow measurements to monitor, quantify, and manage unreported leakage. DMAs are created by defining boundaries with flow meters, control valves, and closed valves. Flow is monitored through permanently installed flow meters. Monitoring flow during minimum consumption periods of the day can help to identify rising levels of leakage. DMAs may use PRVs to reduce minimum pressures and pressure variations, which minimizes the rise of new leaks. PRVs can also serve as emergency boundaries in the event of a large water main break or fire.

A DMA evaluation of the water system was performed to determine where DMAs could be established with the addition of flow meters, PRVs, and closed valves without negatively impacting system hydraulics. DMAs were proposed based on American Water Works Association (AWWA) Manual M36 recommendations and other considerations. DMAs are recommended to have between 500 and 3,000 connections and one to two flow meters. The following should be considered when scoping DMAs: minimum and maximum pressures, maximum velocities, available fire flow, and natural geographic boundaries.

DMAs can use various types of flow meters. Non-intrusive ultrasonic flow meters can be clamped directly to the pipe with little to no service interruption. They have high accuracy within 1% and installations can be directly buried. Alternatively, an electromagnetic flow meter with a bypass can be installed in a permanent vault or above-ground enclosure.

Overall, 18 DMAs are proposed for the water system with nine new PRVs with flow meters, 22 new flow meters, and four closed valves. A summary of the proposed DMAs is provided in Table 5-12 and shown in Figure 5-17. Detailed maps of each DMA can be found in Appendix E.

Table 5-12: District Metered Areas Summary

DMA	Infrastructure Required	Existing Connections	Future LUEs	Total LUEs
Central 888 1	**PRVs with flow meters:** • Weiss Ln & Pleasanton Pkwy • E Pecan St & SH 130 • Balaton Blvd & SH 130 • Balaton Blvd & Pflugerville Pkwy • Becker Farm Rd & Pflugerville Pkwy • Colorado Sand Dr & Pflugerville Pkwy • Biltmore Ave & E Pecan St • Impact Way & E Pecan St **Flow meters:** • Benning Dr & Kelly Ln • FM 685 (Costco) • Balaton Blvd & Colorado Sand Dr	474	0	474
Central 888 2		1,225	2,901	4,126
Central 888 3		0	1,645	1,645
Central 888 4		34	2,871	2,905
Central 888 5		21	1,674	1,695

DMA	Infrastructure Required	Existing Connections	Future LUEs	Total LUEs
Central 888 6	• Colorado Sand Dr & E Pflugerville Pkwy • Rocky Creek Dr & Pfennig Ln • Milton Cv & Rocky Creek Dr • FM 685 & Split Oak Dr • E Pecan St near Old Austin-Hutto Rd • N Railroad Ave & Applewood Dr • E Pecan St & Plumbago Dr • Pigeon Forge Rd & Immanuel Rd (2)	1,216	311	1,527
Central 888 7		208	12,333	12,541 (1)
Central 888 8		492	0	492
Central 888 9	**Zone valves:** • Weiss Ln & Pleasanton Pkwy • Spoonemore Dr & W Pfennig Ln	1,674	121	1,795
East 794 1	**Flow meters:** • Aventura Ave & Weiss Ln • Masi Loop & Weiss Ln • Weiss Ln & E Pflugerville Pkwy (2) • Avalar Ave & Jesse Bohls Dr	1,398	321	1,719
East 794 2		1,001	230	1,231
East 794 3		1,307	2,144	3,451
West 942 1	**PRV with flow meter:** • Ball Ln & E Wells Branch Pkwy	1,183	0	1,183
West 942 2	**Flow meters:** • Mountain View Dr & S 10th St • Immanuel Rd & E Wells Branch Pkwy	646	418	1,064
West 942 3		723	0	723
West 960 1	**Flow meters:** • New Meister Ln & N Heatherwilde Blvd • Pflugerville Pkwy & Wilke Ridge Ln (2) • Golden Eagle St (Park Crest Middle School) **Zone valves:** • New Meister Ln & N Heatherwilde Blvd • Wilke Ridge Ln & N Heatherwilde Blvd	1,747	223	1,970
West 960 2		1,973	5,949	7,922 (1)
West 960 3		372	765	1,137

(1) The City may consider creating multiple DMAs as the area develops.

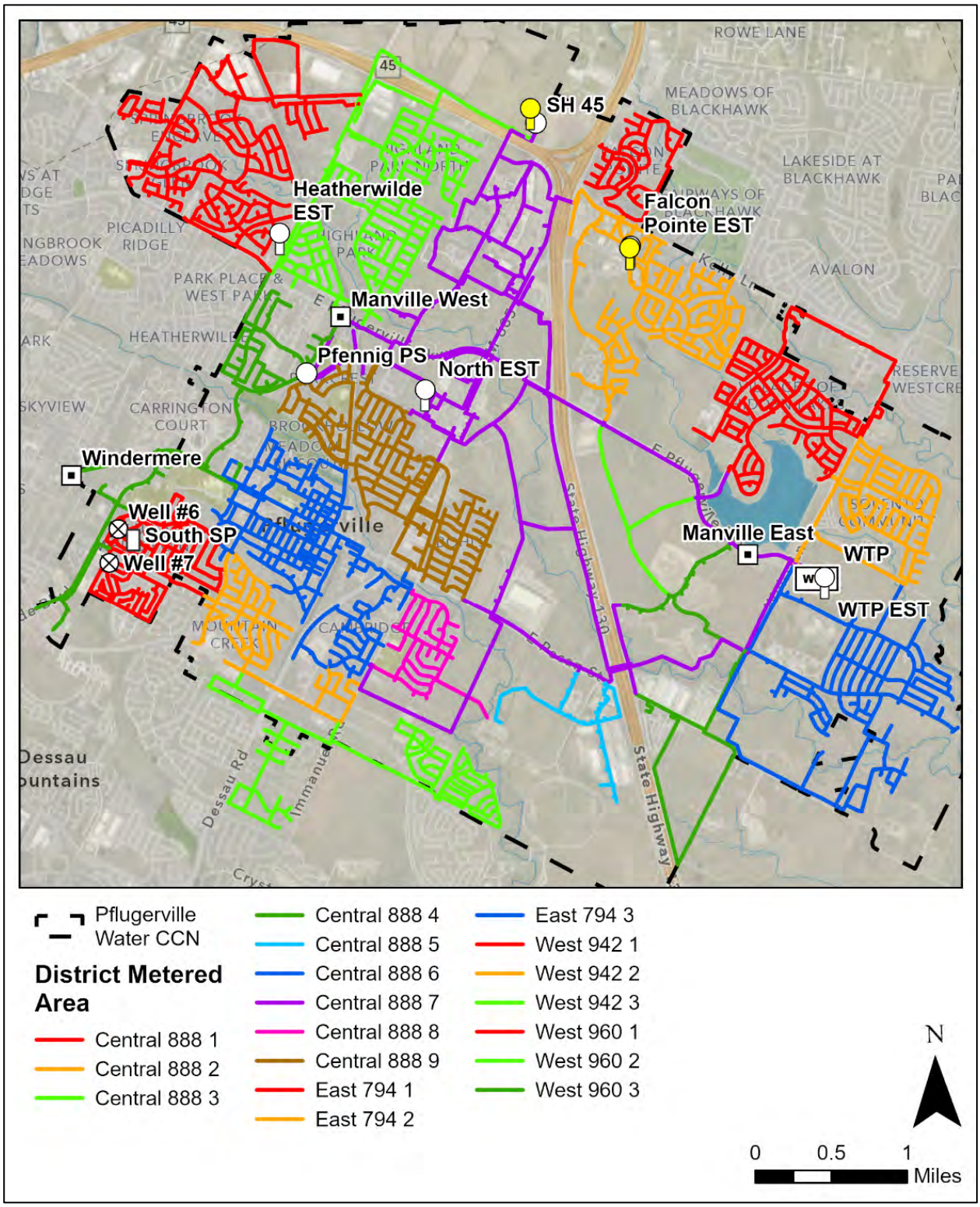

Figure 5-17: Proposed District Metered Areas

6.0 Capital Improvement Plan

A CIP was developed based on improvements identified through the water system assessment. Projects within the CIP are phased based on whether they are currently in design or construction (2025 horizon), needed to meet 2030 demands (2030 horizon), or needed to meet 2035 demands (2035 horizon).

The full set of recommended improvements is summarized in Table 6-1 and Figure 6-1. Each project within Table 6-1 includes a project number, name, description, zone, improvement type, horizon, total project duration, and total cost. Improvement type describes the driver of the improvement. These are split into four types: capital, developer, fire flow, and pressure. Capital improvements are driven by future hydraulic and capacity issues as future developments are connected to the system. Developer improvements are required specifically to serve a new development, with the full cost incurred by the developer. Fire flow improvements address the system's inability to meet the City's fire flow standards. Pressure improvements are driven by areas that exceed a maximum pressure of 100 psi. Detailed project sheets can be found in Appendix F. Project sheets include a project layout, project description, discussion of project drivers and triggers, list of other project considerations, project implementation timeline, and project cost estimate. Project sheets are for planning purposes only. Predesign engineering studies may be needed to determine the preferred alignment for transmission projects and to determine site configuration for facility projects.

Cost estimates were prepared based on the 2025 bidding environment. These costs are an estimate and should be re-evaluated as each project nears its start date. Markups are included for contingency, design, easement acquisition, and mobilization, as applicable. The cost estimates are Class 4 estimates as defined by the Association for the Advancement of Cost Engineering (AACE), which is consistent with cost estimates developed for studies. The expected accuracy range is -30% to +50% of the estimated values. Additional details are needed for each project to develop Class 3 estimates for budget authorization or control. Costs are presented in 2025 dollars.

Table 6-1: Capital Improvement Plan Summary

No.	Name	Description	Zone	Improvement Type	Horizon	Duration (months)	Total Cost
1	12-inch Water Line Looping Improvements	Install approximately 7,150 LF of 12-inch water line along Weiss Ln, E Pecan St, and Cameron Rd from the existing 24-inch water line at Weiss Ln and Pleasanton Pkwy to Urbana Yardhomes.	East 794	Capital	2025	15	$ 3,830,200
2	Colorado Sand Dr	Install approximately 2,820 LF of 16-inch water line along Colorado Sand Dr to connect the two existing 16-inch water lines.	Central 888	Capital	2025	9	Not included [(1)]
3	East Zone High-Service Pump Station	Construct a new HSPS that will pump to the new East 794 Zone. The HSPS will initially contain two pumps with design points of 4,167 gpm at 130 feet of head and will have a firm capacity of 4,167 gpm (6 MGD).	East 794	Capital	2025	21	Not included [(1)]
4	SH 130 (Phase 1)	Install approximately 12,160 LF of 30-inch water line from Pflugerville Pkwy to SH 45 with connections to existing water lines.	Central 888	Capital	2025	30	$ 18,764,000
5	30/24-Inch State Highway 45 Pump Station Discharge Line	Install approximately 1,230 LF of 30-inch water line across SH 45 to the eastern edge of the future SH 45 PS, approximately 3,420 LF of 30-inch water line from the western edge of the future SH 45 PS to the existing 16-inch crossing of SH 45, and approximately 4,700 LF of 24-inch water line from the existing 16-inch crossing of SH 45 to the existing 24-inch water line along N Heatherwilde Blvd.	West 960	Capital	2025	21	$ 11,892,900
6	Weiss Ln & Kelly Ln	Install approximately 7,030 LF of 12-inch water line along Weiss Ln and Kelly Ln and approximately 1,820 LF of 12-inch water line between Jesse Bohls Dr and Wolf Pack Dr.	East 794	Capital	2025	12	$ 4,772,000
7	Weiss Ln & Pecan St	Install approximately 9,340 LF of 42-inch water line along Weiss Ln and across SH 130.	Central 888	Capital	2025	24	$ 16,051,400
						2025 Horizon Capital Subtotal	**$ 55,310,000**
						2025 Horizon Developer Subtotal	**$ -**
						2025 Horizon Total	**$ 55,310,000**
8	SH 45 Pump Station	Construct a new PS that will pump to the West 960 Zone. The PS will contain two pumps with design points of 3,472 gpm at 150 feet of head and have a firm capacity of 3,472 gpm (5 MGD). Construct a new 1.25 MG GST at the PS.	West 960	Capital	2030	33	$ 16,997,700
9	Pfennig Ln (Phase 1)	Install approximately 5,620 LF of 30-inch water line from the North EST to Pfennig PS.	Central 888	Capital	2030	21	$ 8,091,000
10	SH 130 (Phase 2)	Install approximately 10,200 LF of 42-inch water line along the west side of SH 130 from E Pecan St to E Pflugerville Pkwy.	Central 888	Capital	2030	21	$ 19,642,900
11	Lisso Subdivision	Install approximately 4,520 LF of 12-inch water line along Immanuel Rd and through the Lisso Subdivision.	Central 888	Developer	2030	15	$ 2,724,600
12	Water System Improvements	Install approximately 220 LF of 8-inch water line along White Poplar Path to Warm Springs Dr. Close valves at the intersection of Pfennig Ln and Legacy Dr and the intersection of Pfennig Ln and Beechtree Ln. Replace approximately 2,730 LF of existing 8-inch water line along Zanzibar Ln from Rendova Ln to Peridot Rd with 12-inch water line.	West 960 & West 942	Pressure & Fire Flow	2030	14	$ 2,084,500
						2030 Horizon Capital Subtotal	**$ 46,816,100**
						2030 Horizon Developer Subtotal	**$ 2,724,600**
						2030 Horizon Total	**$ 49,540,700**

[(1)] Cost estimate is not included because the project is already under construction.

No.	Name	Description	Zone	Improvement Type	Horizon	Duration (months)	Total Cost
13	Falcon Pointe Elevated Storage Tank Replacement	Replace the existing 0.5-MG EST with a new 2.5-MG EST at Falcon Pointe. The new EST will be approximately 166.5 feet tall and have an overflow elevation of 891.5 feet to match the North EST.	Central 888	Capital	2035	27	$ 18,293,300
14	SH 45 Elevated Storage Tank	Construct a new 1.5-MG EST at the SH 45 PS. The new EST will be approximately 186 feet tall and have an overflow elevation of 960 feet to match the Heatherwilde EST.	West 960	Capital	2035	30	$ 13,118,200
15	High-Service Pump Station Expansion	Expand the HSPS to include one new 4,167 gpm pump at 130 feet of head that will pump to the East 794 Zone and two to four new 5,208 gpm pumps at 315 feet of head that will pump to the Central 888 Zone. Proposed firm capacity to the East 794 Zone will be 12 MGD and proposed firm capacity to the Central 888 Zone will be 37.5 to 52.5 MGD.	East 794 & Central 888	Capital	2035	24	$ 18,143,800
16	Old Austin-Hutto Rd	Install approximately 4,170 LF of 30-inch water line from E Pflugerville Pkwy to FM 685.	Central 888	Capital	2035	15	$ 6,005,000
17	Justice Center Dr	Install approximately 2,390 LF of 30-inch water line along Justice Center Dr from FM 685 to the North EST.	Central 888	Capital	2035	15	$ 3,789,000
18	Pfennig Ln (Phase 2)	Install approximately 6,750 LF of 16-inch water line from the existing 16-inch water line near the Amazon warehouse to the proposed 30-inch water line along the future Old Austin-Hutto Rd with a connection to the proposed 42-inch water line along the west side of SH 130.	Central 888	Capital	2035	24	$ 4,992,100
19	Pfennig Ln (Phase 3)	Install approximately 4,740 LF of 12-inch water line from E Pecan St to the Lisso Subdivision.	Central 888	Capital	2035	21	$ 2,859,000
20	Cameron Rd	Install approximately 11,410 LF of 12-inch water line along E Pecan St, Cameron Rd, and the east side of SH 130.	Central 888	Developer	2035	18	$ 6,847,200
21	East Central Zone Loop (Phase 1)	Install approximately 2,330 LF of 12-inch water line along the east side of SH 130 from the proposed 42-inch water line north of E Pecan St to Balatan Blvd and approximately 6,890 LF of 12-inch water line along the future Colorado Sand Dr from Balatan Blvd to E Pflugerville Pkwy	Central 888	Developer	2035	18	$ 5,593,600
22	East Central Zone Loop (Phase 2)	Install approximately 2,720 LF of 12-inch water line from the future Colorado Sand Dr to E Pflugerville Pkwy.	Central 888	Developer	2035	18	$ 1,666,300
						2035 Horizon Capital Subtotal	**$ 67,200,400**
						2035 Horizon Developer Subtotal	**$ 14,107,100**
						2035 Horizon Total	**$ 81,307,500**
						CAPITAL TOTAL	**$169,708,400**
						DEVELOPER TOTAL	**$ 16,831,700**
						TOTAL	**$186,540,100**

CIP Summary Map

Water CCN

Existing Pipe

- Smaller than 12-inch
- 12-inch or larger

Existing Valve

- Pressure Reducing Valve
- Flow Control Valve
- Zone Valve

Existing Stations

- Elevated Storage Tank
- Pump Station
- Standpipe
- WTP — Water Treatment Plant
- Well Station
- Wholesale

Proposed Pipes

- 2025
- 2030
- 2035
- Project Extent

Proposed Elevated Storage Tanks

- 2035

Proposed Pump Stations

- 2025
- 2030

Zone

- Central 888
- East 794
- West 942
- West 960

Figure 6-1: Capital Improvement Plan Summary Map

N

0 0.5 1 Miles

SH 45 EST
Proposed: 1.5 MG

SH 45 PS
Proposed GST: 1.25 MG
Proposed PS: 5 MGD

Falcon Pointe EST
Existing: 0.5 MG
Proposed: 2.5 MG

Heatherwilde EST
Existing: 1.5 MG

Pfennig PS
Existing GSTs: 2x0.5 MG
Existing PS: 7.8 MGD

North EST
Existing: 2.5 MG

Well 6
Existing Well: 3 MGD
Existing GST: 0.5 MG
Existing PS: 3.9 MGD

Well 7 (Chisholm)
Existing Well: 1.4 MGD
Existing GSTs: 2x0.25 MG
Existing PS: 2.1 MGD

South SP
Existing: 1.6 MG

WTP
Existing Clearwells: 1 MG & 3 MG
Existing HSPS (Central): 22.5 MGD
Proposed HSPS (Central): 37.5 MGD
Existing HSPS (East): 6 MGD
Proposed HSPS (East): 12 MGD
Existing EST: 2 MG

7.0 Summary

This WMP provides an assessment of the City's water system and outlines infrastructure projects recommended to address deficiencies through buildout of the water CCN. The City has three existing sources of supply: a WTP located near Weiss Ln and E Pflugerville Pkwy, that draws from Lake Pflugerville, which is supplied by a raw water line from the Colorado River, and two wells (Well #6 and Well #7) located in or near the Wells Point subdivision. There are three existing pressure zones, the Central 888 Zone, West 960 Zone, and West 942 Zone, and one proposed pressure zone, the East 794 Zone.

A demand analysis was performed to identify historical water demand trends and produce water demand projections for 2030, 2035, and buildout horizons. The greatest MDD of 16.6 MGD occurred on July 27, 2022. Approximately 96% of existing connections are single-family residential accounting for 62% of total usage. The next two highest customer types are commercial and apartments. Pflugerville's average single-family residential water usage in 2023 was approximately 86 gpcd, which is consistent with values from other utilities used for benchmarking purposes which had average residential water usages of approximately 90 gpcd. Overall, the total number of connections within the City's water CCN is projected to be approximately 17,867 in 2030 and 21,076 in 2035. ADD is projected to be 11.3 MGD, 13.6 MGD, and 15.9 MGD in 2030, 2035, and at buildout, respectively. MDD is projected to be 18.6 MGD, 22.8 MGD, and 27.1 MGD in 2030, 2035, and at buildout, respectively.

The City's previous InfoWater Pro hydraulic model of the water system was updated in collaboration with City staff. The updated model includes new pipes from GIS. Pressure zone boundaries were determined in coordination with City staff and are delineated with closed zone boundary valves and PRVs. Facility attributes were verified against record drawings or field data where available. Demands were allocated in the model based on customer billing data from 2023 with unmetered usage applied evenly across the model so that the total demand in the model matches the total supply. Diurnal demand patterns were developed using SCADA data to approximate variations in demand throughout the day and include an overall peak hour factor of 1.4. A 72-hour EPS was established in the model and calibrated against data from pressure loggers and SCADA. Controls were added to the model according to SCADA screens. Calibration sheets for each major pressure zone are provided in this report to compare the model output to the field data.

Assessments of the water system against TCEQ rules and regulations were made to identify capacity improvements needed at buildout. LUE conversion factors were derived based on the City's EDS and UDC. At buildout, existing elevated storage capacity is above the TCEQ requirement of 100 gal/conn but below the 200 gal/conn threshold for reduced pumping for the Central 888 Zone, West 942 Zone, and West 960 Zone. Replacement of the existing 0.5-MG Falcon Pointe EST with a new 2.5-MG EST is recommended for the Central 888 Zone by 2035 and installation of a 1.5-MG EST at the SH 45 PS is recommended for the West 960 Zone also by 2035. At buildout, existing firm pumping capacity is below the TCEQ requirement of 0.6 gpm/conn for the Central 888 Zone and is borderline for the East 794 Zone. By 2035, at least two additional high-service pumps are recommended for the Central 888 Zone, and one additional high-service pump is recommended for the East 794 Zone.

Hydraulic evaluations were performed with the calibrated hydraulic model to identify transmission improvements needed at buildout. Three major areas within the water system have maximum velocities above 5 ft/s which result in minimum pressures below 35 psi near SH 45, Pfennig PS, and the westernmost portion of the Central 888 Zone. Transmission projects are recommended to resolve high velocities and to serve future development. To reduce high pressures within the Central 888 Zone, eight new PRVs are proposed to establish two new reduced pressure zones. A fire flow assessment was completed to identify areas with insufficient available fire flow. Available fire flow is greater than 1,000 gpm across the water system, except for in Pflugerville Estates. A water line replacement project is recommended to resolve the fire flow deficiency. A DMA evaluation of the water system was performed to determine where DMAs could be established with the addition of flow meters, PRVs, and closed valves without negatively impacting system hydraulics. Overall, 18 DMAs are proposed for the water system with nine new PRVs with flow meters, 22 new flow meters, and four closed valves.

Finally, a CIP was developed based on improvements identified through the water system assessment. Projects within the CIP are phased based on whether they are currently in design or construction (2025 horizon), needed to meet 2030 demands (2030 horizon), or needed to meet 2035 demands (2035 horizon). The full set of recommended improvements is summarized in a table and map. Detailed project sheets can be found in Appendix F and include cost estimates prepared based on the 2025 bidding environment. The CIP includes approximately $190 M in infrastructure improvements.

Appendix A

Population and Demand Analysis Technical Memorandum

Pflugerville Water Master Plan

Population and Demand Analysis Technical Memorandum

Prepared by:

GARVER

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Suite 325
Austin, TX 78704

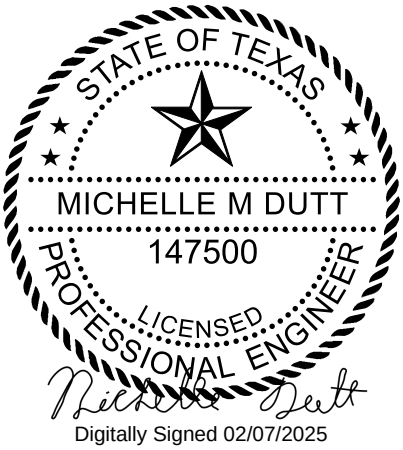
August 2025

Garver Project No. 23W07020

Engineer's Certification

I hereby certify that this Population and Demand Analysis Technical Memorandum for the Pflugerville Water Master Plan was prepared by Garver under my direct supervision for the City of Pflugerville.

Michelle M Dutt, PE
State of Texas PE License 147500



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List of Acronyms

Acronym	Definition
ADD	average day demand
API	application programming interface
CCN	certificate of convenience and necessity
conn	connections
gal	gallons
gpcd	gallons per capita per day
LCRA	Lower Colorado River Authority
MDD	maximum day demand
MGD	mllion gallons per day
SWTP	surface water treatment plant
UDC	unified development code
WSC	water supply corporation

1.0 Introduction

A demand analysis was performed for the City of Pflugerville (City) to identify historical trends and determine per connection or per land area demand values for different demand conditions to apply to future development. Upcoming planned development was mapped based on information provided by the City. Remaining future development through buildout was categorized based on the future land use designation from the City's most recent Comprehensive Plan, *Aspire 2040*. Demand projections were made for 2030, 2035, and buildout horizons.

Consistent terminology is used throughout this report. Supply refers to the total system input from sources. Demand is equal to supply and includes both metered and unmetered consumption. Usage represents total metered consumption (see Figure 1-1).

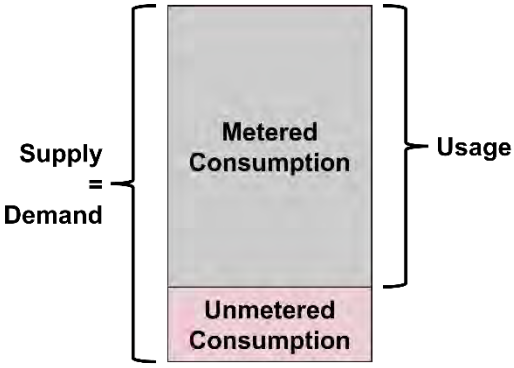


Figure 1-1: Water Supply Terminology

2.0 Data Sources

The data sources listed in Table 2-1 were used to evaluate water demands. All data was provided by the City.

Table 2-1: Data Sources

No.	Format	Description
1	Spreadsheet	Daily production data from January 2013 to August 2024 including volumes from each source and wholesale service connection
2	Spreadsheet	Monthly water utility customer billing data within the water certificate of convenience and necessity (CCN) from 2021 through 2023; includes account number, service address, customer class, monthly usage, and dates service began and ended
3	PDF	Wholesale customer contracts for the Lower Colorado River Authority (LCRA), Manville Water Supply Corporation (WSC), and Windermere Utility Company (Windermere)
4	Spreadsheet	2023 water use and loss summary spreadsheet that compares monthly water usage per customer class plus wholesale volumes to total production
5	Spreadsheet	Spreadsheet of single-family residential developments and apartment complexes that are under or soon to be under construction with number of units built to date and remaining to be built; spreadsheet does not contain developments under review

No.	Format	Description
6	PowerPoint	Maps of private development projects throughout the City with a symbol for every private development project that is in a stage of review or construction; larger private development projects are labeled by name; water demand information was not included with the maps; has overlap with spreadsheet of single-family residential developments and apartments
7	Shapefile	Shapefile with locations of construction plans that are currently under review, in construction, or completed; only includes developments with an accepted application-to-develop
8	PDF [(1)]	*Aspire 2040* Comprehensive Plan; includes a chapter on future land use, growth, and development with maps of developable properties and future land use and descriptions of future land use categories; includes general residential type mix for each future land use category
9	Shapefile	Future land use shapefile from *Aspire 2040* with future land use categories labeled
10	Online Document [(2)]	Unified Development Code (UDC) Subchapter 4 Establishment of District and Boundaries Section 2 Residential Zoning Districts; includes minimum lot area and maximum density
11	Shapefile	Travis Central Appraisal District (TCAD) parcels

[(1)] https://www.pflugervilletx.gov/241/Comprehensive-Plan
[(2)] https://online.encodeplus.com/regs/pflugerville/doc-viewer.aspx?tocid=004.002#secid-45

3.0 Historical Supply and Demand

An analysis of historical supply and demand was performed using daily data from January 2013 to August 2024. The dataset contained daily production volumes for each source and daily wholesale volumes for each wholesale service connection. The City has three existing sources of supply: a Surface Water Treatment Plant (SWTP) located near Weiss Ln and E Pflugerville Pkwy and two wells (Well #6 and Well #7) located in or near the Wells Point subdivision. The wells supply customers in the southwestern corner of the water CCN. The City supplies customers in its water CNN, the Manville Water Supply Corporation (WSC) through two wholesale service connections, and Windermere Utility Company (Windermere) through a single wholesale service connection. See Figure 3-1 for a system overview map.

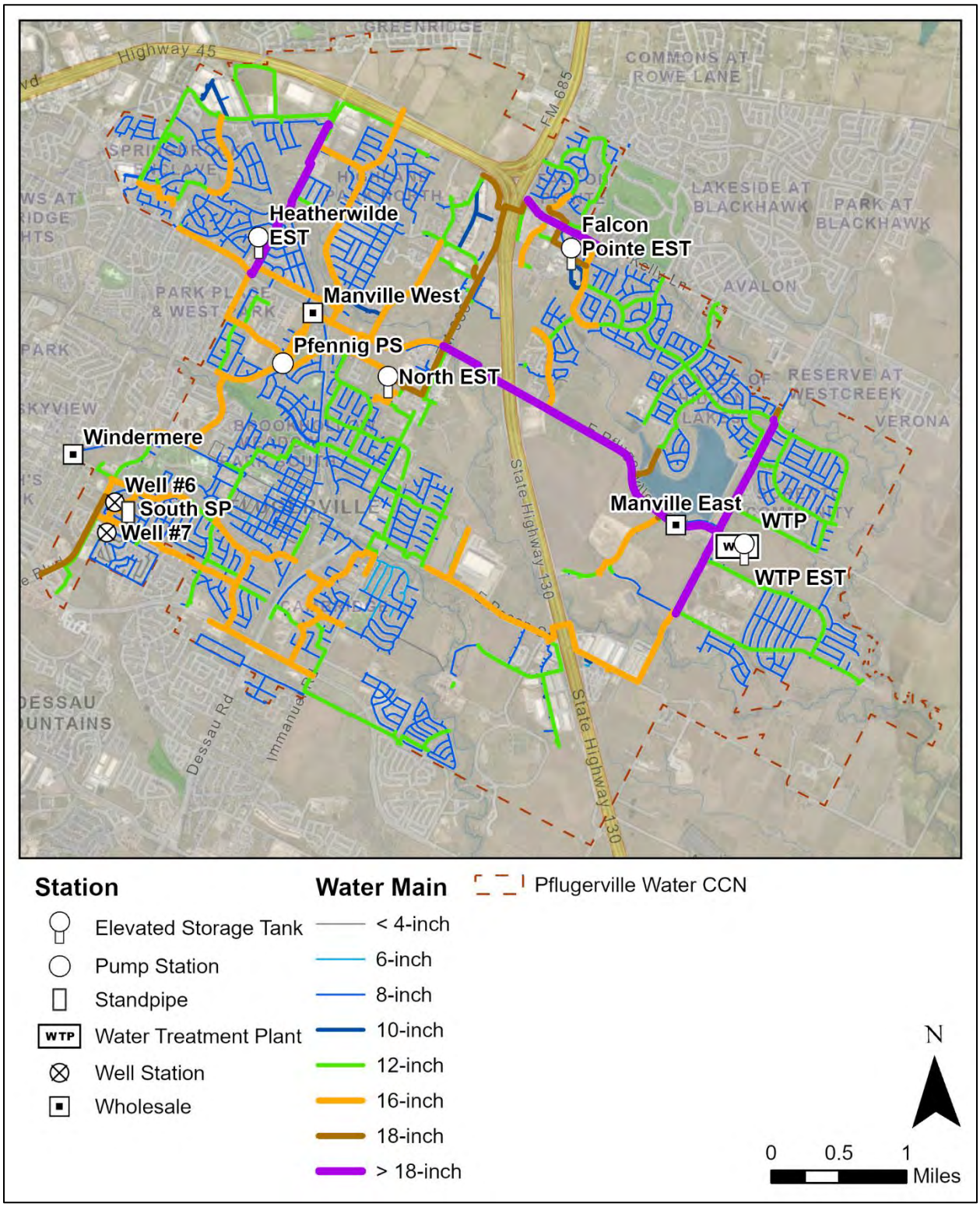


Figure 3-1: System Overview Map

Figure 3-2 and Figure 3-3 display historical monthly average supply and demand. The SWTP accounted for approximately 90% of total system supply in 2023. In 2013, almost 50% of total demand was for Manville and Windermere. This proportion has decreased significantly. In 2023, approximately 87% of total demand was for Pflugerville. There is a gap in the data for December 2014; data was not received for this month.

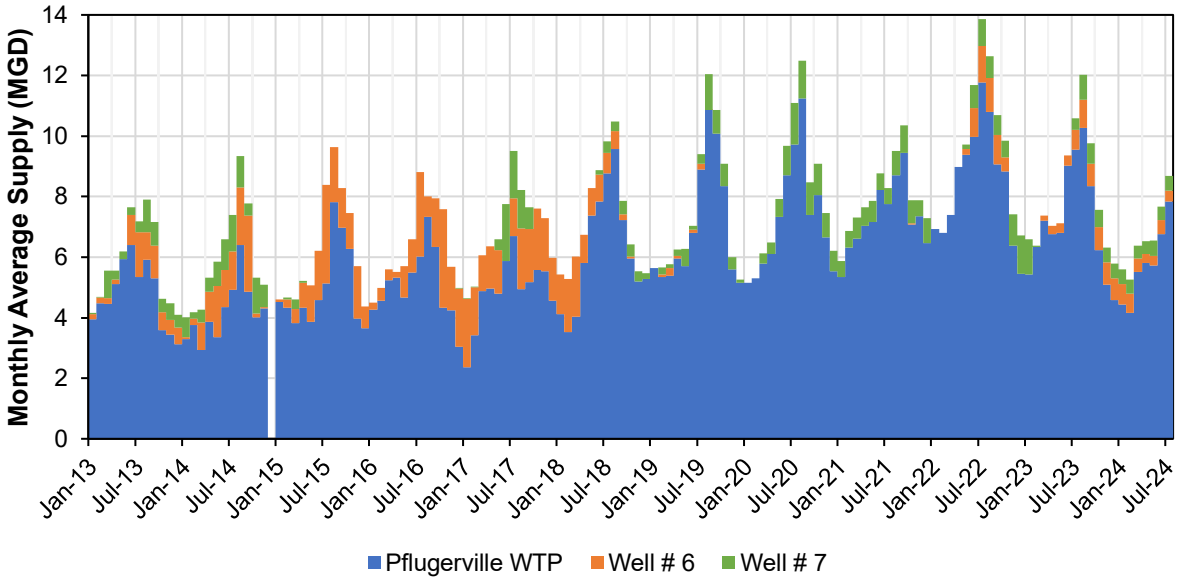


Figure 3-2: Historical Monthly Average Supply

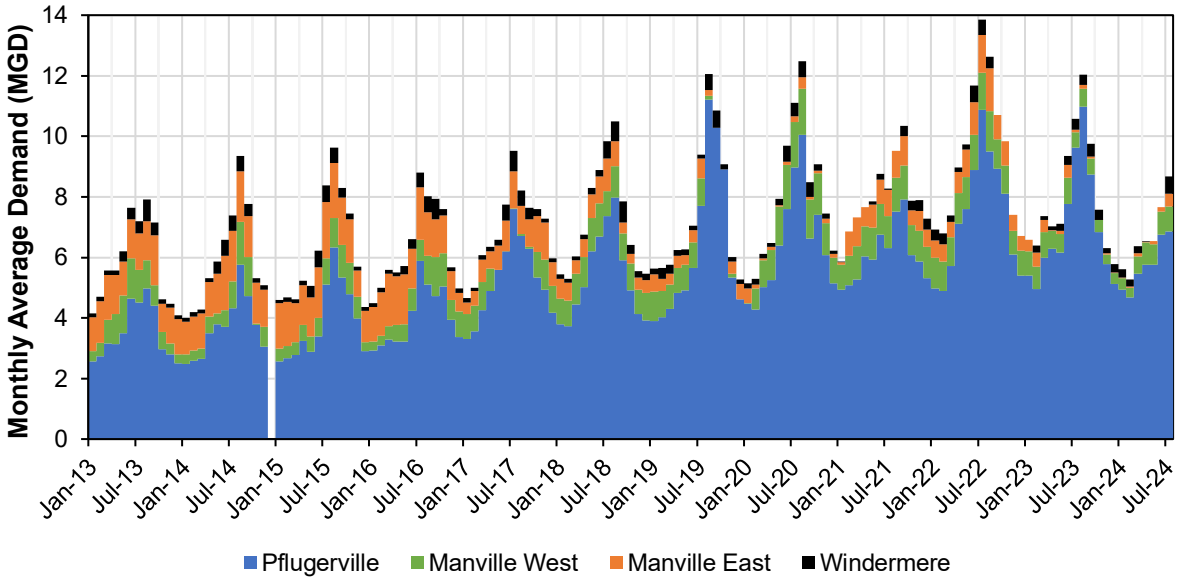


Figure 3-3: Historical Monthly Average Demand

Historical precipitation data was downloaded from the National Oceanic and Atmospheric Administration (NOAA) at the Austin Great Hills weather station. The data was visualized in terms of monthly total and annual rolling average precipitation (see Figure 3-4). The three highest years of precipitation from 2013 through 2023 were 2013, 2015, and 2021. Annual precipitation for 2022 and 2023 was amongst the lowest.

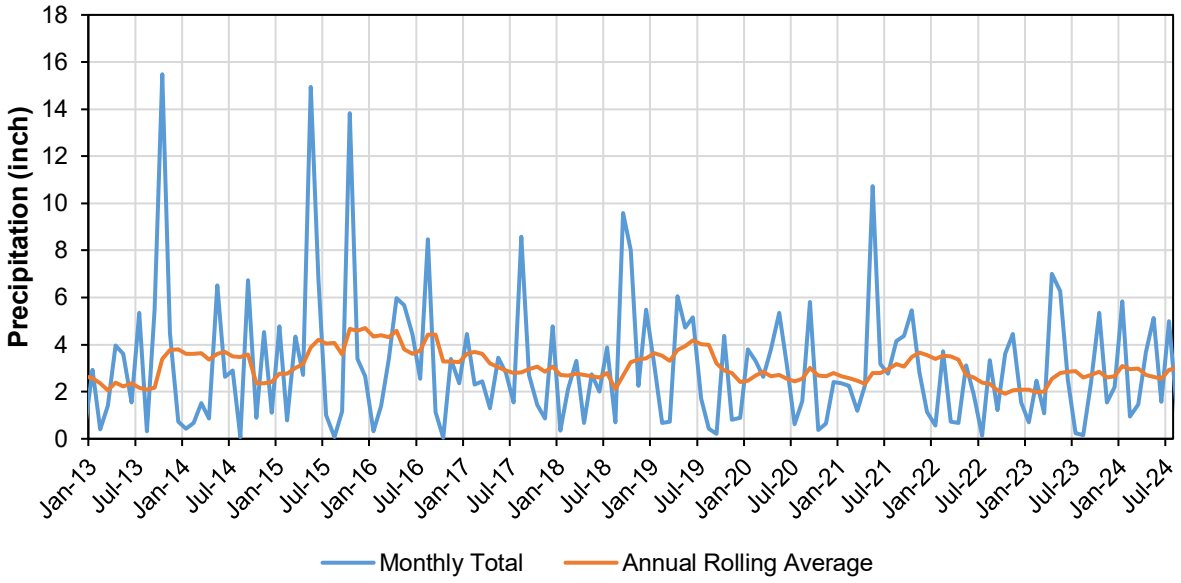


Figure 3-4. Historical Precipitation

The current wholesale contract volumes are summarized in Table 3-1. Manville has a maximum daily allocation of 1 MGD and Windermere has an annual allocation of 100 MG.

Table 3-1. Wholesale Contract Summary

Wholesale Customer	Allocation
Manville	Maximum daily allocation of 1 MGD
Windermere	Annual allocation of 100 MG

Between 2013 and 2022 supply increased steadily across all demand conditions (see Figure 3-5). However, from 2022 to 2023 demand went down due to water conservation measures. The greatest maximum day demand (MDD) of 16.6 MGD occurred on July 27, 2022. MDD in 2023 was lower at 13.4 MGD.

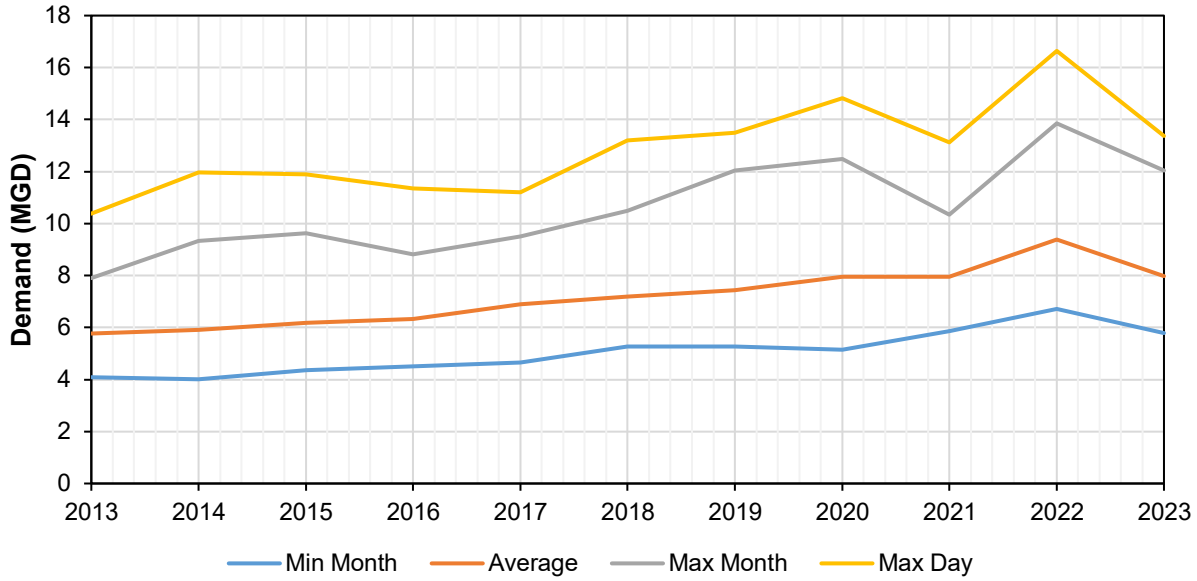


Figure 3-5: Historical Min Month, Average, Max Month, and Max Day Demand

Minimum month demand is typically 70% of average day demand (ADD). During the hottest summer months, maximum month demand increases to approximately 1.47 times ADD. MDD is typically 1.22 times maximum month demand (see Figure 3-6 and Table 3-2).

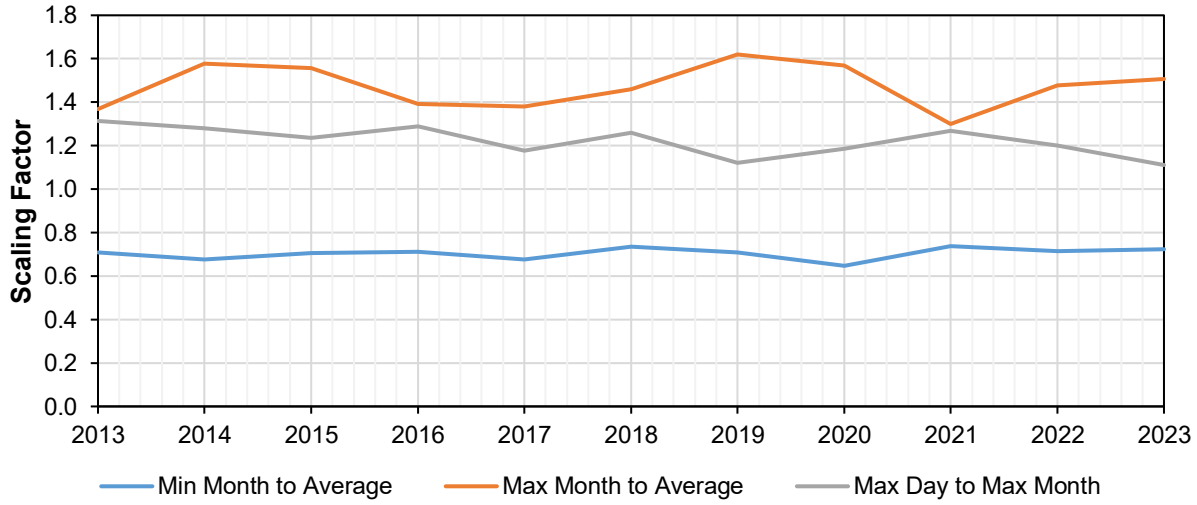


Figure 3-6: Historical Demand Scaling Factors

Table 3-2: Demand Scaling Factors

Scaling Factor	Value
Min Month to Average	0.70
Max Month to Average	1.47
Max Day to Max Month	1.22

2022 was the highest demand year of record with a total ADD and MDD of 9.4 MGD and 16.6 MGD, respectively (see Table 3-3). Pflugerville retail demand was calculated as total supply minus total wholesale demand. In 2022, Pflugerville retail demand was 7.4 MGD and 12.6 MGD for ADD and MDD, respectively. The lowest and highest demand months in 2022 were December and July, respectively.

Table 3-3: 2022 Supply and Demand Summary

Demand Condition	Total Supply (MGD)	Wholesale Demand (MGD)				Pflugerville Retail Demand (MGD)
		Manville East	Manville West	Windermere	Total Wholesale	
Min Month	6.72	0.49	0.84	0.00	1.33	5.39
Average	9.40	0.81	1.02	0.22	2.05	7.36
Max Month	13.85	1.25	1.22	0.51	2.98	10.88
Max Day	16.64	2.00	1.45	0.55	4.01	12.63

Total ADD and MDD decreased to 8.0 MGD and 13.4 MGD, respectively, in 2023 (see Table 3-4). The highest demand months in 2023 were February and August, respectively. Manville demands were higher on average in February than in August. Demands from 2022 and 2023 were used as a baseline for projecting future demands to achieve a middle ground between the highest demand on record and recent demand reductions due to water conservation measures.

Table 3-4: 2023 Supply and Demand Summary

Demand Condition	Total Supply (MGD)	Wholesale Demand (MGD)				Pflugerville Demand (MGD)
		Manville East	Manville West	Windermere	Total Wholesale	
Min Month	6.39	0.46	0.76	0.23	1.44	4.95
Average	8.00	0.18	0.60	0.25	1.02	6.98
Max Month	12.03	0.14	0.59	0.32	1.06	10.97
Max Day	13.36	0.62	0.86	0.28	1.77	11.60

4.0 Historical Usage

An analysis of historical usage was performed using monthly water utility billing data within the water CCN from 2021 through 2023 and a using a 2023 water use and loss summary spreadsheet. Existing water service addresses were geocoded using the Google Maps geocoding application programming interface (API) as shown in Figure 4-1. Customer type is based on the customer class listed within the water utility billing data.

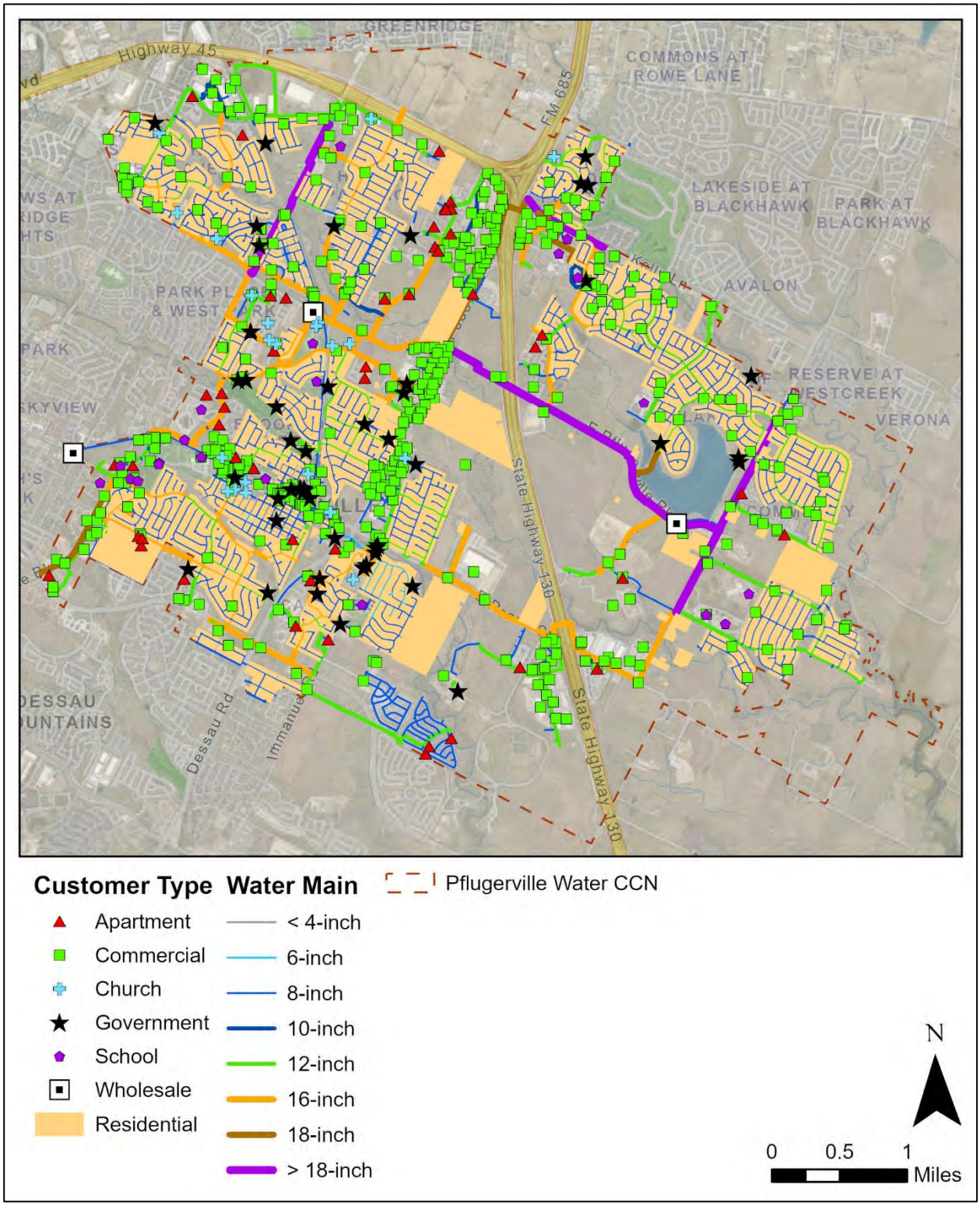


Figure 4-1: Existing Customers by Type

Approximately 96% of existing connections are single-family residential. The next two highest customer types in terms of connections are commercial and apartments at 3% and 0.3%, respectively. Approximately 62% of usage in 2023 was single-family residential (see Figure 4-2 and Figure 4-3). Although the number of commercial and apartment connections is low, the usage per connection is high. Commercial and apartment usage was 15% and 19% of total usage, respectively. Usage for apartments within the water utility billing data is for the entire apartment complex. Apartments are not sub metered; each apartment connection is the apartment complex master meter.

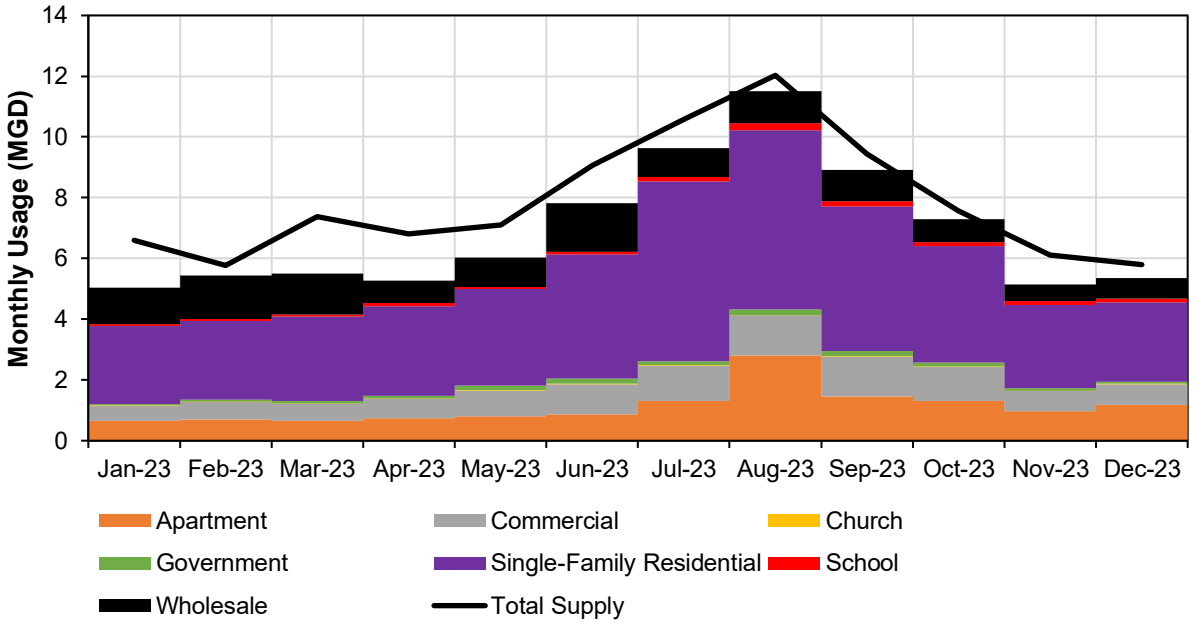


Figure 4-2: 2023 Monthly Usage by Customer Type

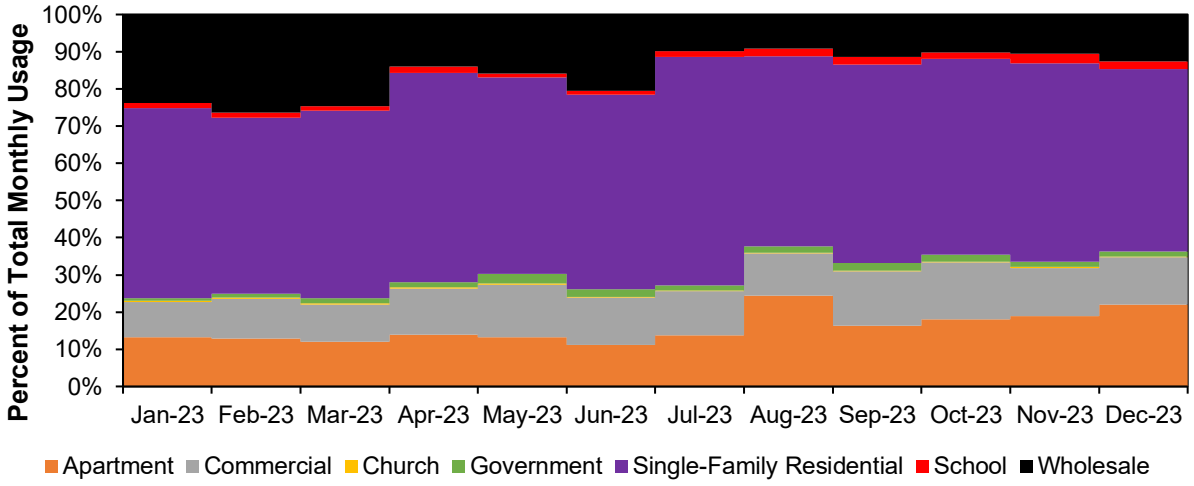


Figure 4-3: 2023 Percent of Total Monthly Usage by Customer Type

Historical usage per single-family residential connection or per commercial land area was calculated based on the water utility billing data from 2021 through 2023 for single-family residential and commercial customers. Single-family residential usage per connection was visualized in terms of cumulative probability, or the probability that the single-family residential usage per connection will be less than a given value for minimum month, average day, and maximum month conditions (see Figure 4-4). All zeros were removed from the data set. For instance, 50% of the time, single-family residential maximum month usage per connection was less than 307 gal/conn/day. Conversely, maximum month single-family residential usage per connection was greater than 817 gal/conn/day only 10% of the time.

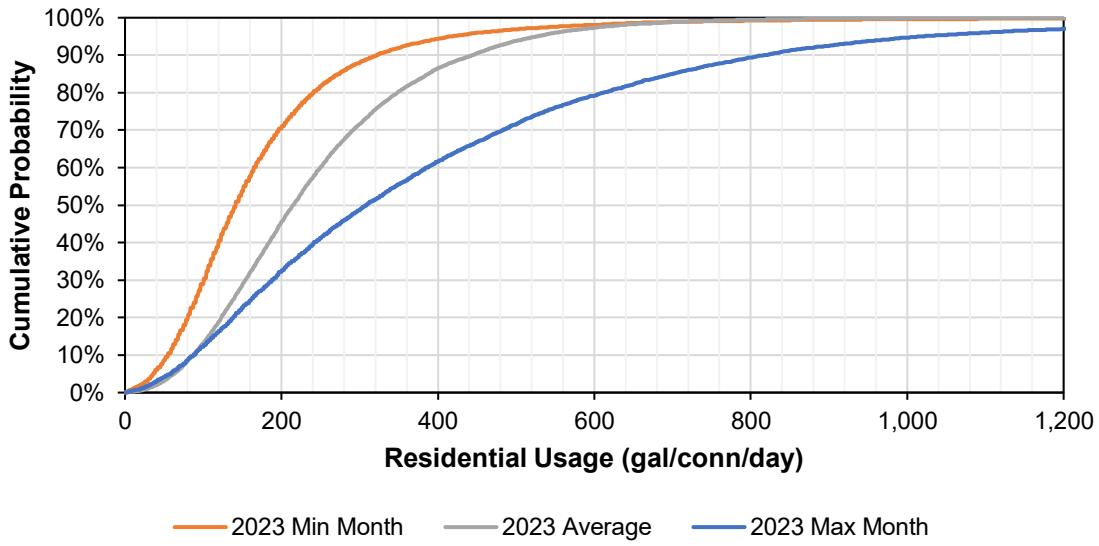


Figure 4-4: Cumulative Probability of Single-Family Residential Usage per Connection

Three statistics were calculated for single-family residential usage per connection: median (50th percentile), average, and average excluding values below the 5th percentile and above the 95th percentile. Average values excluding outliers of 219 gal/conn/day and 334 gal/conn/day were selected for projecting future demands for average day and maximum month conditions respectively (see Table 4-1). These values represent typical single-family residential demands from 2023 when drought conservation measures were in effect, ignoring any extremely low or extremely high water users.

Table 4-1: Single-Family Residential Usage per Connection

Statistic	Single-Family Residential Usage per Connection (gal/conn/day)		
	Min Month	Average	Max Month
Median	142	216	307
Average Excluding Outliers	148	219	334
Average	177	245	398

A similar analysis was conducted for apartment usage. An estimate of usage per apartment unit was made by taking the total monthly usage per apartment complex and dividing by the number of apartment units within the complex. However, the data set was too small to provide accurate insights. Instead, an apartment unit was assumed to use approximately 50% as much water as a single-family home. This assumption is based off the City's living unit equivalent (LUE) conversion factor of 0.5 for high-density apartment complexes. Accordingly, values of 110 gal/unit/day and 167 gal/unit/day were selected for projecting future demands for average day and maximum month, respectively (see Table 4-2).

Table 4-2: Apartment Usage per Unit

Apartment Usage per Unit (gal/unit/day)		
Min Month	Average	Max Month
74	110	167

Finally, a third analysis was performed for commercial usage. An estimate of commercial usage per acre was made by taking the monthly usage per commercial connection and dividing by the land area in acres of the associated parcels. If multiple commercial connections shared a parcel, the commercial usage was summed across the connections and then divided by the land area of the shared parcel. Commercial sub-classes were not included in the water utility billing data. Calculations could not be made to differentiate usage for commercial sub-classes such as restaurants, offices, retail, etc. Building square footage was also not available within the parcel data set. The commercial usage per acre was then visualized in terms of cumulative probability (see Figure 4-5).

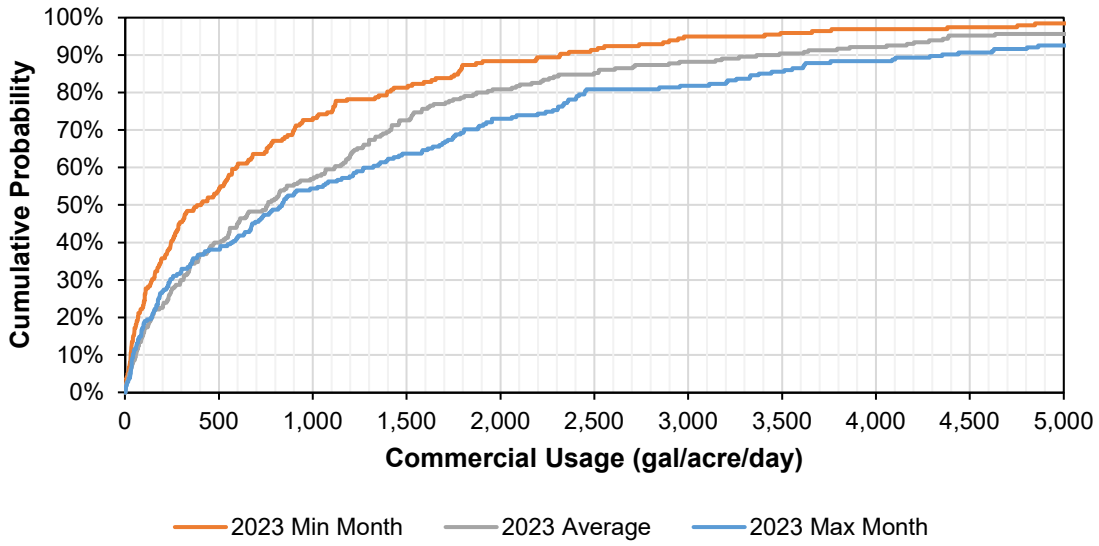


Figure 4-5: Cumulative Probability of Commercial Usage per Acre

Again, three statistics were calculated for commercial usage per acre: median (50th percentile), average, and average excluding values below the 5th percentile and above the 95th percentile. Average values excluding outliers of 1,079 gal/acre/day and 1,404 gal/acre/day were selected for projecting future demands for average day and maximum month conditions, respectively (see Table 4-3).

Table 4-3: Commercial Usage per Acre

Statistic	Commercial Usage per Acre (gal/acre/day)		
	Min Month	Average	Max Month
Median	382	756	836
Average Excluding Outliers	693	1,079	1,404
Average	1,581	2,568	4,278

5.0 Benchmarking

Benchmarking of water usage was performed against other local utilities of similar composition and size (see Table 5-1). Most of the utilities researched had recent average residential water usage of approximately 90 gpcd. The exception being Georgetown with an average residential water usage of 136 gpcd in 2018. Georgetown's target average residential water usage for 2024 per their Water Conservation Plan is 125 gpcd. Pflugerville's average single-family residential water usage in 2023 was similar at approximately 86 gpcd assuming an average household size of 2.85 people based on information from the City.

Table 5-1: Usage Benchmarking

City	Year	Average Residential Water Usage (gpcd)	Average Total Water Usage (gpcd)	Source
Cedar Park	2019	91	136	Cedar Park 2019 Water Conservation Plan
Hutto	2021	91 (1)	Not available	City of Hutto Water Master Plan Update
Round Rock	2023	88	146	Utility Profile and Water Conservation Plan
Georgetown	2018	136	187	Georgetown Water Conservation Plan 2019
Pflugerville	2023	86 (2)	130 (3)	

(1) Data reported in terms of gpd per LUE only; assuming 3 people per household based on US Census data.
(2) Assuming 2.85 people per household based information from the City.
(3) Does not included wholesale usage.

6.0 Demand Projections

Demand projections were made for 2030, 2035, and buildout horizons. Projections were made assuming that the City's water CCN is fixed and unchanging in the future per direction from the City. Projections through 2030 are based on current planned development. Projections through 2035 and buildout are based on future land use designations from *Aspire 2040*. Data is current as of November 2024.

Planned development through 2030 was identified by the City through three means:

- Spreadsheet of single-family residential developments and apartment complexes that are under or soon to be under construction with number of units built to date and remaining to be built; spreadsheet does not contain developments under review.
- Maps of private development projects throughout the City with a symbol for every private development project that is in a stage of review or construction; larger private development projects are labeled by name; water demand information was not included with the maps; maps have overlap with spreadsheet of single-family residential developments and apartments.
- Shapefile with locations of construction plans that are currently under review, in construction, or completed; only includes developments with an accepted application-to-develop.

These data sources were combined in a single shapefile to outline the extent of current development. Planned single-family residential development and apartment demands were projected based on the number of units remaining and the unit demand assumptions listed in Table 6-1. Planned commercial development demands were projected based on the area in acres and the unit demand assumption listed in Table 6-1. Estimated water demand information for planned developments was requested from the City but not available. More information about the unit demand assumptions can be found in *Section 4.0* of this report. MDD was determined from maximum month demand by applying a 1.22 peaking factor. This is the historical maximum month to maximum day peaking factor.

Table 6-1: Unit Demand Assumptions per Customer Type

Customer Type	Min Month	Average	Max Month	Max Day
Single-Family Residential (gal/conn/day)	148	219	334	407
Apartment (gal/unit/day)	74	110	167	204
Commercial (gal/acre/day)	693	1,079	1,404	1,713

The planned single-family residential developments, apartments, and commercial developments with projected ADD and MDD are listed in Table 6-2, Table 6-3, and Table 6-4, respectively. The IDs listed in Table 6-2 through Table 6-4 correspond to the labels in Figure 6-1.

Table 6-2: Planned Single-Family Residential Development Demand Projections

ID	Development Name	Units Remaining	ADD (MGD)	MDD (MGD)
8	The Pfarm	2	0.000	0.001
13	Kuempel Townhomes	18	0.004	0.007
19	Paradise Cove Condominiums	15	0.003	0.006
28	Townhomes of Old Town East	18	0.004	0.007
32	Lakeside Meadows Single-Family	442	0.097	0.180
35	Sorento	52	0.011	0.021
42	Lisso Tract	369	0.081	0.150
47	Carmel West	794	0.174	0.324
49	Murchison Subdivision	176	0.039	0.072
	Total	**1,886**	**0.413**	**0.769**

Table 6-3: Planned Apartment Demand Projections

ID	Development Name	Units Remaining	ADD (MGD)	MDD (MGD)
7	Chisolm Station Multi-Family	3,125	0.342	0.637
10	Wilke Lane Multi-Family	0	0.000	0.000
11	Lifestyle Communities (Mixed Use)	919	0.101	0.187
12	Hill Country Bible Church (Sparrow Apartments)	196	0.021	0.040
15	Pflugerville Farms Apartments	162	0.018	0.033
16,17	Northpointe (Mixed Use)	4,000	0.438	0.815
25	The Commons at Heatherwilde (Pecan District)	978	0.107	0.199
26	Heatherwilde Multi-Family	46	0.005	0.009
29	Dessau Creekside Mixed Use	60	0.007	0.012
31	Lakeside Meadows Multi-Family	1,200	0.131	0.244
33	Tacara at Weiss Ranch Mixed Use	300	0.033	0.061
37	17314 Weiss Lane (Weiss Lane Multi-Use)	354	0.039	0.072
38	Village at Wells Branch (Multi-Family)	506	0.055	0.103
41	Wuthrich Hill Farms (w/Olympic Dr Apts)	266	0.029	0.054
44	Pecan Street Subdivision	453	0.050	0.092
46	Pecan Estates Multi-Family	210	0.023	0.043
48	Cameron 96 Planned Development	300	0.033	0.061
	Total	**13,075**	**1.432**	**2.664**

Table 6-4: Planned Commercial Development Demand Projections

ID	Development Name	Zoning Type	Area (acres)	ADD (MGD)	MDD (MGD)
1	Springbrook South Commerce Center	LI	25.6	0.028	0.044
2	Skybox Data Centers, Pflugerville Business Park, and Kenney Fort Extension	CI	20.4	0.022	0.035
3	Skybox	CI	10.1	0.011	0.017
4	Timmermann West	CL-5	72.0	0.078	0.123
5	Deck - Wilke	CL-5	67.2	0.073	0.115
6	Timmermann East	CL-5	123.1	0.133	0.211
9	Crux Climbing Center	CL-4	3.0	0.003	0.005
14	Retail Strip Center	GB-1	1.4	0.001	0.002
18	Shops at Kelly Lane & Villages of Hidden Lake Commercial	R	67.7	0.073	0.116
20	Pfennig Place	CL-3	14.6	0.016	0.025
21	Austin Achieve High School	GB-1	18.2	0.020	0.031
22	Baylor Scott and White Medical Center	PUD	26.4	0.028	0.045
23	Quik Trip 4180	GB-1	1.7	0.002	0.003
24	HEB	CL-5	22.1	0.024	0.038
27	Downtown East	PUD	29.6	0.032	0.051

ID	Development Name	Zoning Type	Area (acres)	ADD (MGD)	MDD (MGD)
30	Wash N' Roll	GB-1	4.8	0.005	0.008
34	Gas Station at Jesse Bohls	R	4.7	0.005	0.008
36	Lakeside Meadows Corporate Campus	PUD	96.2	0.104	0.165
39	BASIS Charter School	GB-1	11.3	0.012	0.019
40	Wells Branch Retail	GB-1	12.9	0.014	0.022
43	SH130 Commerce Center	CL-5	24.4	0.026	0.042
45	Pecan Crossing Industrial	CI	104.8	0.113	0.179
50	Cameron Rd Industrial	CL-4	148.7	0.160	0.255
	Total		**910.8**	**0.983**	**1.560**

Future development through 2035 and buildout was estimated based on the remaining undeveloped area within the water CCN and corresponding future land use designation from *Aspire 2040*. Undeveloped parcels fell into four future land use types: low to medium density single-family residential, medium to high density single-family residential, mixed use, and employment. Mixed use and employment areas are divided further based on the zoning type (CL-3, CL-4, or CL-5). Single-family residential and mixed use areas were assigned a density in terms of units per acre based on maximum densities within the City's Unified Development Code (UDC). The total number of units was then estimated by multiplying the units per acre by the total area in acres of each land use type. Demands were calculated for single-family residential areas using the single-family residential unit demands listed in Table 6-1 and for mixed use areas using the apartment unit demands listed in Table 6-1. Demands for employment areas were estimated by taking the total area for this land use type and multiplying by the commercial unit demands listed in Table 6-1. A summary of the future development demand projections is provided in Table 6-5. Approximately 30% of the future development was projected to occur between 2030 and 2035 and the remaining 70% was projected to occur between 2035 and buildout.

Table 6-5: Future Development Demand Projections

Future Land Use Type	Units Per Acre	Total Area (acres)	Total Units	ADD (MGD)	MDD (MGD)
Low to Medium Density Single-Family Residential	3	872	2,616	0.573	1.066
Medium to High Density Single-Family Residential	5	760	3,802	0.833	1.549
Mixed Use (CL-3)	20	2	41	0.004	0.008
Mixed Use (CL-4)	75	130	9,721	1.064	1.981
Mixed Use (CL-5)	90	151	13,632	1.493	2.777
Employment (CL-4)	n/a	391	n/a	0.422	0.670
Employment (CL-5)	n/a	238	n/a	0.257	0.408
Total		**2,545**	**29,811**	**4.646**	**8.459**

Figure 6-1 shows planned and future development throughout the water CCN. Developments are generally labeled from northwest to southeast within the water CCN.

Figure 6-1. Development Map

Pflugerville Water CCN

Water Main

Planned Development

Single-Family

Apartment

Commercial*

Future Development

Employment (CL-4)

Employment (CL-5)

Low to Med Density Res

Med to High Density Res

Mixed Use (CL-3)

Mixed Use (CL-4)

Mixed Use (CL-5)

* Zoning types for planned commercial developments are listed in Table 6-4.

0 0.25 0.5 Miles

N

GARVER

Overall, the total number of connections within the City's water CCN is projected to be approximately 17,867 in 2030 and 21,076 in 2035 (see Figure 6-2). Estimated connections in 2030 include existing connections plus 1,886 single-family residential units (as listed in Table 6-2), 10 apartment complexes from Table 6-3 where construction has yet to begin, and 23 commercial developments (as listed in Table 6-4). Estimated connections in 2035 includes an additional 3,209 single-family residential units (50% of the total listed in Table 6-5). An estimated connection count associated with new apartment complexes or commercial developments was not made.

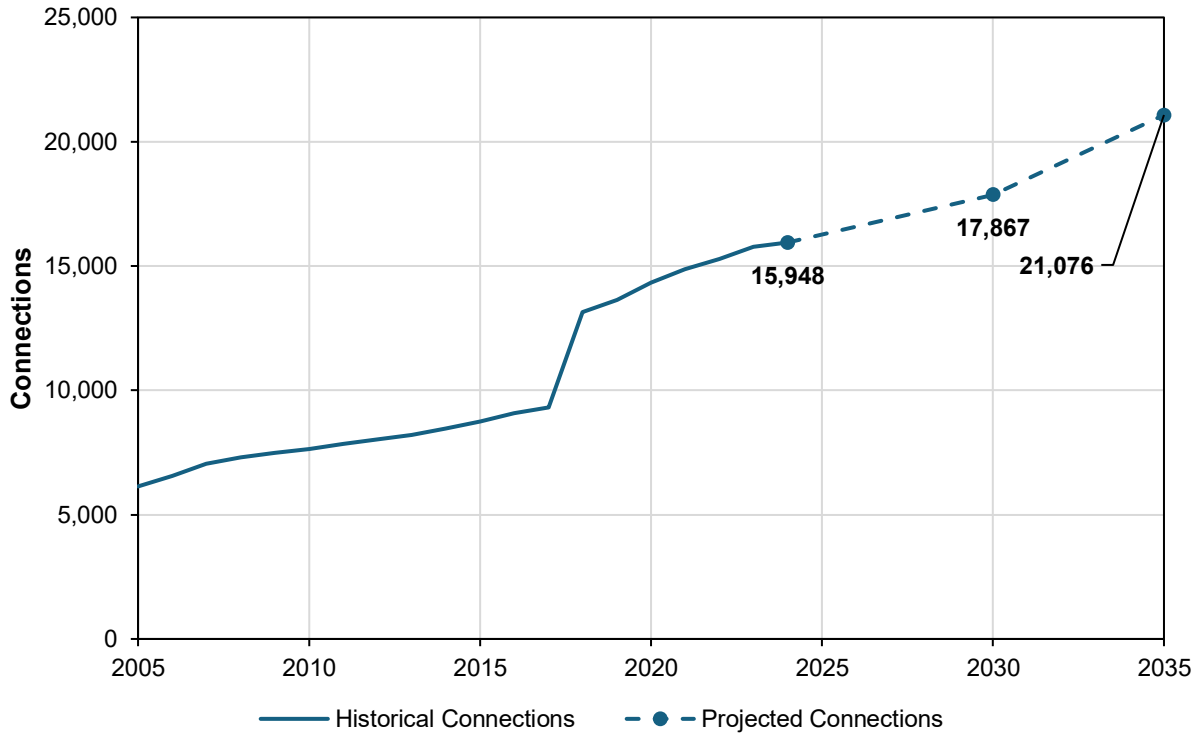


Figure 6-2: Historical and Projected Connections

Planned and future demands were added to average historical demands from 2022 and 2023. Demands from 2022 and 2023 were used as a baseline for projecting future demands to achieve a middle ground between the highest demand on record and recent demand reductions due to water conservation measures. Wholesale demands for all three future horizons are 1.3 MGD and 1.5 MGD for ADD and MDD, respectively. Manville has a daily allocation of 1 MGD. Windermere daily allocations were projected as 0.3 MGD for average day and 0.5 MGD for max day. In total, ADD is projected to be 11.3 MGD, 13.6 MGD, and 15.9 MGD in 2030, 2035, and at buildout, respectively (see Table 6-6). MDD is projected to be 18.6 MGD, 22.8 MGD, and 27.1 MGD in 2030, 2035, and at buildout, respectively.

Table 6-6: Demand Projections

Year	Average Day Demand (MGD)			Max Day Demand (MGD)		
	Pflugerville	Wholesale	Total	Pflugerville	Wholesale	Total
Existing (1)	7.2	1.5	8.7	12.1	2.9	15.0
2030	10.0	1.3	11.3	17.1	1.5	18.6
2035	12.3	1.3	13.6	21.3	1.5	22.8
Buildout	14.6	1.3	15.9	25.6	1.5	27.1
(1) Average of demands from 2022 and 2023.						

Figure 6-3 displays historical and projected ADD and MDD. Historical demands are shown as colored solid lines, and projected demands are shown as colored dashed lines. Exponential best fit lines of historical ADD and MDD are overlayed as black dashed lines. Best fit lines are extrapolated to 2035.

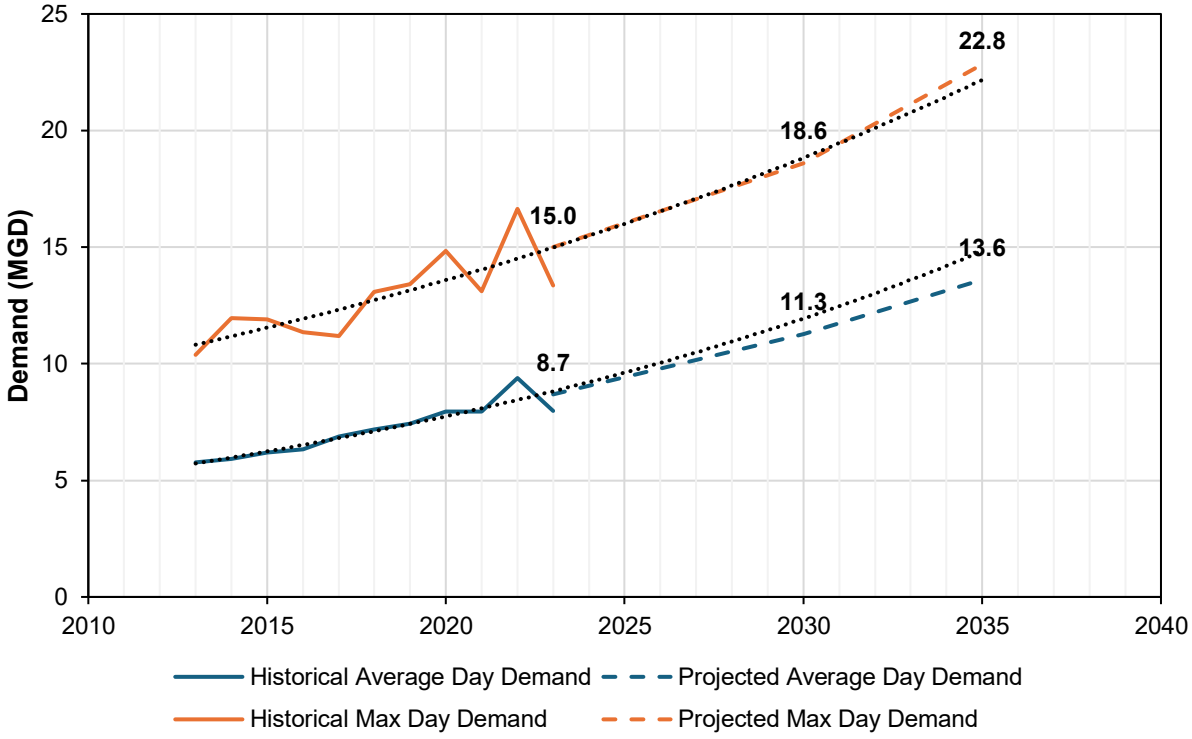


Figure 6-3: Historical and Projected Demand

Projected ADD and MDD have approximately the same slope as the exponential best fit lines, meaning that demands are projected to increase at approximately the same exponential rate as they have for the past 20 years, at least through 2035.

7.0 Summary

An analysis of historical supply and demand was performed using daily production and wholesale data from January 2013 to August 2024. In 2023, approximately 87% of total demand was for Pflugerville with only 13% of total demand for Manville and Windermere. The greatest maximum day demand (MDD) of 16.6 MGD occurred on July 27, 2022. MDD in 2023 was lower at 13.4 MGD. Demands from 2022 and 2023 were used as a baseline for projecting future demands to achieve a middle ground between the highest demand on record and recent demand reductions due to water conservation measures.

An analysis of historical usage was performed using monthly water utility billing data within the water CCN from 2021 through 2023 and a using a 2023 water use and loss summary spreadsheet. Approximately 96% of existing connections are single-family residential accounting for 62% of total usage. The next two highest customer types are commercial and apartments at 3% and 0.3%, respectively, accounting for 15% and 19% of total usage, respectively. Historical usage per single-family residential connection and per commercial land area was visualized in terms of cumulative probability. Average values excluding outliers below the 5th percentile and above the 95th percentile were selected for projecting future demands. Usage per apartment unit was assumed to be 50% of usage per single-family residential connection.

Benchmarking of water usage was performed against other local utilities of similar composition and size. Pflugerville's average single-family residential water usage in 2023 was the same at approximately 86 gpcd as compared to most other utilities which had average residential water usages of approximately 90 gpcd.

Demand projections were made for 2030, 2035, and buildout horizons. Projections through 2030 are based on current planned development. Projections through 2035 and buildout are based on future land use designations from *Aspire 2040.* Overall, the total number of connections within the City's water CCN is projected to be approximately 17,867 in 2030 and 21,076 in 2035. ADD is projected to be 11.3 MGD, 13.6 MGD, and 15.9 in 2030, 2035, and at buildout, respectively. MDD is projected to be 18.6 MGD, 22.8 MGD, and 27.1 MGD in 2030, 2035, and at buildout, respectively. Demands are projected to increase at approximately the same exponential rate as they have for the past 20 years, at least through 2035.

Appendix B

Facility Layouts

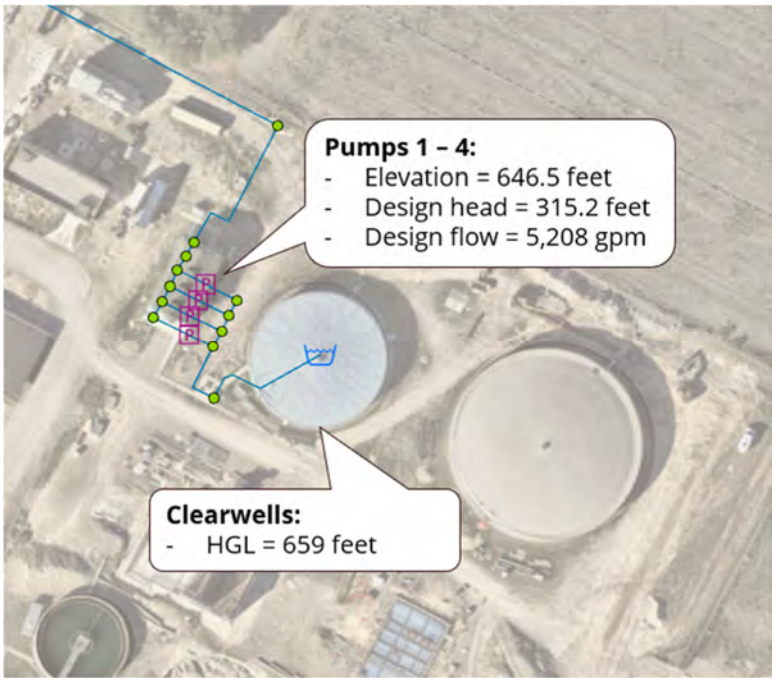


Figure B-1. Pflugerville WTP

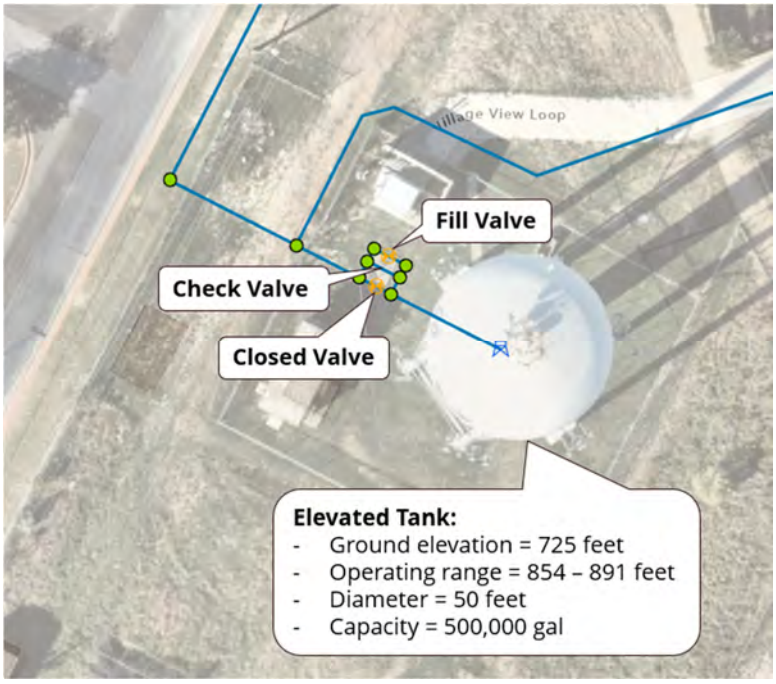


Figure B-2. Falcon Pointe Elevated Storage Tank

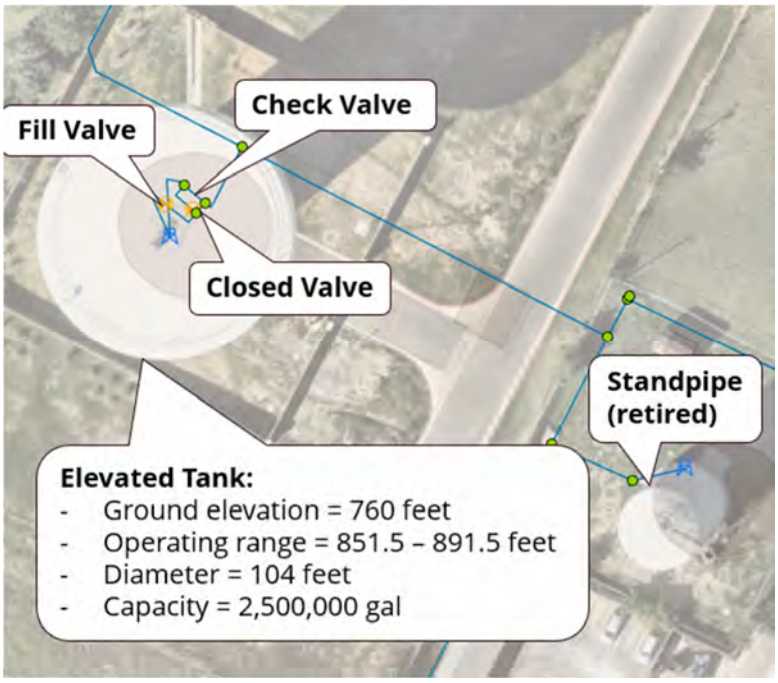


Figure B-3. North Elevated Storage Tank

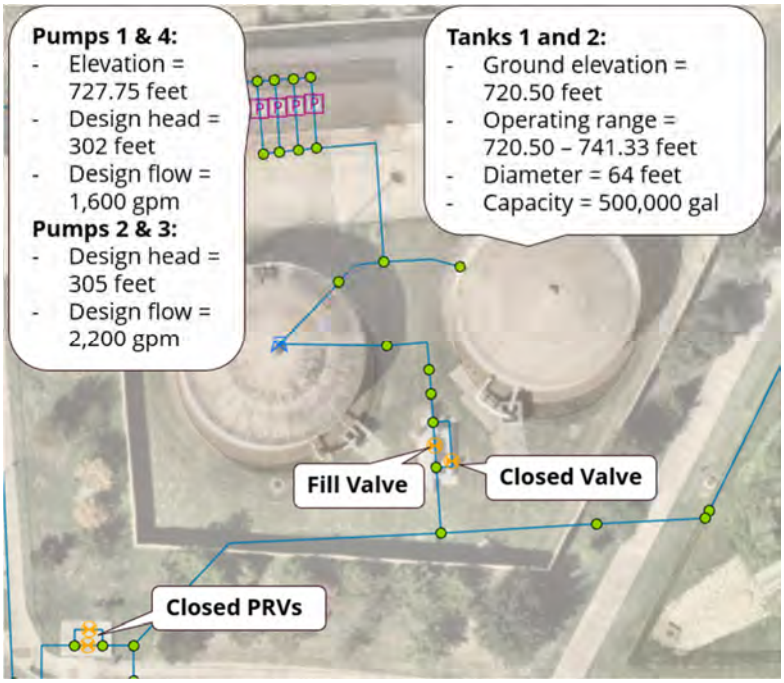


Figure B-4. Pfennig Pump Station

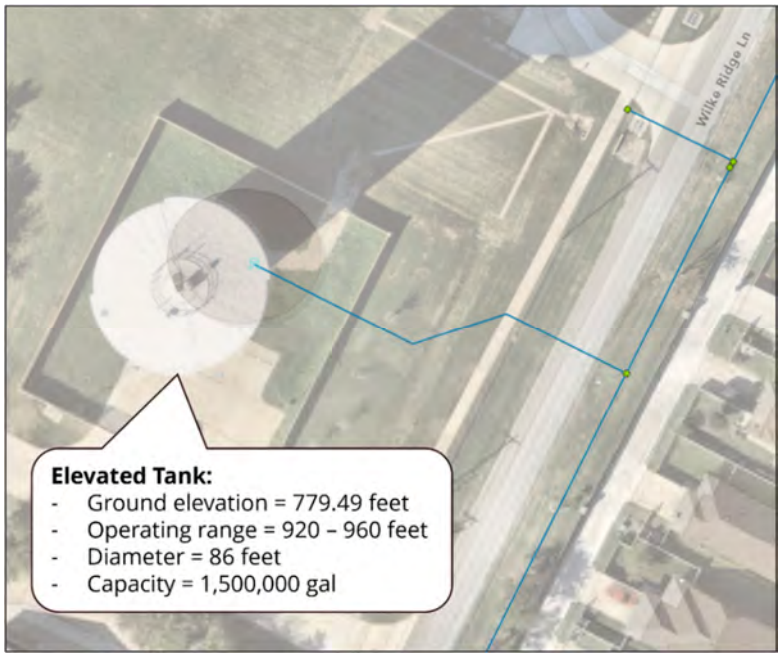


Figure B-5. Heatherwilde Elevated Storage Tank

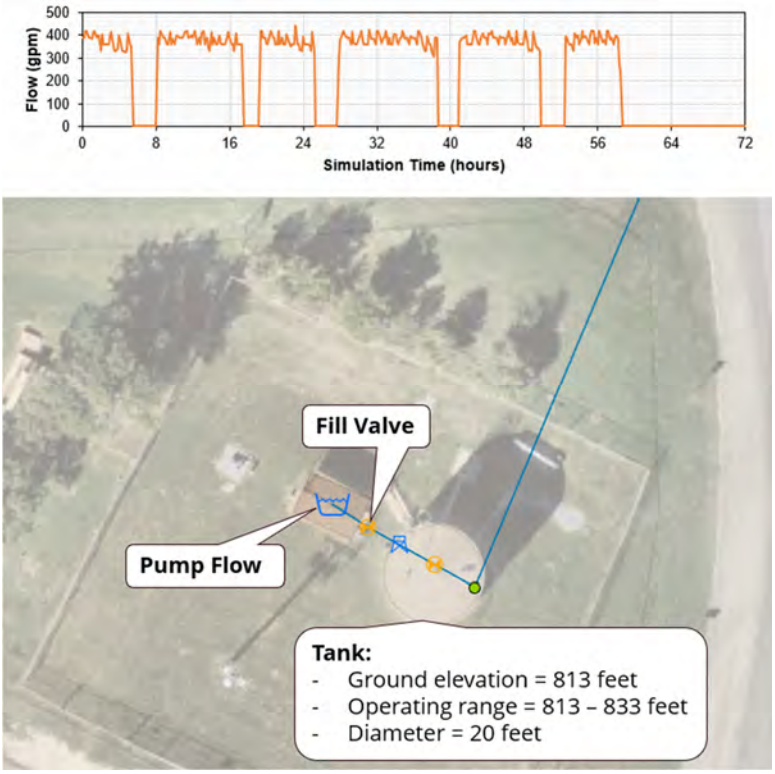


Figure B-6. Windermere

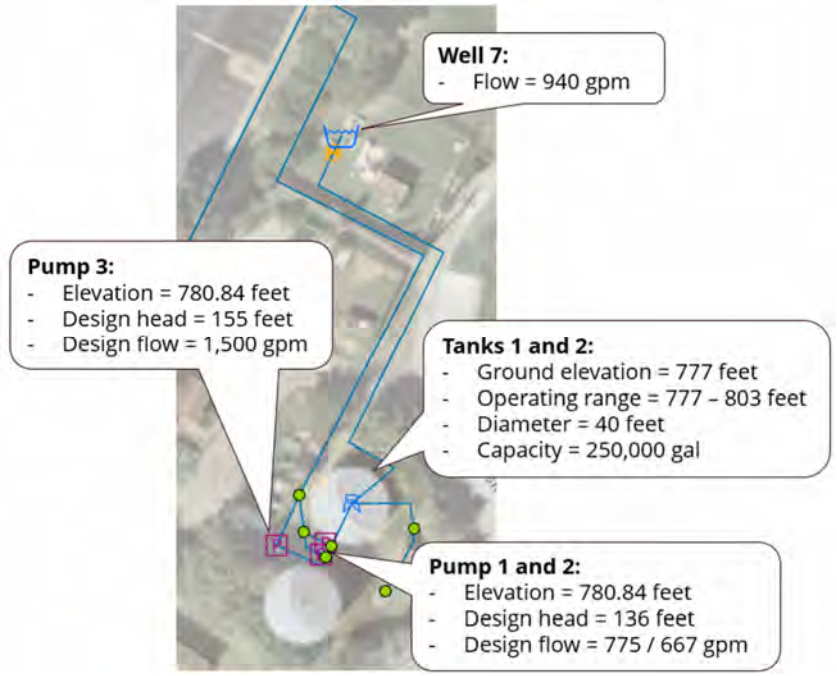


Figure B-7. Chisolm Well Station

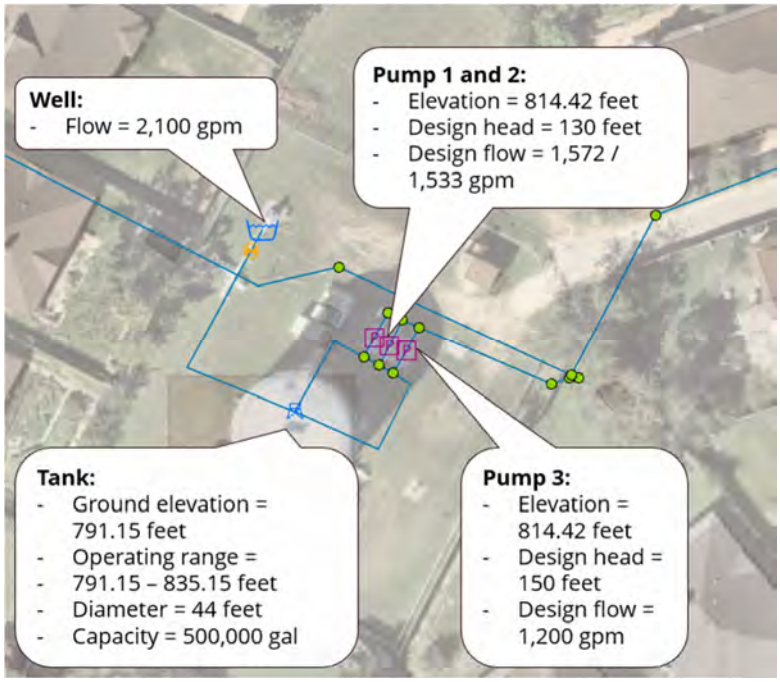


Figure B-8. Well 6 Station

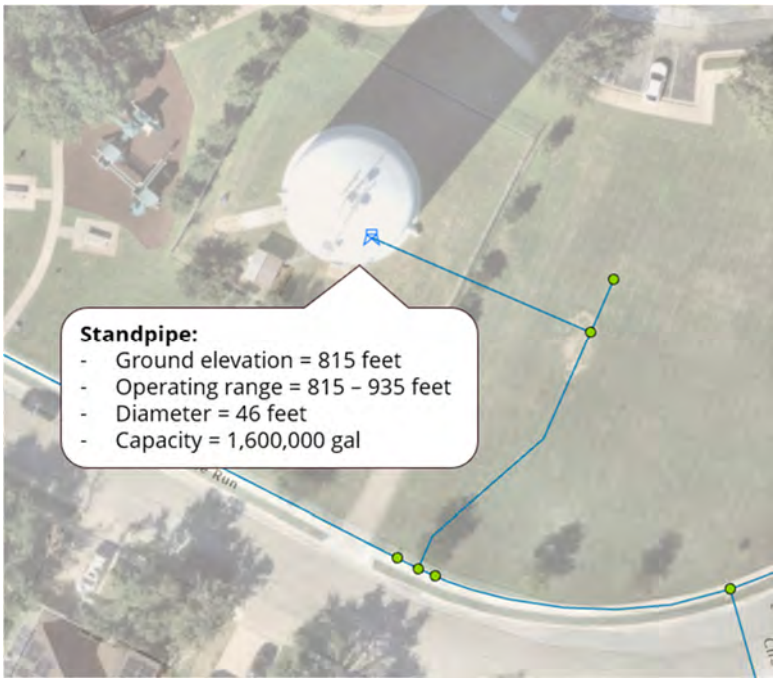


Figure B-9. South Standpipe

Appendix C

Pump Curves

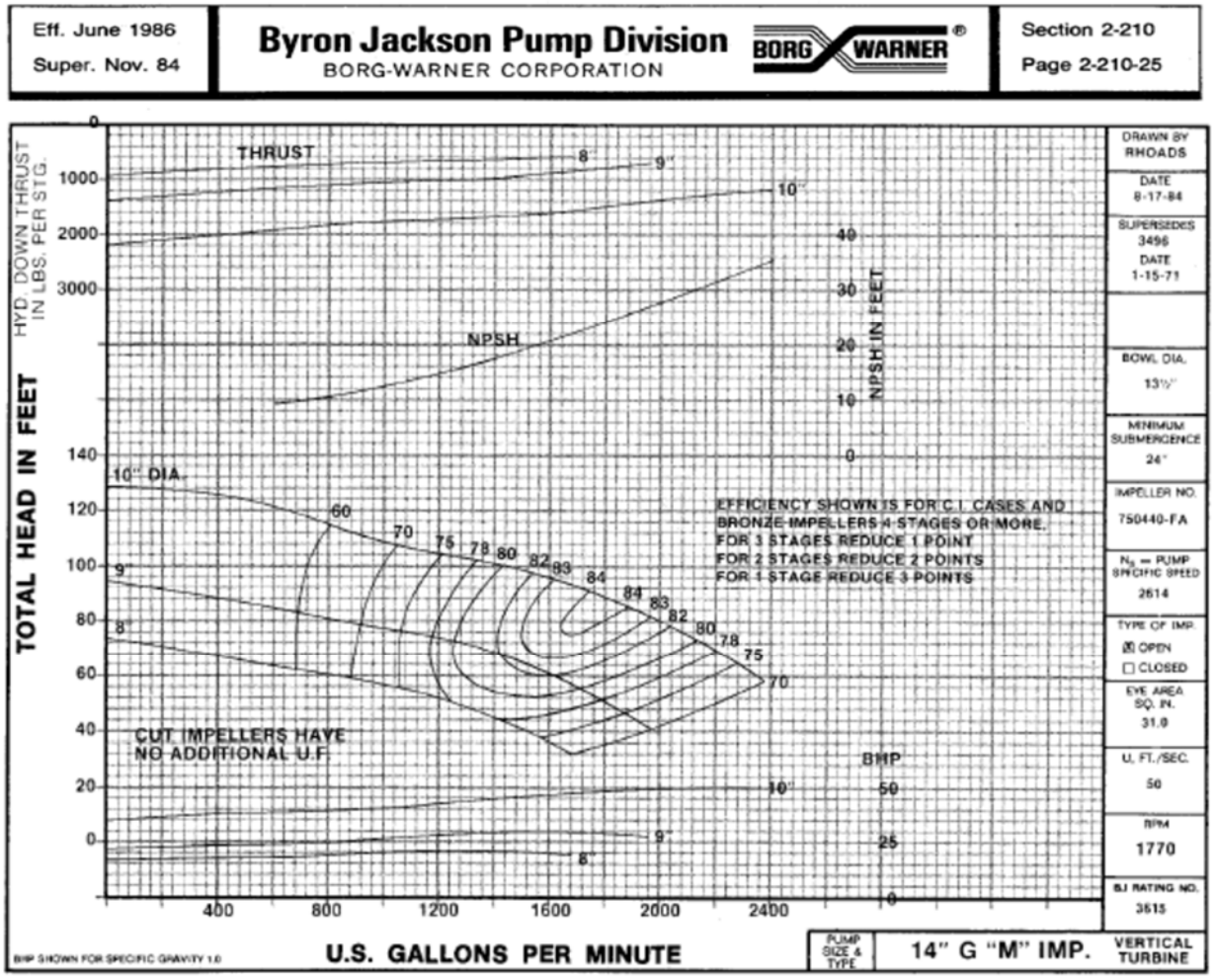


Figure C-1: Chisholm Pump 3 Curve

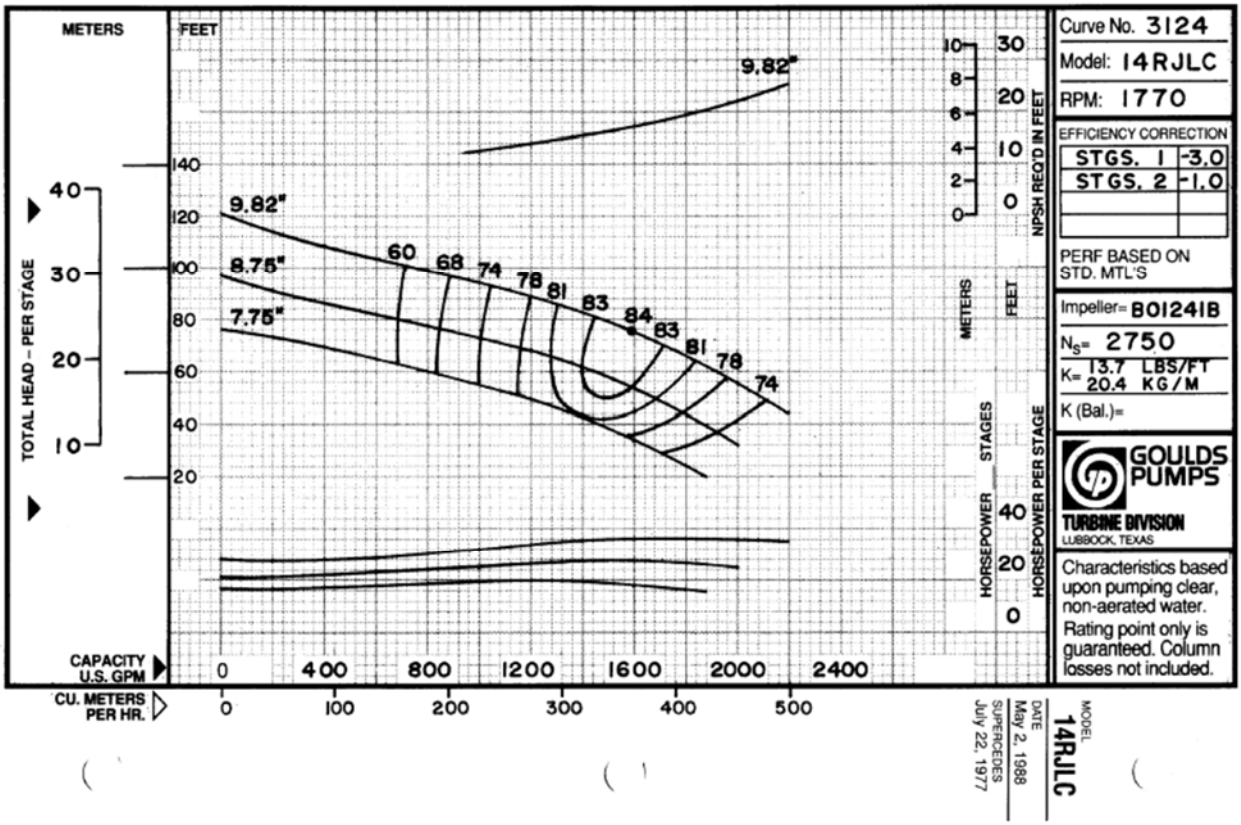


Figure C-2: Pfennig Pump 1 & 4 Curve

Hydraulic Datasheet

Customer	: Smith Pump Company, Inc.	Pump / Stages	: 15EMM / 3
Customer reference	:	Based on curve no.	: EC-2377
Item number	: Pville-Pfennig-200hp Alt	Flowserve reference	: 162525 Version 1
Service	:	Date	: March 3, 2014

Operating Conditions

Capacity	: 2200.0 USgpm
Water capacity (CQ=1.00)	: -
Normal capacity	: -
Total Developed Head	: 305.00 ft
Water head (CH=1.00)	: -
NPSH available (NPSHa)	: 33.4 ft
NPSHa less NPSH margin	: -
Maximum suction pressure	: 0.0 psig
Rated suction pressure	: 0.0 psig

Liquid

Liquid type	: Fresh water
Liquid description	:
Temperature / Spec. Gravity	: 60 F / 0.999
Viscosity / Vapor pressure	: 1.0 cSt / 0.26 psia

Materials / Specification

Material column code	: B30

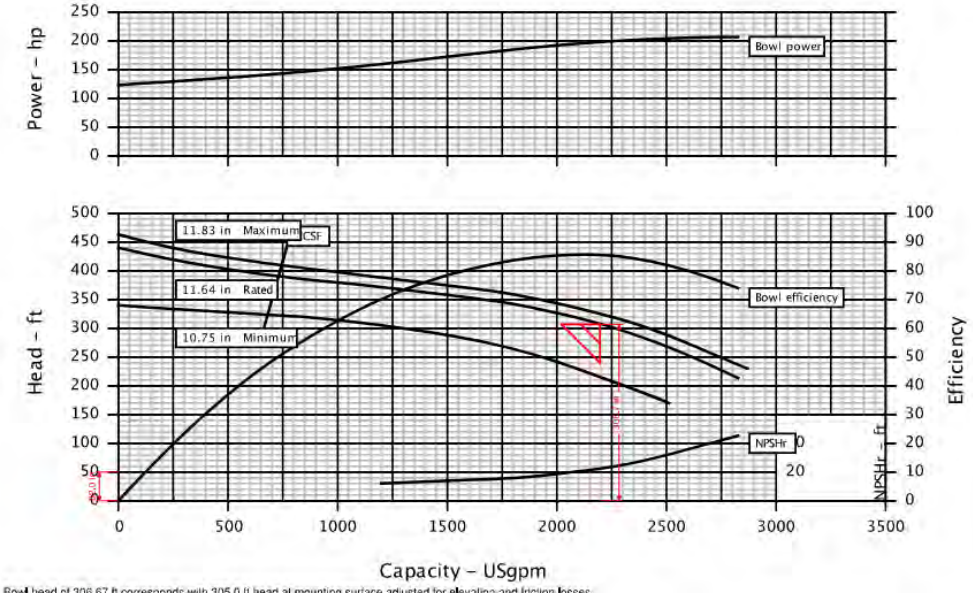
Other Requirements

Hydraulic selection : No specification
Construction : No specification
Test tolerance : Hydraulic Institute Level A
Driver Sizing : Max Power (SO to EOC) w/o SF

Performance

Pump speed	: 1775 rpm	Impeller diameter	: Rated 11.64 in / Maximum 11.83 in / Minimum 10.75 in
NPSH required (NPSHr)	: 20.0 ft		
Hydraulic power	: 169 hp	Impeller dia ratio (rated/max)	: 98.4 %
Efficiency (CE=1.00)	: 85.0 %	Maximum head @ rated dia	: 439.46 ft
Power: (Rated / Max)	: 199 hp / 208 hp	Head rise to shut off	: 43.3 %
Driver power	: 250 hp / 186 kW	Total head ratio (rated/max)	: 94.4 %
Bowl Pressure	: 190.1 psig	Flow at BEP	: 2103.9 USgpm
(based on shut off and Rated specific gravity @ Cut dia)		Flow as % of BEP	: 104.6 %
Maximum allowable	: 375.0 psig	Minimum continuous flow	: 736.1 USgpm
Bowl & column hydrotest	: 237.6 psig	Suction specific speed	: 9100 US units
Dischg Head Dischg Region MAWP	: 285.0 psig	Thrust - Rated flow / Rated suction	: 2969.3 lbf
Suction Regions MAWP	: 285.0 psig	Max thrust - Shut off / Rated suction	: 4147.3 lbf
		Min thrust - Runout flow / Max Suction	: 2136.7 lbf
		(A negative thrust value indicates an upthrust condition)	

CURVES ARE APPROXIMATE, PUMP IS GUARANTEED FOR ONE SET OF CONDITIONS: CAPACITY, HEAD, AND EFFICIENCY.
Bowl performance shown below is corrected for materials, viscosity and construction.



Bowl head of 306.67 ft corresponds with 305.0 ft head at mounting surface adjusted for elevation and friction losses.

Figure C-3: Pfennig Pump 2 & 3 Curve

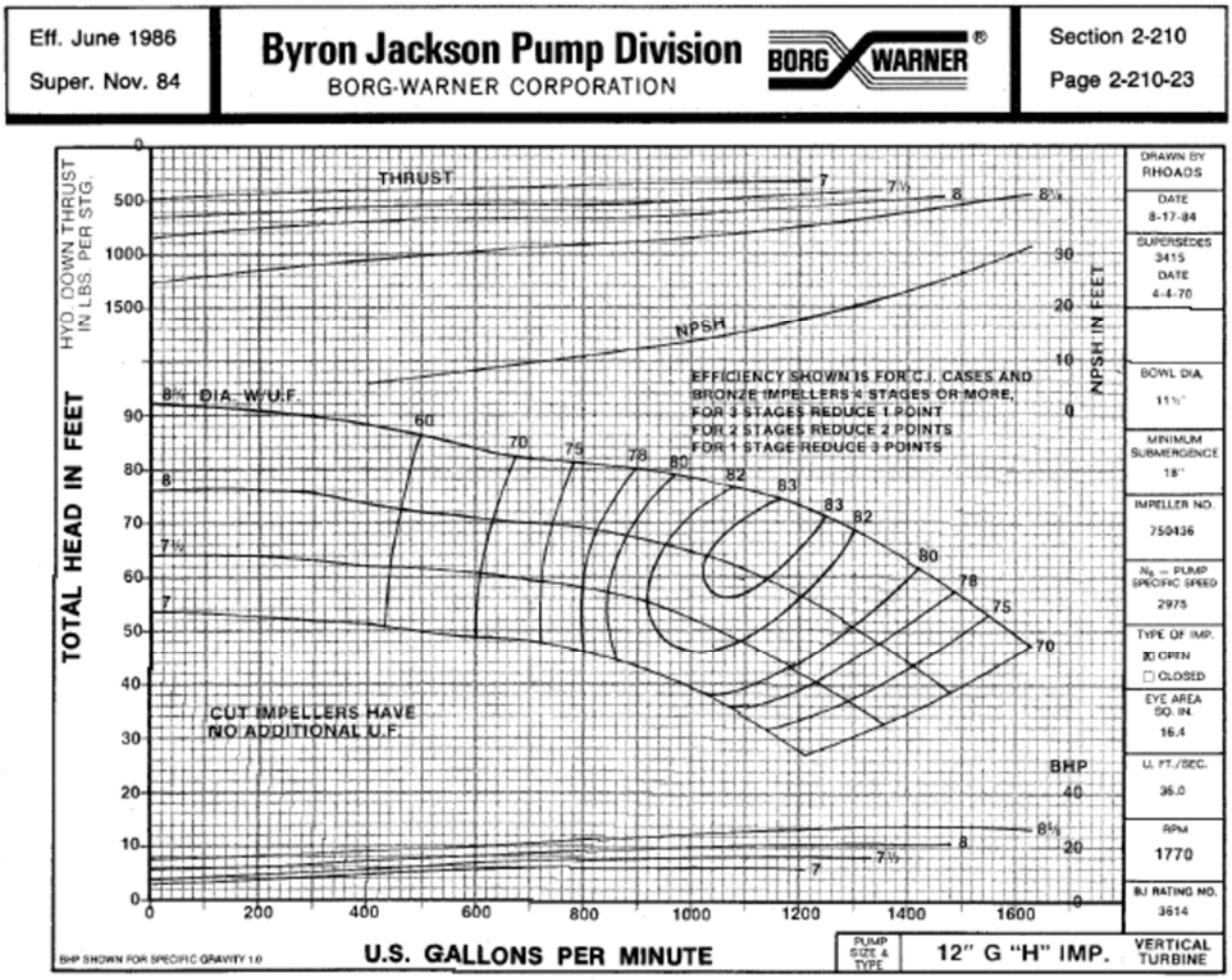


Figure C-4: Well 6 Pump 3 Curve

PENTAIR

Customer : Odessa Pumps
Project name : City of Pflugerville HSPS Expansion

Pump Performance Datasheet
Encompass 2.0 - 20.4.1

Item number	: Copy of 001	Size	: 19A-SS
Service	:	Stages	: 3
Quantity	: 1	Based on curve number	: 19_TURB_3700_1800_SS Rev 150924
Quote number	: City of Pflugerville HSPS Expansion Project	Date last saved	: 09 Nov 2020 12:06 PM

Operating Conditions

Flow, rated	: 5,208.0 USgpm
Differential head / pressure, rated (requested)	: 315.0 ft
Differential head / pressure, rated (actual)	: 315.2 ft
Suction pressure, rated / max	: 0.00 / 0.00 psi.g
NPSH available, rated	: Ample
Site Supply Frequency	: 60 Hz

Performance

Speed criteria	: Synchronous
Speed, rated	: 1770 rpm
Impeller diameter, rated	: 13.78 in
Impeller diameter, maximum	: 14.36 in
Impeller diameter, minimum	: 12.12 in
Efficiency (bowl / pump)	: 81.28 / - %
NPSH required / margin required	: 25.86 / 0.00 ft
nq (imp. eye flow) / S (imp. eye flow)	: 68 / 215 Metric units
Minimum Continuous Stable Flow	: 2,992.6 USgpm
Head, maximum, rated diameter	: 533.3 ft
Head rise to shutoff (bowl / pump)	: 69.20 / - %
Flow, best eff. point (bowl / pump)	: 4,950.3 / - USgpm
Flow ratio, rated / BEP (bowl / pump)	: 105.21 / - %
Diameter ratio (rated / max)	: 95.96 %
Head ratio (rated dia / max dia)	: 88.41 %
Cq/Ch/Ce/Cn [ANSI/HI 9.6.7-2010]	: 1.00 / 1.00 / 1.00 / 1.00
Selection status	: Acceptable

Liquid

Liquid type	: Water
Additional liquid description	:
Solids diameter, max	: 0.00 in
Solids diameter limit	: 1.25 in
Solids concentration, by volume	: 0.00 %
Temperature, max	: 68.00 deg F
Fluid density, rated / max	: 1.000 / 1.000 SG
Viscosity, rated	: 1.00 cP
Vapor pressure, rated	: 0.34 psi.a

Material

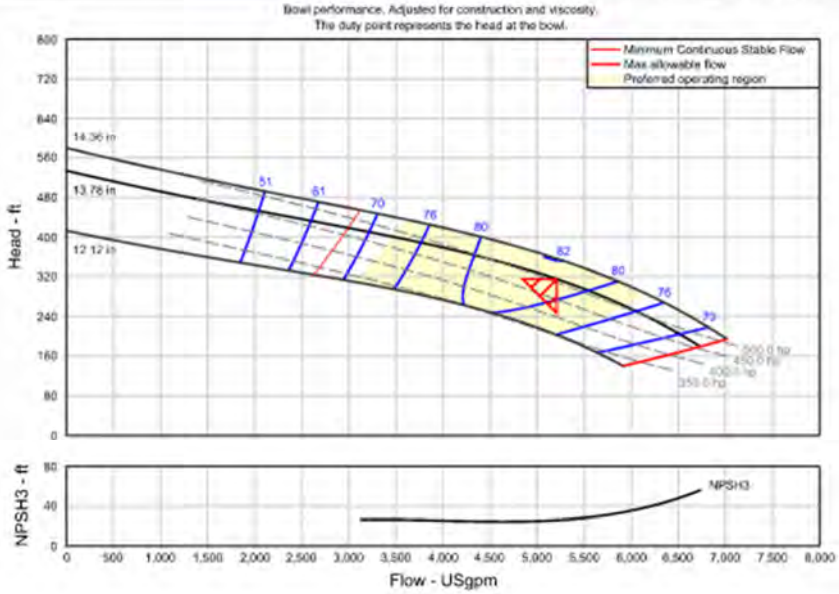
Material selected	: Cast Iron bowl Std impeller

Pressure Data

Maximum working pressure	: See the Additional Data page
Maximum allowable working pressure	: See the Additional Data page
Maximum allowable suction pressure	: N/A
Hydrostatic test pressure	: See the Additional Data page

Driver & Power Data (@Max density)

Driver sizing specification	: Maximum power
Margin over specification	: 0.00 %
Service factor	: 1.00
Power, hydraulic	: 414 hp
Power (bowl / pump)	: 510 / - hp
Power, maximum, rated diameter	: 511 hp
Minimum recommended motor rating	: 600 hp / 447 kW



PENTAIR

ODESSA PUMPS - ODESSA TX
ODESSA, TX

PHONE: FAX:

Figure C-5: WTP Pump 1 - 4 Curve

Appendix D

Transportation Master Plan

PFLUGERVILLE
PFORWARD
TRANSPORTATION MASTER PLAN

OCTOBER 2020 - REVISION 1

ACKNOWLEDGMENTS

Transportation Planning Oversight Committee (TPOC)

- Richard Coaxum
- Jodie Kaluza
- Mary Foss
- Urcha Dunbar-Crespo
- Geoff Guerrero
- Jason Kemp
- Ann-Marie Price
- Ronald Moellenberg
- Bob Daigh
- David Vesling
- Amy Madison
- Victor Vargas
- April Griffin
- Shontel Mays
- Josh Foss
- Nick Perkins
- Bobby Ortiz
- Crystal Connally
- Jason Cavness
- Walter Muse
- Erin Crespo

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- Victor Gonzales, Mayor
- Doug Weiss
- Omar Peña, Mayor Pro Tem
- Jeff Marsh
- Rudy Metayer
- Mike Heath
- Jim McDonald

City Manager

- Sereniah Breland

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- Abby Morrison
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- Clarissa Bruns
- Monica Powell

Cambridge Systematics

- Rachel Copperman
- Zeina Wafa

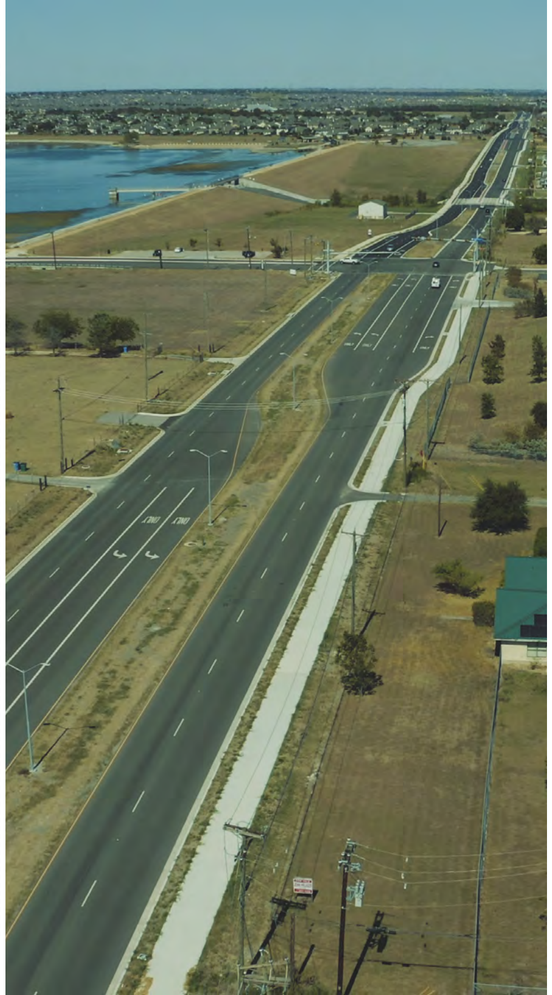

TABLE OF CONTENTS

The Transportation Master Plan is organized into eight chapters as outlined below.

Glossary of Terms/Abbreviations begins on page 61.

06
CHAPTER 1
Pfirst Impressions
Gives an overview of existing conditions in Pflugerville related to both land use and transportation facilities and operations.

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CHAPTER 2
PUBLIC INVOLVEMENT
Summarizes feedback received from community stakeholders throughout the planning process.

20
CHAPTER 3
PLAN OBJECTIVES
Describes TMP objectives based on collaboration with the Transportation Plan Oversight Committee and City staff to align community goals with desired outcomes.

22
CHAPTER 4
MODELING
Documents the technical processes used to model several planning scenarios, which informed the decision-making process, resulting in a results-oriented, data driven plan.

37
CHAPTER 5
MAP AND CROSS SECTIONS
Contains the proposed thoroughfare plan map and cross sections in the City of Pflugerville as well as maps for active transportation.

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CHAPTER 6
CAPITAL IMPROVEMENTS PLAN
Develops a prioritized Capital Improvements Plan with High, Medium, and Low priority projects with planning level cost estimates.

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CHAPTER 7
PFUNDING
Identifies potential funding sources for transportation projects in Pflugerville.

55
CHAPTER 8
POLICIES
Proposes new policies for transportation to help the City achieve its vision and goals for transportation infrastructure.

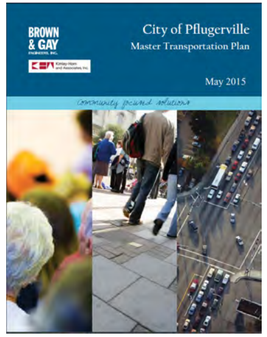
INTRODUCTION

WHAT IS A TRANSPORTATION MASTER PLAN?

The Transportation Master Plan (TMP) is a long-range plan that identifies transportation objectives, solutions, and policies the City of Pflugerville needs to consider as it continues to be one of the fastest growing cities in America. The transportation planning process defines future investments that will move people and goods in a safe and efficient manner. Developing the TMP was a collaborative process that analyzed a variety of alternative scenarios imagining a fully built-out city. This process was used to inform citizens, stakeholders, and elected officials to make decisions regarding future facilities and policies. On August 13, 2019 Council passed Resolution 633 to develop a Locally Preferred Alternative (LPA) for the Mokan corridor.

WHY IS THE TMP BEING UPDATED?

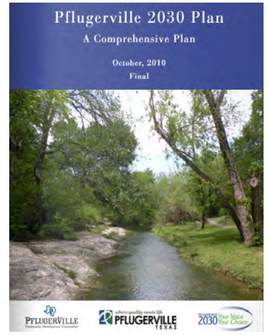
The TMP is being updated to reflect current City priorities through identification of updates to the Thoroughfare Plan map, including roadway classification changes, intersection projects, and new corridor studies to manage existing condition and future demands on the transportation system. Master planning documents in general should be updated on a regular basis to properly reflect community priorities and be responsive to change. As a result, the 2015 TMP is being updated to reflect the City of Pflugerville's transportation objectives, which are elaborated on in Chapter 3 of this document. Specific changes that reflect objectives are revisions to the Thoroughfare Plan map to identify new connections and changes to the cross sections to reflect desire for multimodal travel, both found in Chapter 5 of this document.



WHAT IS THE RELATIONSHIP OF THE TMP TO OTHER CITY PLANS?

The TMP is a document that serves to implement goals of the Comprehensive Plan and further refine policies for transportation within it. The 2030 Comprehensive Plan specifies several transportation goals, referencing development of a Thoroughfare Plan, specifying corridor studies, regional connectivity and agency coordination, and transportation project prioritization all of which are addressed in this document. The TMP takes the broader goals of the Comprehensive Plan and refines them into mode specific maps, projects, and policies for implementation. The 2019-2023 5-year Capital Improvements Plan (CIP) was reassessed with additional projects identified in the TMP along with community feedback to further refine priority transportation projects.

The TMP also contains some modal plans (vehicle and bike modes) in the form of maps within the document, as well as policy directives to develop planning maps for other modes such as a Sidewalk Master Plan (pedestrian mode) and Transit System Plan, which relates to the Transit Development Plan adopted by council in August 2018. The Comprehensive Plan includes a future trails map as an appendix, which is memorialized in a bike system map within Chapter 5 of this document.



WHAT IS IN THIS TMP REPORT?

The Table of Contents on page 3 specifies the beginning page of each chapter and what is generally contained within them. Throughout this document links are provided in the electronic version to larger scale poster sized maps for ease of viewing information. The following is a general overview of what can be found in this document by topical area, with references to specific chapters where topics are addressed:

- Plan Objectives to guide transportation project investments and policy implementation – **Chapter 3**
- Modeling – shows how roadways are performing today and for several future scenarios. This is the technical, data-driven analysis used to develop the plan – **Chapter 4**
- Thoroughfare Plan Map – used for Right-of-Way reservation and long-range planning for widening existing roadways and future roadway alignments. New in this TMP is also recommendations related to intersection improvements and frontage road ramp reversals and corridor study directives for key arterials – **Chapter 5**
- Roadway Cross sections – based on functional classifications identified in the map (roadway function implies both roadway capacity and context influencing allocation of space) – this shows intent of how right-of-way should look for the lines on the Thoroughfare Plan Map, but actual design may differ due to various design conditions and priorities – **Chapter 5**
- 5-Year Capital Improvements Plan that builds upon 2019-2023 5-Year Capital Improvements Plan with some new projects and a refined prioritization process – **Chapter 6**
- Implementation strategies and funding – both local and regional perspective – **Chapter 7**
- Policies – these are directives toward new policies to support transportation system needs and plan objectives, as well as identification of additional studies to help achieve plan objectives – **Chapter 8**

1

PFIRST IMPRESSIONS

To understand the state of the City of Pflugerville, a review of the existing conditions and trends was performed as a baseline for developing the 2019 TMP. Understanding how Pflugerville is growing, where there are existing strains on the transportation system, and where gaps in connectivity exist will help develop a plan that serves Pflugerville in perpetuity.

GROWTH

Pflugerville, like many other areas, is growing at a rapid pace. Growth brings many benefits, including economic investment, but can create challenges to fund supporting infrastructure.

LAND USE AND ZONING

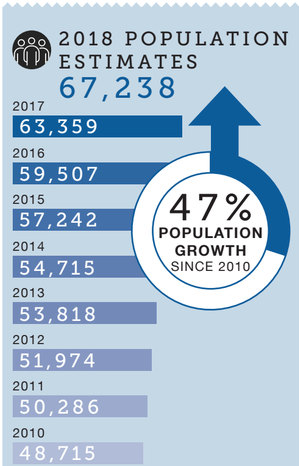
The City of Pflugerville's current land use is predominantly residential with retail, commercial, and general business uses concentrated along heavily traveled corridors and near intersections. The City is characterized by several commercial destinations along SH 45, FM 685 and near SH 130 and Pecan St. In addition to the destination retail, commercial neighborhood services dominate the arterials bounded by SH 45, and SH 130. Historically, residential growth has occurred through a mixture of single-family subdivisions, multi-family developments, and some Planned Unit Developments (PUDs).

The Zoning map in **Figure 1** illustrates the planned concentration of retail and commercial development primarily along Pflugerville Pkwy., SH 45 and SH 130 with a central destination near the existing Stone Hill Town Center development on the southwest quadrant of SH 45 and SH 130. East of SH 130 is predominantly residential and agricultural with most of commercial and neighborhood services development concentrated along SH 130.

DEMOGRAPHICS

Pflugerville is growing at an exponential rate. The rapid growth for Pflugerville is attributed to the increased jobs, availability of affordable housing, and close proximity to employment centers. The community is characterized by:

- A large number of families with children under the age of 18
- Over 40% minority population
- Approximately 4,500 veterans
- Half of businesses are owned by women, minorities, and veterans.



PFLUGERVILLE IS ANTICIPATED TO GROW BY 156% BETWEEN 2010 AND 2030

NUMBER OF COMPANIES (RESTAURANTS, RETAIL, PROFESSIONAL, INDUSTRIAL)
3,898

NUMBER OF SCHOOLS
18

Sources: US Census, City of Pflugerville

Source: City of Pflugerville

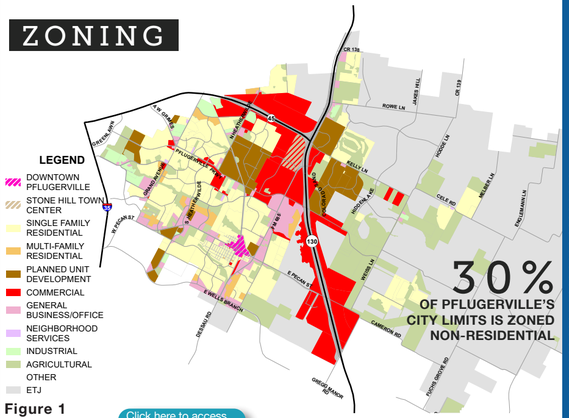


Figure 1

Click here to access full scale image

CONNECTIVITY

The roadway network provides daily connections for thousands of commuters and residents within the City and to surrounding municipalities. Improving, expanding and maintaining these roadways is vital to the dynamic growth of Pflugerville.

ROADWAYS

The heart of Pflugerville's roadway network is characterized by major arterial and collector roadways that connect regional thoroughfares to local streets. Pflugerville accesses the surrounding region by way of SH 130, FM 685 and IH 35 in the north-south direction and Pflugerville Pkwy., FM 1825 (Pecan St.) and SH 45 in the east-west direction. Primary arterials and collector roadways in the east-west direction connecting SH 130 and IH 35 are Pflugerville Pkwy., Pecan St., and Wells Branch Pkwy. In the north-south direction, Heatherwilde Blvd., FM 685/Dessau Rd., and A.W. Grimes Blvd./Grand Ave. Pkwy. connect SH 45 to downtown Pflugerville and North Austin. Roadway functional classifications are shown on the Thoroughfare Plan map in Chapter 5 and described with cross sections on Pages 39-43.

Downtown Pflugerville, shown in **Figure 2** continues to grow around Pecan St. with planned extensions to accommodate commercial and retail growth in the surrounding area. The Downtown Action Plan, adopted September 2018, specifies the vision for this area of the City.

The area of Pflugerville east of SH 130 lacks options for connectivity and will be the site for future expansion of the roadway network to service growing residential neighborhoods west of FM 973.

Source: Pflugerville Downtown Action Plan

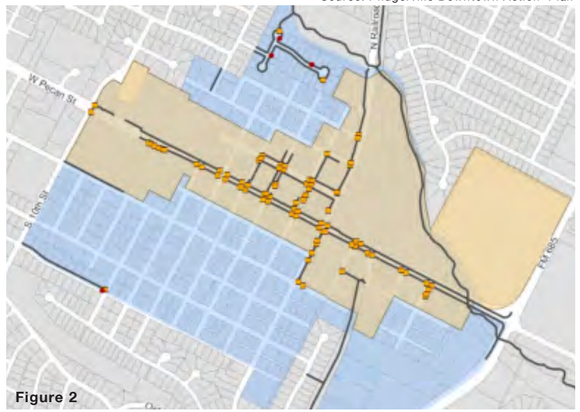


Figure 2

REGIONAL MOVEMENT

While a large portion of traffic on Pflugerville's roads serve local residents, a substantial component of traffic is from regional travel. A significant amount of travel occurs in the North-South direction in the Austin area to connect surrounding communities with predominantly residential land uses to employment centers in Austin and other areas. SH 130 is the only highway facility within Pflugerville traveling in this direction and is tolled, which discourages many drivers from using the main lanes of travel. This has resulted in significant traffic and congestion on the SH 130 frontage roads and adjacent arterials such as FM 685, Heatherwilde Blvd., and Weiss Ln.

In the East-West direction, the only highway facility is SH 45, which is also a tolled facility that discourages use by some travelers due to the additional cost of use. In addition, there is the gap in the SH 45 frontage roads to the west of Heatherwilde Blvd., which further inhibits east/west mobility in this area. Further to the east, where SH 45 terminates as a highway facility, the offset between Kelly Ln. and Cele Rd. at Weiss Ln. reduces the viability of this arterial as a regional thoroughfare. Alternatives to SH 45 and Kelly exist with Pflugerville Pkwy. and Pecan St. further south of SH 45. However, Pflugerville Pkwy. terminates at Greenville Pkwy. before reaching IH 35 and Pecan St. passes through downtown Pflugerville as a narrower urban roadway, inhibiting the flow of traffic towards other regional facilities.

Figure 3 illustrates the regional facilities for both north-south and east-west travel in Pflugerville. Regional connectivity and congestion are both addressed with plan objectives outlined in Chapter 3.

MAJOR REGIONAL CONNECTIONS

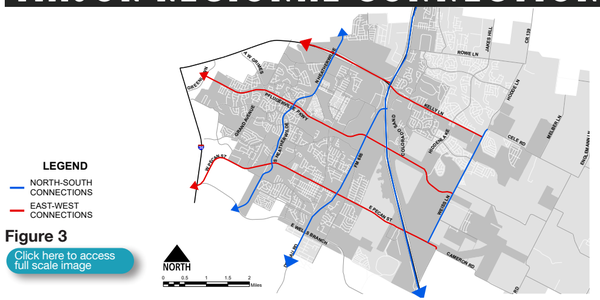


Figure 3

Click here to access full scale image

CONNECTIVITY

LOCAL STREETS AND COLLECTORS

Approximately 68% of the City of Pflugerville roadway network is local streets and collectors. These facilities are the backbone of the roadway network connectivity that allow residents to reach destinations without driving on regional arterials. See **Figure 4** for breakdown of roadway classifications.

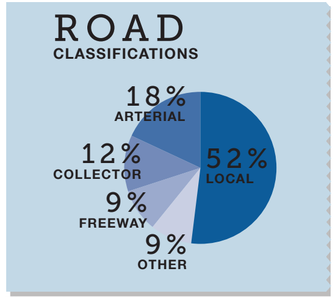


Figure 4

CURRENT BOND PROJECTS

As of the writing of this plan, the City of Pflugerville is actively at work to address strains on the transportation network through implementation of several bond projects shown in **Figure 5.** While many of these projects address deficiencies with roadway widenings and new connections, they are only a first step at addressing the challenges that Pflugerville is facing. Chapter 3 outlines objectives for addressing transportation challenges in Pflugerville, which are highlighted throughout the remainder of the document.

INTERSECTIONS

The existing roadway network includes 31 signalized intersections and numerous stop-controlled intersections that act as the nodes of the roadway system, shown in **Figure 6**. Historically, conventional signals and stop signs were the only means of traffic control used in Pflugerville. Intersections are a significant source of traffic delays and bottlenecks. Intersections have historically not been identified as part of previous transportation planning in Pflugerville, but can have a substantial impact on congestion and connectivity in the City and the region. As Pflugerville moves well past 50,000 residents and is in the process of taking over signals from the Texas Department of Transportation (TxDOT), there is opportunity for the City to make investments at these important locations and with greater autonomy. Intersections are addressed in subsequent chapters of the report in both the Thoroughfare Plan map (Chapter 5), and in the Capital Improvement Plan (Chapter 6).

CURRENT BOND PROJECTS

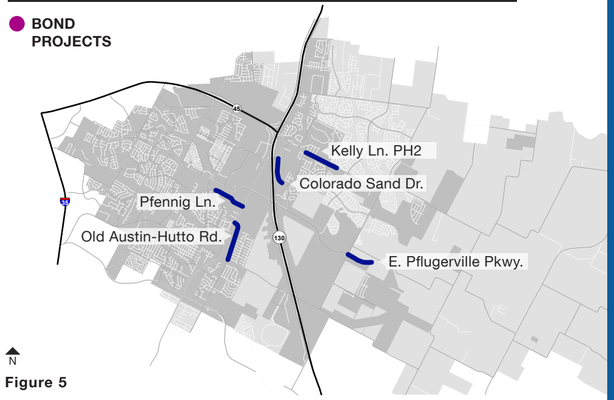


Figure 5

TRAFFIC CONTROL

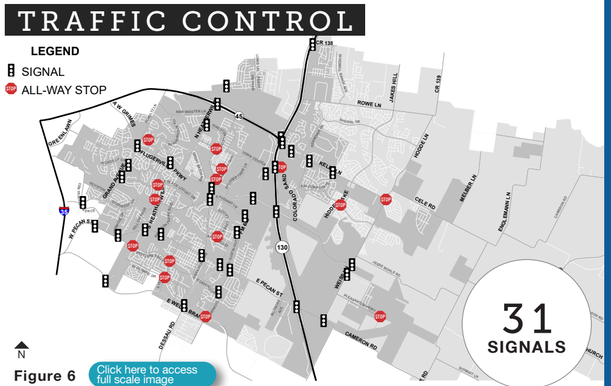


Figure 6

Click here to access full scale image

CRASH HISTORY

The frequency of crashes in Pflugerville affect the safety and daily quality of life for residents. A total of 3,322 collisions occurred in Pflugerville between 2014 and 2018 with 170 crashes involving injuries. Clusters in locations shown in red on the heat map **(Figure 7)** illustrate that heavily traveled corridors are a source for high frequencies of collisions. Several hot spots for collisions include the intersections of Pecan St./FM 1825 and FM 685/Dessau Rd., Heatherwilde Blvd., Pecan St., Wells Branch Pkwy., Dessau Rd., and the interchanges at SH 130 and SH 45.

On average, two reported fatalities occurred per year from 2014 to 2018 involving motor vehicle only crashes on City roadways. During the same period, there were six bicycle crashes and two pedestrian crashes per year on city roadways, primarily along arterials and at major intersections. Although no pedestrian or bicyclist fatalities were noted in the TxDOT reporting system, several pedestrian fatalities have occurred along SH 45, IH 35, and Wells Branch Pkwy. in recent years.

In the last 12 months, 5 pedestrian or bike related crashes have occurred with 1 cyclist fatality.

The safety of the citizens of Pflugerville should be the highest priority when examining the transportation system. Pflugerville averages two collisions per day, causing delays on the transportation system. Special consideration should be given to increasing safety for vulnerable road users. All data on this page is sourced from TxDOT's Crash Reporting Information System (CRIS) database.

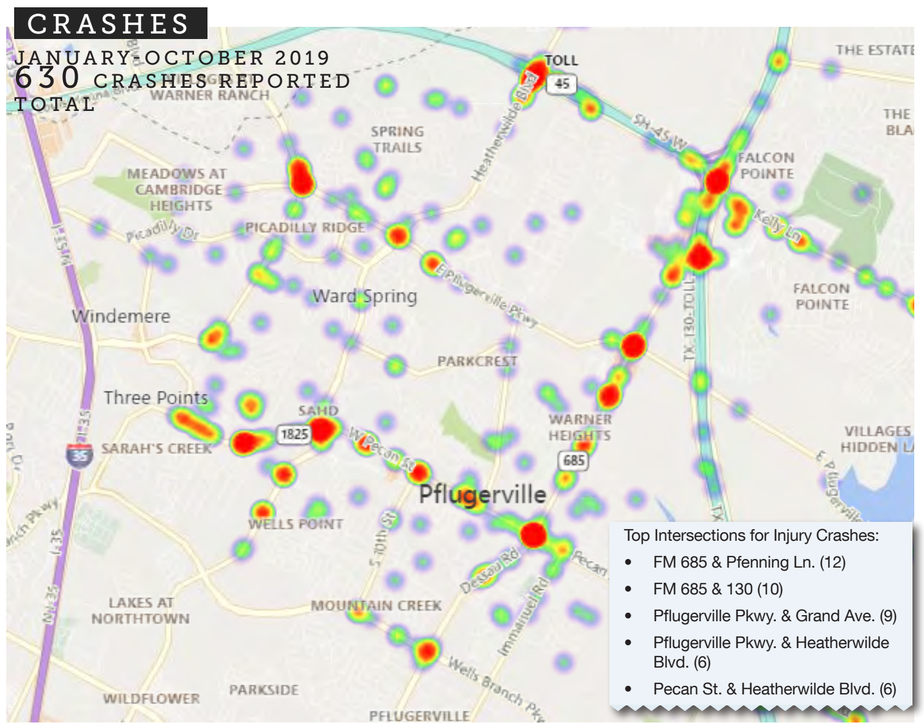


Figure 7

SAFETY

Crashes are presented in **Figure 8** normalized by showing the number of crashes per center line mile in the City to illustrate the trends year over year between 2014-2018. This metric is used to illustrate more of a rate of crashes rather than a raw number for ease of comparison. In addition, crash types are shown by severity, with approximately 70% of all crashes not involving reported injuries.

INTERSECTION SAFETY

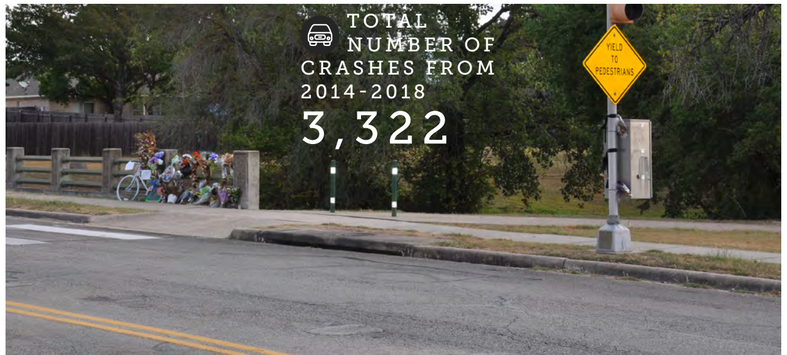
As is evident from the heat map shown in **Figure 7** (higher frequency of crashes is represented by warmer colors such as red), the predominant location of crashes in Pflugerville occur at intersections and concentrated locations along FM 685. A corridor study for this corridor is recommended for FM 685 in Chapters 5 and 6, which should include in depth crash analysis to determine safety countermeasures. In Chapter 6, six (6) critical intersection projects are identified for further study, design, and implementation of potential improvements, which should consider safety as an important component in an Intersection Control Evaluation (ICE) process, noted in policy directives in Chapter 8 of this document.

TRAFFIC CALMING

It was also acknowledged that the previous TMP had wider lanes than necessary for automobiles, which encourage higher travel speeds. New cross sections presented in Chapter 5 include a standard lane width of 11' (excluding the 18" gutter pan), and several cross sections include buffered bike lanes that could also contain parallel parking in specific contexts. Narrower lanes and on-street parking have been demonstrated as effective traffic calming measures per the FHWA's PEDSAFE and BIKESAFE programs.

NON-AUTO TRAVEL MODES

The previous TMP and Comprehensive Plan lacked provision of space for bikes on the street and did not have a vision for providing space for bike travelers. This TMP develops critical pedestrian and bike connections and presents a bike system map in Chapter 5 for both near-term and long-term implementation of facilities for both of these modes of travel.



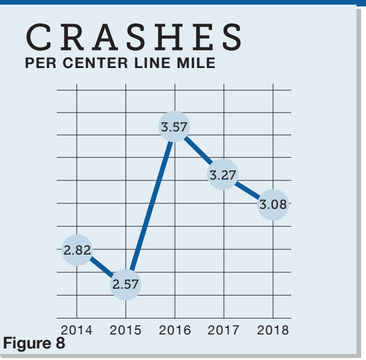
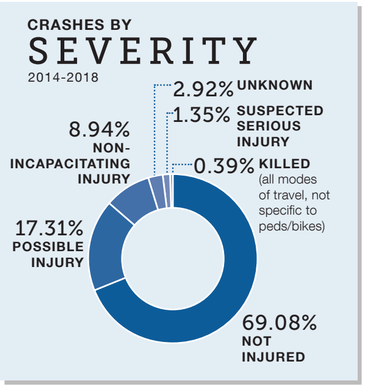


Figure 8



Source: TxDOT Crash Records Information System (CRIS)

MULTIMODAL

To travel efficiently in Pflugerville's growing community, it is important to provide a variety of ways to travel to and from daily activities. Accommodating multimodal transportation improves safety for non-vehicular travelers and increases access to community resources and activities.

PEDESTRIAN FACILITIES

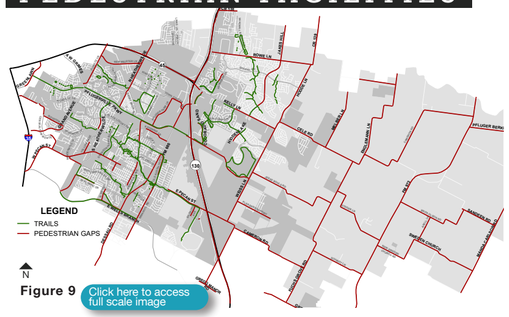


Figure 9 Click here to access full scale image

BICYCLE FACILITIES

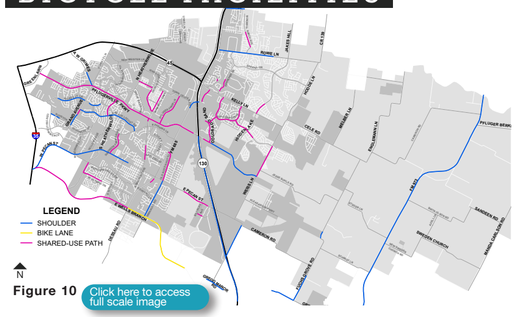


Figure 10 Click here to access full scale image

PEDESTRIAN FACILITIES

A well-designed pedestrian network is safe, connected, and separated from vehicular traffic. The standard sidewalk facility in Pflugerville is 6 feet wide and shared-use paths are at least 10 feet in width. Shared-use paths accommodate pedestrian and bicycle traffic and typically run along arterial roadways. Frequent gaps in the sidewalk network and shared-use paths exist across Pflugerville. Connecting pedestrian facilities **(Figure 9)** is most important on heavily traveled corridors such as FM 685/ Dessau Road, W Pecan St., Immanuel Rd., Pflugerville Pkwy., Kelly Ln., and N Heatherwilde Blvd. where there is high speed vehicular traffic.

BICYCLE FACILITIES

Residents traveling by bicycle in Pflugerville have access to shared-use paths, on-street shoulders, marked bicycle lanes, and the trails system **(Figure 10)**. Although existing marked bicycle lanes are limited, shoulders along several arterials and connectors can accommodate bicycle traffic. The majority of bicycle traffic is served by the trails system and shared-use paths.

TRANSIT DEVELOPMENT PLAN

On October 13, 2015, the City Council approved an Interlocal Agreement between the Capital Metropolitan Transportation Authority (CMTA) and the City of Pflugerville to develop a three-year Transit Development Plan.

The City Transit Plan:

- Identifies transit needs in Pflugerville
- Analyzes service options and financing
- Provides recommendations for transit services
- Complements the future high-capacity services that are part of the Cap Metro Project Connect North Corridor Study.

TRAILS

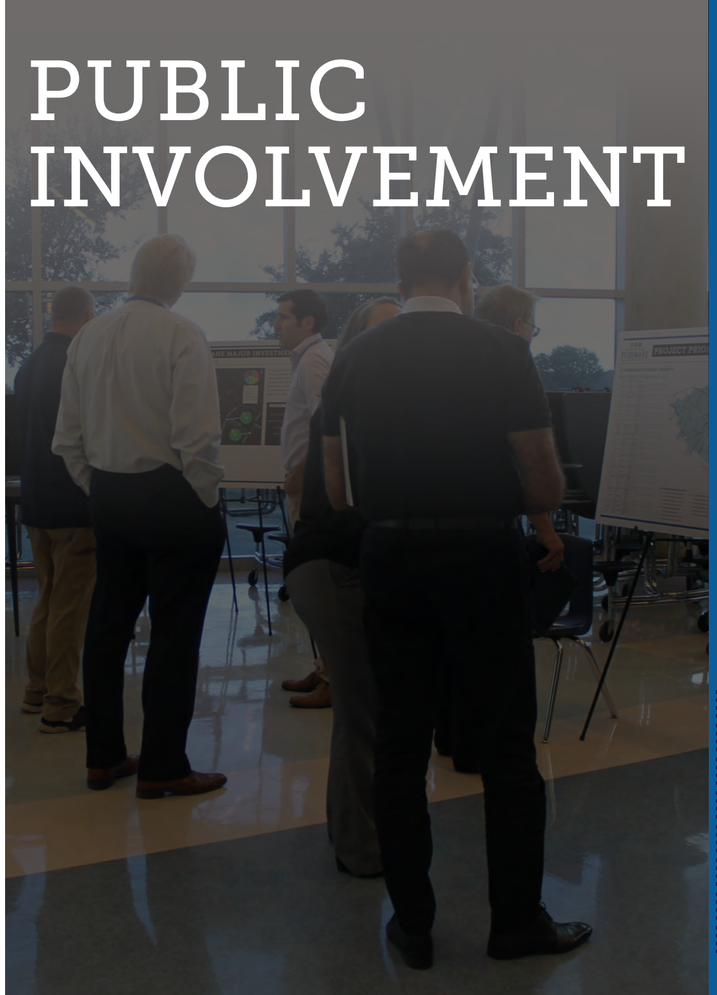
The trail system in Pflugerville consists of over 40 miles of bicycle- and pedestrian-friendly paths for leisure or travel. Most existing trails connect within neighborhood communities or follow off-street paths through scenic areas of Pflugerville such as around Lake Pflugerville, parallel to Settlers Valley Dr., and along Falcon Pointe Blvd.. Included in the trail network are shared-use paths that serve pedestrian and bicycle traffic along roadways. The Trails Master Plan for Pflugerville outlines the following objectives:

- Fill gaps between existing trail segments
- Create regional spine corridors
- Provide access to public spaces
- Connect across major vehicular corridors such as SH 130 and SH 45

2

PUBLIC INVOLVEMENT

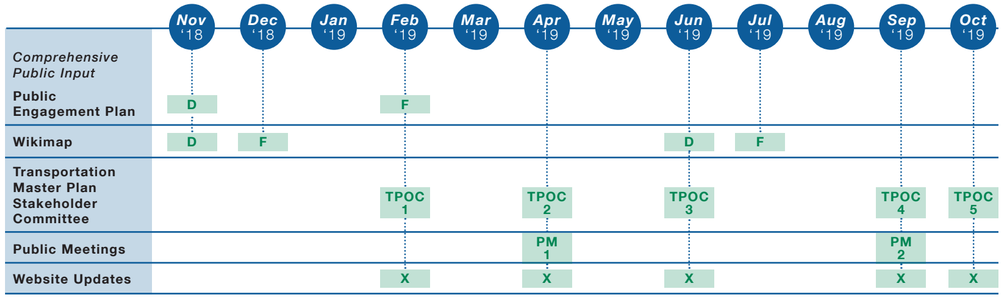
The TMP was developed with a focus on engagement and input from local government, transportation stakeholders, and the public at large. This chapter summarizes the comprehensive public participation that took place throughout plan development that engaged the community through both in-person and virtual formats at various locations in the City to maximize feedback opportunities.



ENGAGEMENT

Communication occurred with the public through multiple formats to maximize engagement opportunities. The following documents the various opportunities for public feedback, oversight by community stakeholders, and the general concerns that citizens have for transportation.

Figure 11 is a timeline of public engagement activity throughout the plan development.

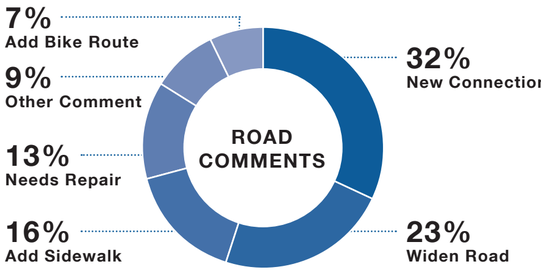


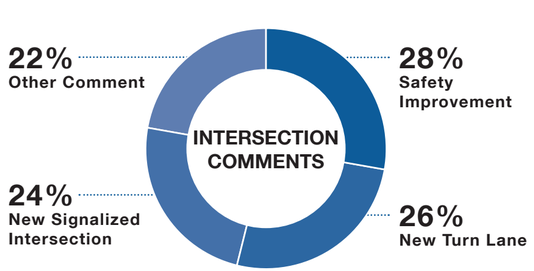
Key: **D**=DRAFT • **F**=FINAL DELIVERABLE • **TPOC**=TRANSPORTATION PLANNING OVERSIGHT COMMITTEE MEETING
PM=PUBLIC MEETING • **X**=WEBSITE UPDATE POSTED

Figure 11

WIKIMAP SURVEY COMMENTS

In the six months the survey was open, 1,715 comments were received from 415 individual respondents. Comments could be provided by drawing lines along routes, represented as "road comments", or by placing points, representing "intersection comments" as shown below.





WIKIMAP

The general public was given the opportunity to present feedback through an online survey, interactive online map (Wikimap), and at two public open houses on April 30th and September 17th. The Wikimap allowed the public to input comments geographically through a website with a map of Pflugerville. The results of these online and in-person public engagements are presented in this section.

The frequency of comments for intersections and streets are shown in **Figure 12.** The online interactive map allowed residents to comment on new connections for vehicular, bicycle, and pedestrian traffic; needs for road widening or maintenance; and other issues. In addition, it provided residents the opportunity to communicate operational and safety issues at intersections in Pflugerville. Feedback received from the Wikimap as well as input received at Open Houses were used to refine project prioritization through additional weighting based on frequency of comments received. Chapter 6 elaborates more on the specific use of these comments in the project prioritization process.

Figure 12

LEGEND

INTERSECTION COMMENTS
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 25
- 26 - 45

ROADWAY COMMENTS
- 0 - 5
- 6 - 10
- 11 - 25
- 26 - 60
- 61 - 101
- Bond New Alignment
- Bond Widening
- Comment New Alignment
- Mokan Corridor

Click here to access full scale image

COMMENT SOUND BITES

"Need **public transportation**"

"This was a **great experience** for me"

"**SH 130** ramp access is a **problem.**"

"**685** from Pecan to 130 **is a highway!**"

"**Move traffic** through intersections."

COMMENT LOCATIONS

TOP 5 ROADS

1. KELLY LN.
2. SH 45 FRONTAGE ROADS WEST OF N HEATHERWILDE BLVD.
3. FM 685
4. IMMANUEL RD.
5. SH 130

TOP 5 INTERSECTIONS

1. KELLY LN. & FALCON POINTE BLVD.
2. SH 130 & FM 685/COPPER MINE DR.
3. E PECAN ST. & FM685/ DESSAU RD.
4. IMMANUEL RD. & E WELLS BRANCH PKWY.
5. HEATHERWILDE BLVD. & W PECAN ST.

IN THE SIX MONTHS THE SURVEY WAS OPEN, 1,715 COMMENTS WERE RECEIVED FROM 415 INDIVIDUAL RESPONDENTS.

TPOC

In addition to public opportunities for feedback, a Transportation Planning Oversight Committee (TPOC) was established at project inception, consisting of community stakeholders. TPOC members were selected to represent the City's diverse population in providing feedback and direction. The TPOC was consulted with for feedback on various elements of the TMP on a bi-monthly basis during the project duration.

The TPOC included members from public agencies, local businesses, and other leaders in the community. Agencies represented on the TPOC include Williamson County, Travis County, Pflugerville ISD, Pflugerville Fire Department, the Texas Department of Transportation (TxDOT), Pflugerville Community Development Corporation (PCDC), Pflugerville Chamber of Commerce, and Austin Executive Airport. The TPOC met five times during the plan development to cover various topics. The subject matter of the meetings covered with the TPOC is listed below:

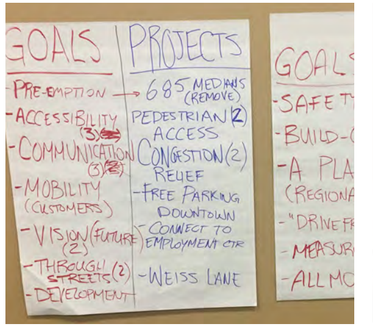
February 2019
TPOC Meeting #1
- TMP Objectives
- Plan Branding

April 2019
TPOC Meeting #2
- Review Pfirst Impressions
- CIP Project Identification
- Open House #1 Activities

June 2019
TPOC Meeting #3
- Review Draft Changes to TMP Map
- CIP Project Prioritization

September 2019
TPOC Meeting #4
- Modeling Results
- Draft 2019 TMP Map
- Open House #2 Activities

October 2019
TPOC Meeting #5
- Draft Report Review



OPEN HOUSE 1

The first Open House was held on April 30th at the Pflugerville Library to present the Pfirst Impressions and receive feedback on project priorities and goals from the community. Approximately 50 people attended the meeting.

The first Open House focused primarily on understanding the needs and concerns of the citizens of Pflugerville to inform the planning process.

In addition, attendees were asked to comment on where they lived and worked, as well as future transportation trends that they thought worthy of investment by the City of Pflugerville.

At Station 4, participants were asked to rank their highest community priorities in a pyramid diagram. 9 community priorities were given, which are further elaborated on in Chapter 6, and participants had to choose their top 6 priorities from this set and place them in three tiers, per the example image on this page. Priorities were then tabulated and weighted to inform the project prioritization process detailed in Chapter 6.

The stations at Open House 1 were:

Station 1: Live / Work
- Activity to place dots where attendees live and work

Station 2: Pfirst Impressions
- Existing Development
- Crash History
- Pedestrian and Bike Facilities

Station 3: Pfuture Trends
- Activity to vote on Transportation Technology trends for Pflugerville

Station 4 Priority Pyramid
- Activity to rank community priorities on a pyramid diagram

Station 5: Wikimap
- Feedback received via on-line feedback tool

OPEN HOUSE 2

The second Open House was held on September 17th at Kelly Lane Middle School to present the draft TMP Map revisions, receive feedback on Capital Improvements Plan (CIP) project prioritization results, active transportation projects, and policy and funding priorities. Approximately 60 people attended the meeting, and increase from the 50 attendees at the first Open House.

The second Open House was intended to gather feedback from the public to the draft recommendations of the TMP report.

Feedback received during and prior to the 1st Open House was incorporated into the Thoroughfare Plan Map and CIP project rankings presented at the 2nd Open House. Comments received were taken into consideration and, where appropriate, changes were made to the final report plan.

This meeting was a join meeting with the Kelly Ln. Major Investment Study (MIS) project kickoff. The location of the meeting was intentionally selected to be near the area being studied, and for variation in location for public feedback compared to the first Open House.

The stations at Open House 2 were:

Station 1: Live / Work
- Activity to place dots where attendees live and work

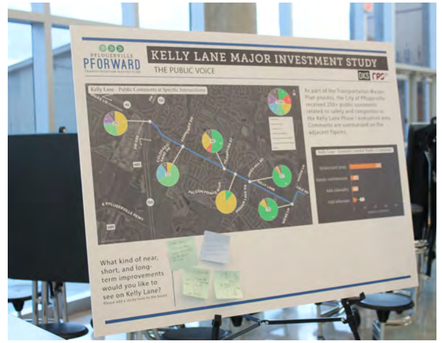
Station 2: Proposed TMP Revisions
- Existing TMP Map
- New Alignments, Reclassifications and Intersection Projects
- Proposed TMP Map

Station 3: Kelly Ln. MIS
- Kelly Ln. Comments
- Corridor Study Timeline

Station 4: Project Prioritization
- Activity to up vote and down vote ranked projects

Station 5: Ped/Bike Plans
- Critical Connections
- Bike System Map

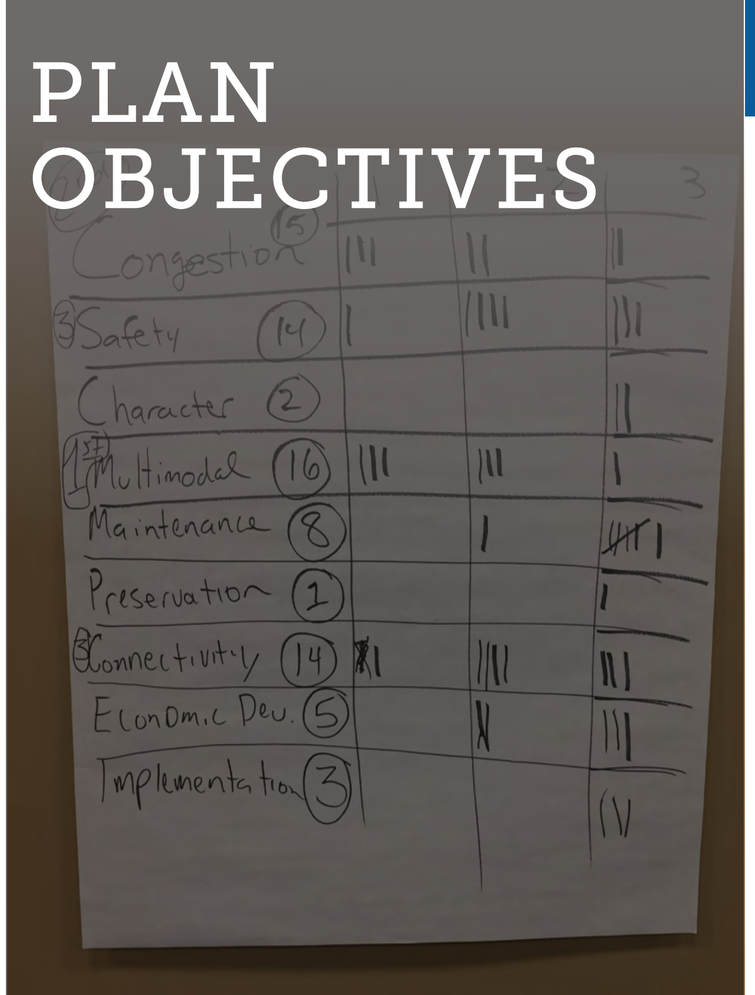
Station 6: Policies
- Activities to vote for priority of proposed TMP policies resulted in additional policies being identified and priorities being assigned for specific policies that are shown in rank order by topic area in Chapter 8



3

PLAN OBJECTIVES

Objectives help direct the TMP process and recommendations to best serve the needs of the City of Pflugerville. This chapter documents the objectives developed and refined through public engagement with citizens and staff throughout the planning process.



OBJECTIVES

Objectives guide the plan and serve as a rubric against which it can be measured. These objectives were consulted throughout the planning process to best serve the citizens of Pflugerville.

Objectives from the previous TMP were combined with new ones identified by staff and the TPOC as a starting point. During the planning process, these objectives were combined and further refined through public input, resulting in the objectives shown on this page. Seven (7) objective statements are shown on this page with descriptions of how these objectives are intended to be implemented in this report. Icons have been developed to be associated with each objective and appear at various points throughout the report nearby **green bold** text to draw attention to fulfillment of plan objectives.

Enhance
SAFETY
in all modes of travel and all projects

Safety is intended to be addressed on all projects including removing bottlenecks for emergency service response times.

Identify a network that includes projects needed to serve Pflugerville in its
ULTIMATE STATE
(Build Out) for all modes

The Thoroughfare Plan Map in Chapter 5 is intended to serve Pflugerville when all land has developed in the City limits and Extraterritorial Jurisdiction (ETJ).

Communicate through purposeful formats a plan that has short-term,
IMPLEMENTABLE PROJECTS

Projects for roadway capacity and intersection improvements are presented in Chapter 6 and critical connections for pedestrian and bike networks are identified in Chapter 5

Develop a technically sound plan that
RELIEVES CONGESTION

The modeling in Chapter 4 shows the technical performance of the proposed thoroughfare plan with revised functional classifications and new connections.

Develop a prioritized
CAPITAL IMPROVEMENT PROGRAM

A refined, prioritized CIP is presented in Chapter 6 of this report which builds upon previous CIP planning and utilizes feedback received during the TMP process to inform project priorities.

Have a policy
FRAMEWORK
that supports the plan

Chapter 8 details specific policy directives for implementation as a result of the TMP to support projects and objectives identified in the plan.

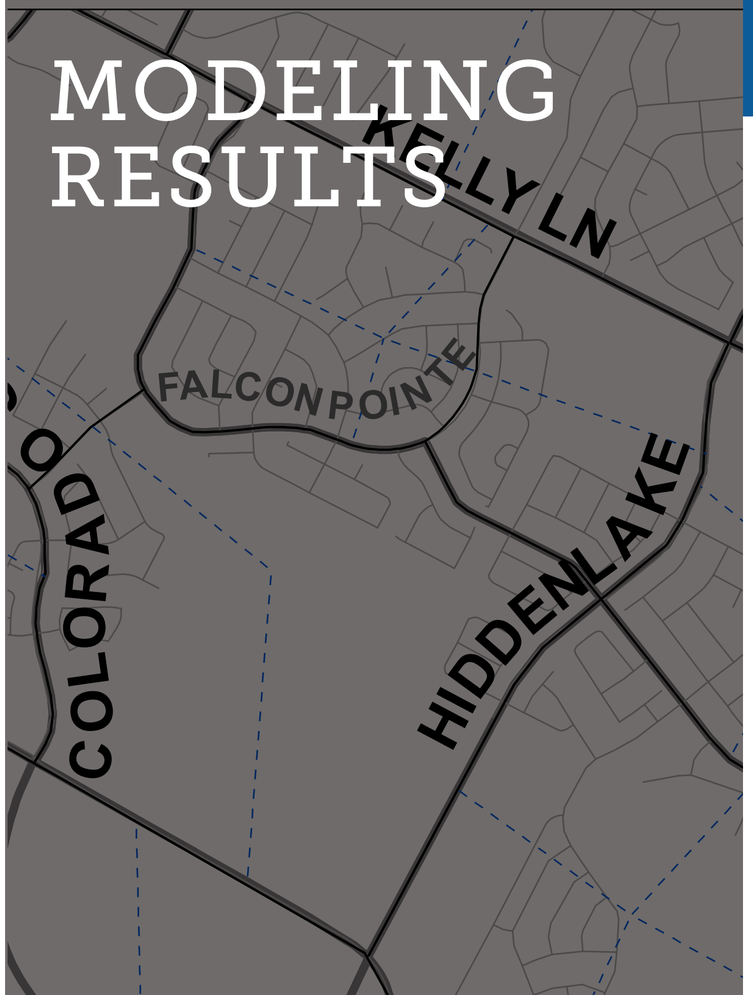
CONNECT DESTINATIONS
In Pflugerville and the region

Regionalism is discussed throughout the plan for project identification, implementation, and regional cooperation towards achieving transportation objectives

4

MODELING RESULTS

Travel Demand Modeling is the projection of traffic volumes on a transportation network based on land use, population, and network characteristics. Forecasting future traffic demand on a roadway network is an essential element in transportation planning, to help assess the performance of the transportation network for proposed improvements. Scenario Planning is the process of comparing different future conditions with specific performance measures such as travel time, delay, and trip length. This chapter documents the travel demand modeling process implemented as part of this plan and provides a detailed overview of the modeling process and methodology used to develop the model.



THE PROCESS

The travel demand modeling process involves several steps, including model calibration and validation of existing conditions, and setting up future anticipated demographics to capture transportation demand. This page documents the process used to develop the model.

WHAT IS TRAVEL DEMAND MODELING:

Travel demand modeling is the prediction of traffic volumes on a transportation network based on land use, population, and network characteristics. Forecasting future traffic demand on a roadway network is an essential element in mobility planning. This section highlights the travel demand modeling process implemented as part of this plan and provides a detailed overview of the modeling process and methodology used to develop the model.

The primary goal of using a travel demand model is to provide a means for making informed planning decisions regarding proposed transportation improvements. As such, the information and process for developing a model must be carefully conditioned. Building a sound base model is necessary to create the foundation of the entire modeling process. One goal of base model development is to produce a model that is verifiable, reproducible, and accurate. Base model development tasks and data should be well documented and transparent.

TRAVEL DEMAND MODELING BASICS:

The travel demand model is broken up into two main components: roadway network and land use.

The **roadway network** is represented by the number of lanes of travel, the functional classification of the roadway, and travel speed.

The **land use** is broken up into many Traffic Analysis Zones (TAZs), which contain information related to the number of households or employees in a small area, see **Figure 13**. The travel demand model utilizes the land use assumptions to load trips onto the roadway network via centroid connectors, see **Figure 14**.

MODEL ASSUMPTIONS:

The foundation of Pflugerville's travel demand model is the CAMPO's 2040 regional model. Outside of Pflugerville's City Limits and ETJ the existing plus committed projects regional model was utilized. Inside Pflugerville the entire model was updated. **Figure 15** documents the daily capacities, as well as various break points for Level of Service (LOS) represented by Volume to Capacity (V/C) ratios used in making maps for comparing modeling scenarios in the remainder of this report. LOS A-C generally represents acceptable conditions, while LOS D reflects deteriorating conditions. LOS E/F represents unacceptable conditions where demand is exceeding capacity on system roadway links.

TAZ Example

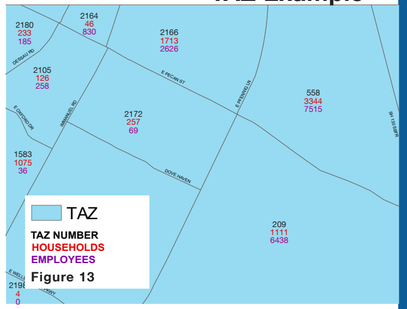


Figure 13

Centroid Connector Example

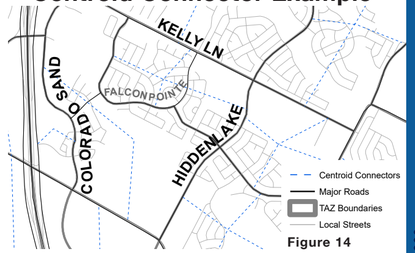


Figure 14

Figure 15 Facility Type	LOS A-C (<0.65 V/C)	LOS D (0.65-0.8 V/C)	LOS E/F (>0.8 V/C)	Daily Capacity (V/C = 1)
6 Lane Divided Arterial	< 32,760	32,760	40,320	50,400
4 Lane Divided / 5 Lane Undivided Arterial	< 21,840	21,840	26,880	33,600
4 Lane Undivided Arterial	< 18,720	18,720	23,040	28,800
4 Lane Collector	< 17,160	17,160	21,120	26,400
2 or 3 Lane Roadway	< 8,320	8,320	10,240	12,800
Frontage Road 3 Lanes	< 16,380	16,380	20,160	25200
Frontage Road 2 Lanes	< 10,920	10,920	13,440	16800
Frontage Road 1 Lane	< 5,460	5,460	6,720	8,400
Urban 3 Lane Roadway	< 9,360	9,360	11,520	14,400

PFLUGERVILLE IS ANTICIPATED TO INCREASE HOUSEHOLDS FROM 27,597 TO 120,175 BY BUILDOUT.

LAND USE

Demographics outside the City Limits and Extraterritorial Jurisdiction (ETJ) of Pflugerville used the inputs to the 2040 CAMPO model but demographics within the City Limits and ETJ were substituted with data based on local information. Demographic information for existing conditions **(Figure 16)** was compiled taking into account the following sources of information:

- Travis Central Appraisal District
- Williamson Central Appraisal District
- 2019 Aerial Imagery
- City of Pflugerville staff

Demographic information was validated by comparing with city population and employment estimates for 2019 from City planning staff.

Build-Out demographics were estimated based on the following sources of information:

- Comprehensive Plan (2009)
- Pflugerville 2030
- Future Land Use Plan
- 2018 Water and Wastewater Master Plan Update
- City of Pflugerville staff

The population and employment estimates and projections were compiled in accordance with the following categories:

- **Units:** Number of dwelling units (single and multi-family)
- **Population:** Number of people, based on person per dwelling unit
- **Employment:** Square feet of building based on four different classifications. The total square footage was converted to number of employees based on conversion factors derived from ITE's Trip Generation, 10th Edition and Urban Land Institutes's Development Handbook and Dollars and Cents of Shopping Centers. Each employment classification has unique trip characteristics.

Retail: Land use activities which provide for the retail sale of goods that primarily serve households, such as grocery stores, shopping centers, and restaurants. Higher trip characteristics. One employee per 500 sq. ft.

Service: Land use activities which provide personal and professional services such as government, schools, and other office-type of facilities. Medium trip characteristics. One employee per 300 sq. ft.

Basic: Land use activities that produce goods and services such as those exported outside the local economy such as manufacturing, construction, transportation, wholesale, trade, warehousing, and other industrial uses. Low trip characteristics. One employee per 700 sq. ft.

Education: Land use activities that provide academic services, typically for full week enrollment classes for both public and private education. One employee per 1,500 sq. ft.

Demographic Scenario	Housing Unit	Retail Employees	Service Employees	Basic Employees	Education Employees	Total Employees
Developed (2018)	27,597	5,248	7,092	7,523	1,728	21,591
Undeveloped (Vacant Land)	92,578	34,594	22,568	35,100	3,129	95,391
Build Out	120,175	39,842	29,660	42,623	4,857	116,982

Figure 16

VALIDATION

The model validation process is a series of measures used to determine the model's credibility in replicating observed traffic conditions. This is a crucial step to ensure the model is appropriate for the planning decisions to be tested.

A baseline 2018 model run was used to compare modeled volumes against counts. Roadways selected were based on locations where the City takes traffic counts on a regular basis. **Figure 17** lists the links for which modeled volumes were compared against counts. The following page collapses the validation results to the functional class level and includes FHWA acceptable ranges after the 2nd iteration.

The Pflugerville model provides the city with an accurate tool to predict what the thoroughfare system will need to look like to accommodate future transportation needs. Although a primary use of the model is development the TMP, it can also be used for other technical analysis such as:

- Evaluating development impacts and mitigation measures (a supplement to a Traffic Impact Analysis)
- Determination and prioritization of capital expenditures (see Chapter 6)
- Scenario planning - Land use and transportation

The travel demand model analyzes macro level analysis and should not be used in replacement of micro analysis that would analyze specific intersection operations.

*Source: City of Pflugerville

LOCATION	AREA TYPE	FUNCTIONAL CLASS	2018 COUNT*	2018 MODELED VOLUMES	% DIFFERENCE
Picadilly Dr.	3	6	4,233	4,529	7%
S Heatherwilde Blvd.	3	7	12,454	14,924	20%
E Pflugerville Pkwy.	4	7	6,316	9,515	51%
N Heatherwilde Blvd.	3	4	17,873	14,771	-17%
Wells Branch Pkwy.	3	4	9,145	4,030	-56%
W Pflugerville Pkwy.	3	4	22,129	18,341	-17%
S Heatherwilde Blvd.	3	7	11,367	12,032	6%
N Heatherwilde Blvd.	3	7	16,734	18,529	11%
Grand Ave Pkwy.	3	4	19,513	21,921	12%
E Pecan St.	5	4	11,042	6,673	-40%
E Pecan St.	3	7	14,869	4,761	-68%
Weiss Ln.	4	10	7,870	9,084	15%
Weiss Ln.	4	9	6,487	5,078	-22%
N Heatherwilde Blvd.	4	4	19,979	18,684	-6%
Kelly Ln.	4	4	15,854	9,304	-41%
FM 685	3	18	17,426	12,137	-30%
Grand Ave Pkwy.	3	4	21,974	24,724	13%
N Railroad Ave.	4	9	5,927	3,411	-42%
Grand Ave Pkwy.	3	4	20,702	29,579	43%
Pfennig Ln.	3	9	7,270	6,862	-6%
Grand Ave Pkwy.	4	4	20,810	24,718	19%
Picadilly Dr.	3	6	4,245	6,128	44%
Wells Branch Pkwy.	3	4	18,084	5,277	-71%
10th St.	5	6	5,293	1,522	-71%
Colorado Sand Dr.	4	10	5,920	1,200	-80%
Colorado Sand Dr.	4	10	8,529	12,224	43%
Rowe Ln.	4	8	6,896	6,656	-3%
W Pflugerville Pkwy.	4	4	10,659	18,341	72%
Royston Ln.	3	12	1,356	126	-91%
W Pflugerville Pkwy.	5	4	19,203	17,630	-8%
E Pflugerville Pkwy.	5	4	15,631	14,622	-6%
Pfennig Ln.	3	6	5,975	1,174	-80%
Kelly Ln.	4	4	28,458	26,847	-6%
Dessau Rd.	3	4	27,512	34,001	24%
FM 685	2	4	32,491	35,831	10%
E Pflugerville Pkwy.	4	9	13,190	14,430	9%
N Heatherwilde Blvd.	3	4	12,487	13,748	10%
Total			**505,903**	**483,366**	**-4%**

Figure 17

According to Federal Highway Administration's (FHWA) modeling guidelines, the Pflugerville Travel Demand Model was calibrated to an acceptable percent error on its second iteration. Due to a desire to have less % difference on specific arterials in the City, several more iterations were performed to get arterials and collector streets within a 5% error range.

Six iterations are presented in **Figure 18**, comparing model volumes to existing count data for different roadway classifications as a percent error. Percent error is measured against the FHWA target range for models in each iteration.

The Pflugerville model was successfully calibrated to FHWA standards.

Green: *Within FHWA percent error target range* | **Red:** *Not within FHWA Percent Error target range*

ITERATION 1

	COUNT	VOLUME	% DIFF	FHWA TARGET
Principal Arterial	388,709	329,553	-15%	15%
Minor Arterial	54,819	44,613	-19%	15%
Collector	40,209	12,921	-68%	25%
Frontage Roads	483,737	387,087	-20%	
Total	967,474	774,174	-20%	

ITERATION 2

	COUNT	VOLUME	% DIFF	FHWA TARGET
Principal Arterial	383,426	334,729	-13%	15%
Minor Arterial	68,436	58,126	-15%	15%
Collector	14,449	11,884	-18%	25%
Frontage Roads	17,426	9,028	-48%	
Total	483,737	413,767	-14%	

ITERATION 3

	COUNT	VOLUME	% DIFF	FHWA TARGET
Principal Arterial	407,247	353,619	-13%	15%
Minor Arterial	44,615	43,583	-2%	15%
Collector	14,449	11,971	-17%	25%
Frontage Roads	17,426	9,051	-48%	
Total	483,737	418,224	-14%	

ITERATION 4

	COUNT	VOLUME	% DIFF	FHWA TARGET
Principal Arterial	407,247	375,003	-8%	15%
Minor Arterial	40,370	41,763	3%	15%
Collector	14,449	13,007	-10%	25%
Frontage Roads	17,426	9,324	-46%	
Total	479,492	439,097	-8%	

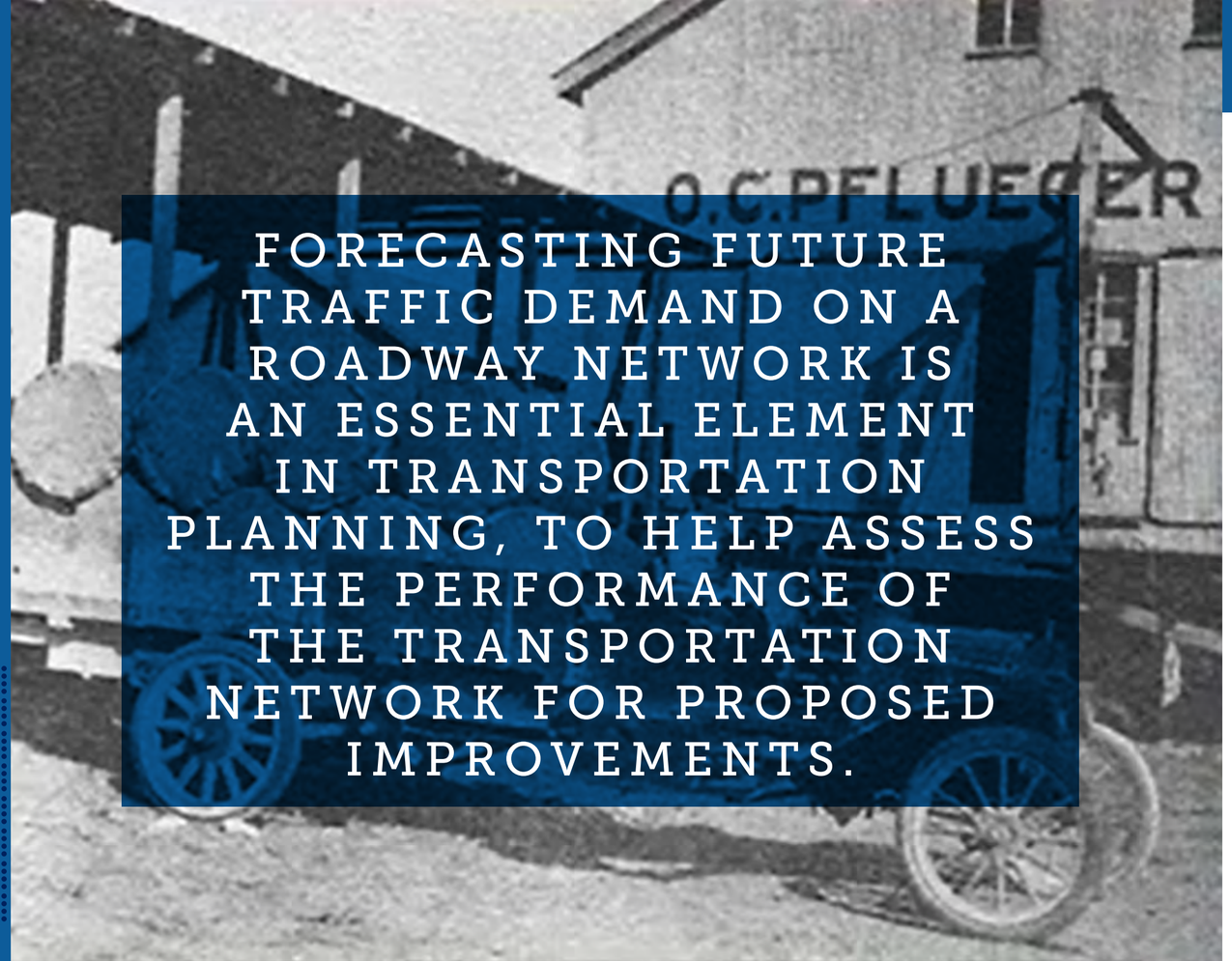
ITERATION 5

	COUNT	VOLUME	% DIFF	FHWA TARGET
Principal Arterial	411,492	392,148	-5%	15%
Minor Arterial	40,370	43,313	7%	15%
Collector	14,449	12,498	-14%	25%
Frontage Roads	17,426	10,306	-41%	
Total	483,737	458,266	-5%	

ITERATION 6

	COUNT	VOLUME	% DIFF	FHWA TARGET
Principal Arterial	363,292	352,396	-3%	15%
Minor Arterial	101,510	96,199	-5%	15%
Collector	23,675	22,634	-4%	25%
Frontage Roads	17,426	12,137	-30%	
Total	505,903	483,366	-4%	

Figure 18



FORECASTING FUTURE TRAFFIC DEMAND ON A ROADWAY NETWORK IS AN ESSENTIAL ELEMENT IN TRANSPORTATION PLANNING, TO HELP ASSESS THE PERFORMANCE OF THE TRANSPORTATION NETWORK FOR PROPOSED IMPROVEMENTS.

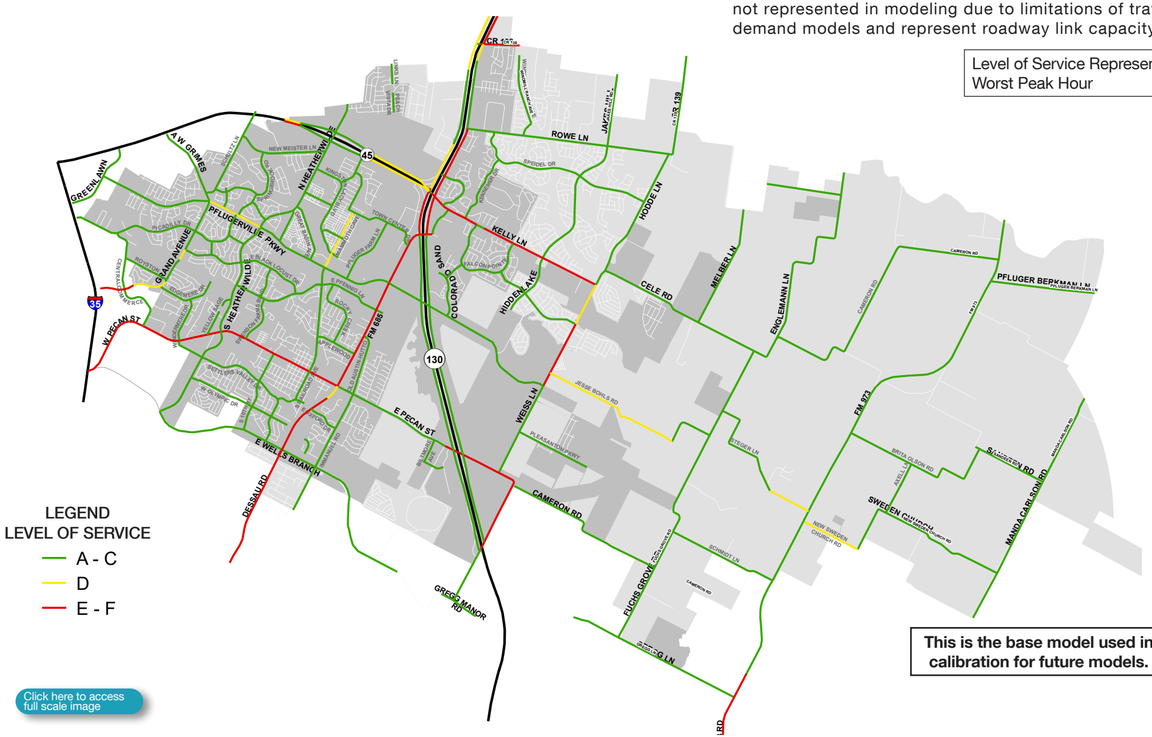
EXISTING MODEL

The Level of Service "LOS" map represents the existing roadway system in Pflugerville as of January 2019 and was calibrated to traffic counts taken in 2018.

EXISTING DEFICIENCIES

The number of lanes shown does not reflect active or recently completed construction projects in the City such as Weiss Ln. expanding to four lanes. Intersections are not represented in modeling due to limitations of travel demand models and represent roadway link capacity only.

Level of Service Represents Worst Peak Hour



This is the base model used in calibration for future models.

CONNECTIONS SCENARIO

The connections scenario represents new roads identified by City staff as critical connections. The existing model was modified to include these connections and run with the additional network capacity to compare with the existing network performance. This page documents the new connections reflected in this scenario along with model volumes for the existing model run compared with the connections scenario model run in the vicinity of the critical connections.

1

The connections in this area provide better connectivity from neighborhoods to regional arterials, SH 45, and SH 130. Providing alternative routes relieves pressure at the intersection of SH 130 and SH 45.

2

This area fills gaps in local and collector streets where dead ends exist and provides outlets for traffic to avoid longer trips on major arterials. This provides alternative routes to avoid one of the most congested intersections in the city, FM 685 & Pecan St.

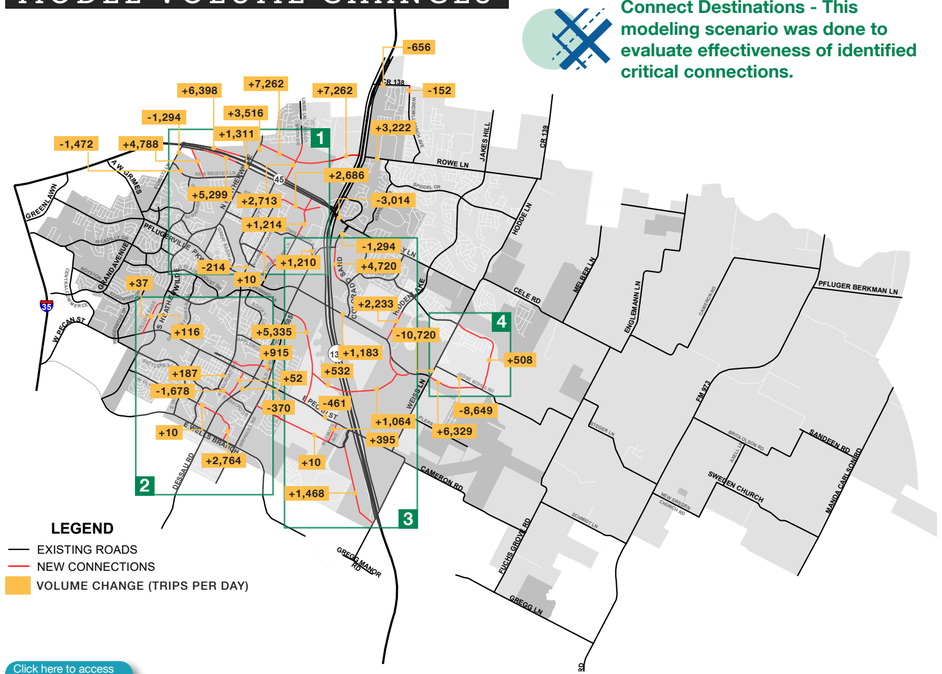
3

This area provides north south connectivity on either side of SH 130 and a new crossing of SH 130 between Pflugerville Pkwy. and Pecan St.

4

This area provides for a continuation of Pflugerville Pkwy. to the east and collector connectivity to the east of the current City limits.

MODEL VOLUME CHANGES

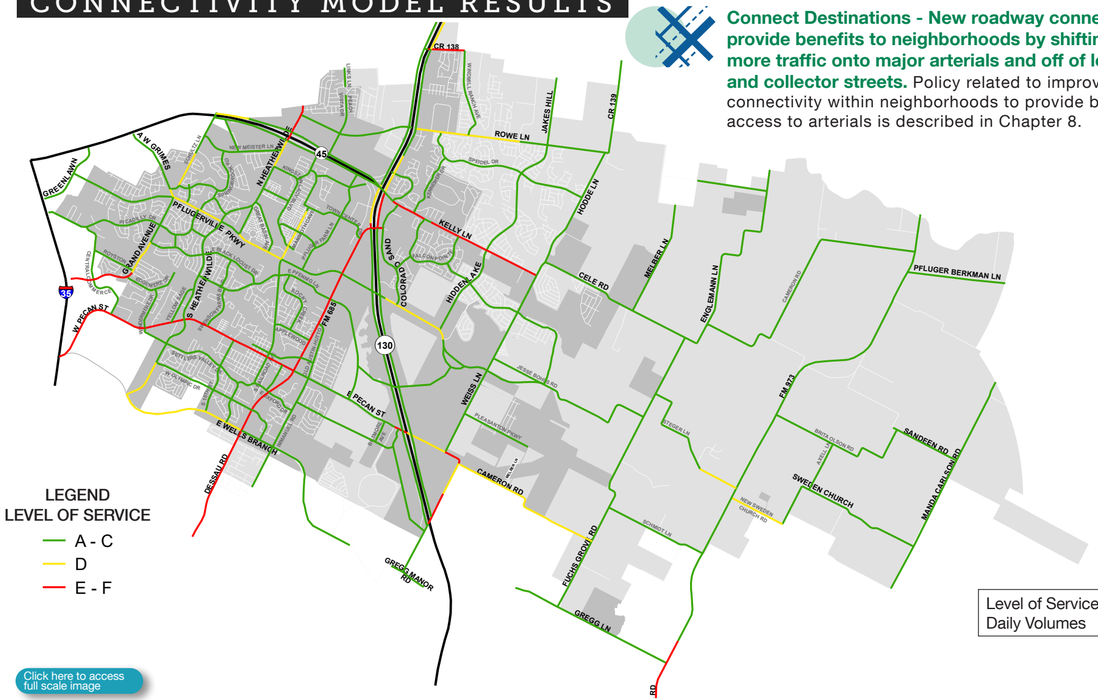


Click here to access full scale image

Connect Destinations - This modeling scenario was done to evaluate effectiveness of identified critical connections.

This page reflects the existing LOS of roadways based on the critical connections in the connections scenario.

CONNECTIVITY MODEL RESULTS



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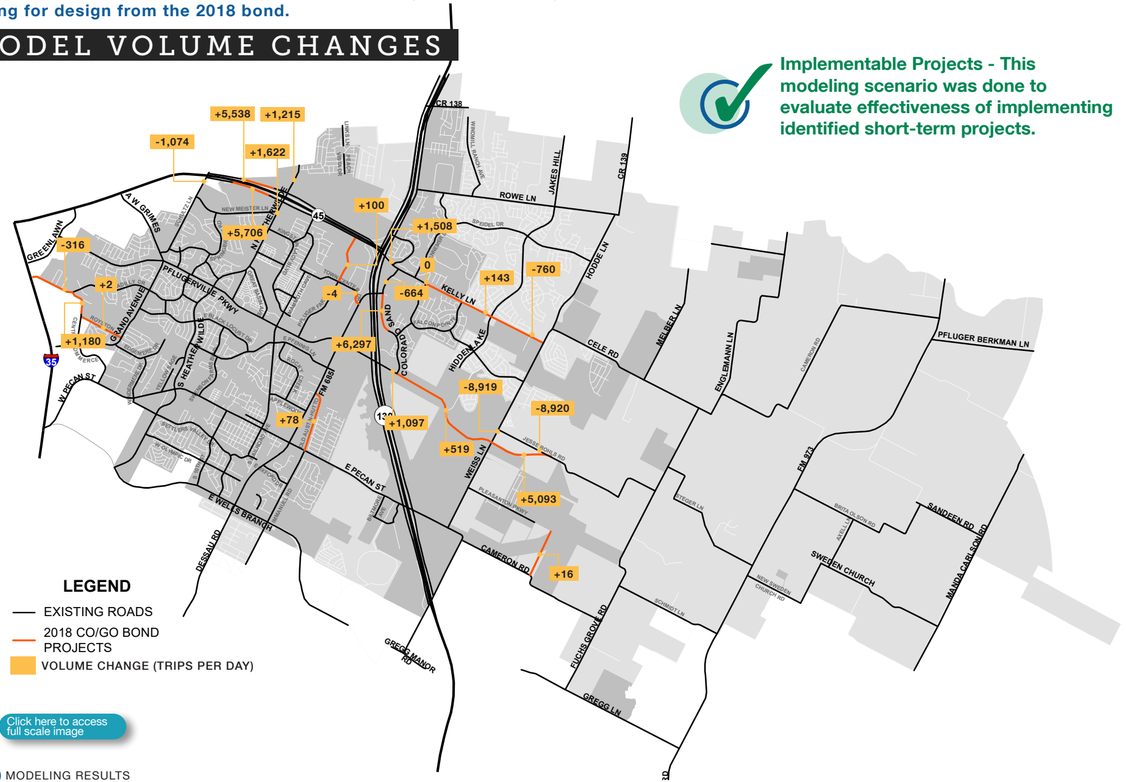
Connect Destinations - New roadway connections provide benefits to neighborhoods by shifting more traffic onto major arterials and off of local and collector streets. Policy related to improving connectivity within neighborhoods to provide better access to arterials is described in Chapter 8.

Level of Service Represents Daily Volumes

FISCALLY CONSTRAINED SCENARIO

The fiscally constrained scenario represents both roadway widenings and new connections for additional capacity anticipated to be completed by 2025. Projects represented in this scenario model run are predominantly 2018 General Obligation (GO) and 2018 Certificates of Obligation (CO) bond projects. Although not all funding has been identified for construction, all of these projects have funding for design from the 2018 bond.

MODEL VOLUME CHANGES



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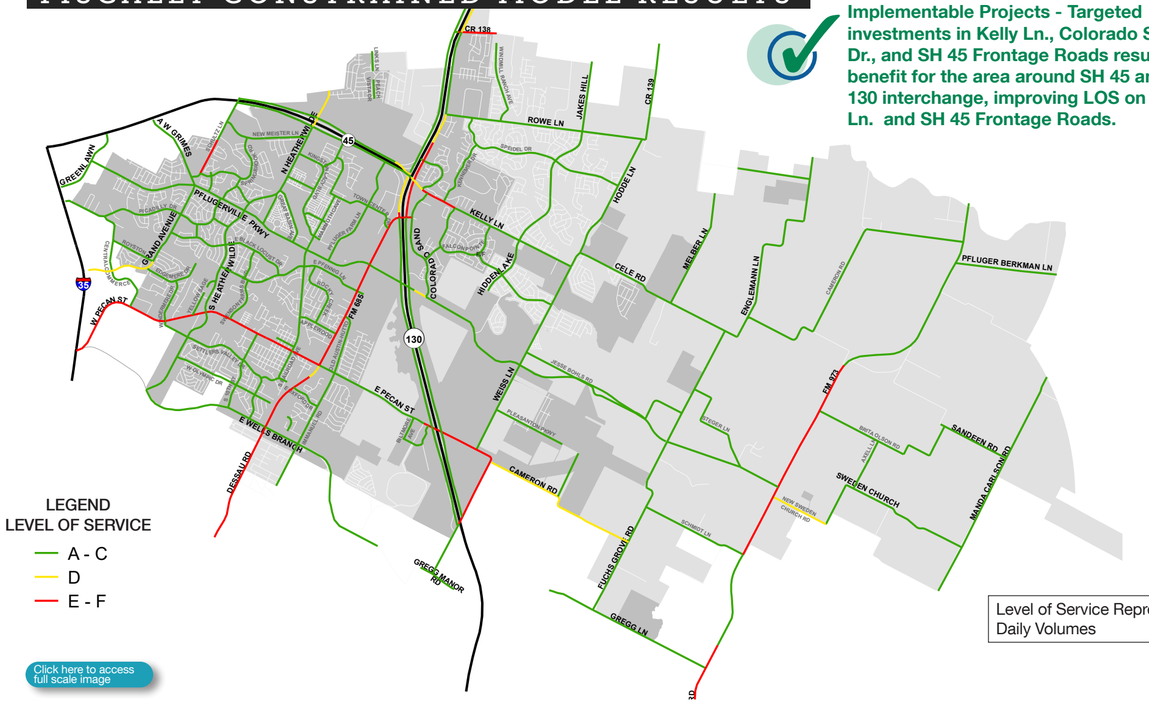
Implementable Projects - This modeling scenario was done to evaluate effectiveness of implementing identified short-term projects.

This page reflects the LOS of existing and widened roadways as well as new connections in the fiscally constrained scenario.

FISCALLY CONSTRAINED MODEL RESULTS



Click here to access full scale image

Implementable Projects - Targeted investments in Kelly Ln., Colorado Sand Dr., and SH 45 Frontage Roads result in benefit for the area around SH 45 and SH 130 interchange, improving LOS on Kelly Ln. and SH 45 Frontage Roads.

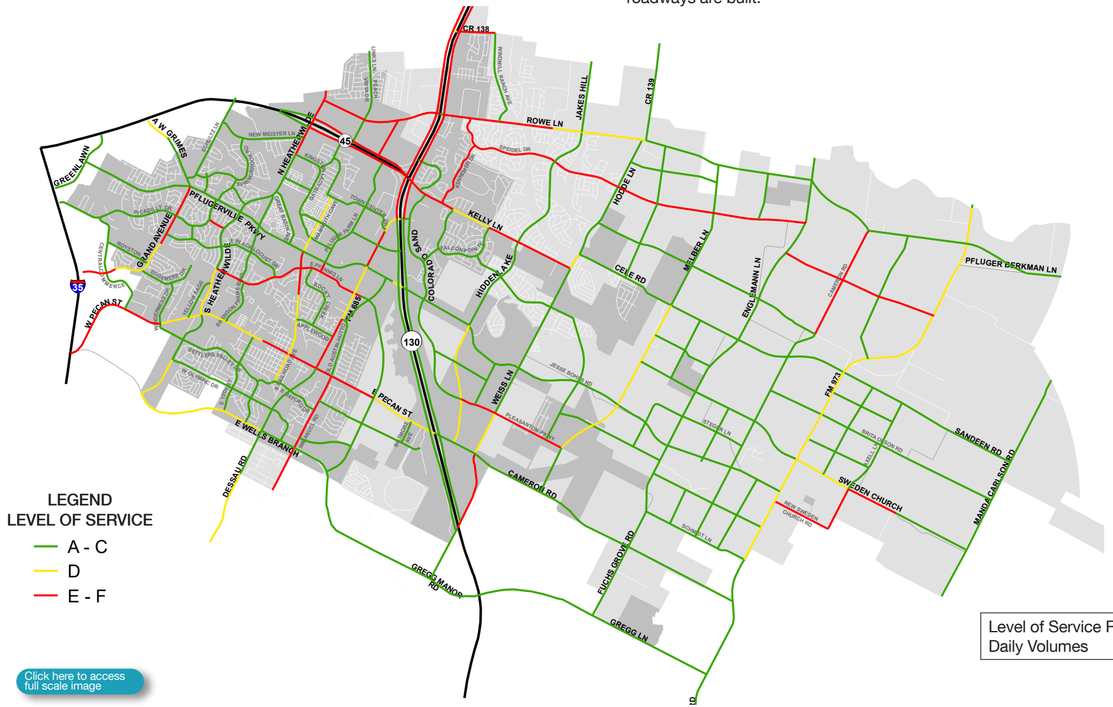
Level of Service Represents Daily Volumes

TMP SCENARIOS

The Existing TMP Scenario represents build out of the network shown in the current 2015 TMP.

EXISTING TMP MODEL RESULTS

This model scenario can be compared where roadways exist today with the Existing Deficiencies Map on Page 29 to see how the current Thoroughfare Plan will perform when Pflugerville is built-out and all Thoroughfare Plan roadways are built.



LEGEND
LEVEL OF SERVICE
- A - C
- D
- E - F

Level of Service Represents Daily Volumes

Click here to access full scale image

The Proposed TMP Scenario represents build out of the network in the proposed 2019 TMP map in Chapter 5.

PROPOSED TMP MODEL RESULTS

This model scenario can be compared with the Existing TMP Model Results Map on Page 34 to see how the revisions to the TMP improve performance on specific roadways compared to the previous TMP.

LEGEND
LEVEL OF SERVICE
- A - C
- D
- E - F

Level of Service Represents Daily Volumes

Click here to access full scale image

Some roadways continue to perform at LOSE/F under the normal capacity assumptions in Figure 15 when the 2019 TMP is built out. Several of these facilities such as FM 685 have been identified for corridor studies on the Thoroughfare Plan Map in Chapter 5. A corridor study may provide innovative intersection solutions or use strategies such as access management to increase the capacity limits identified in Figure 15.

TMP RESULTS COMPARISON

A comparison of the 2015 and 2019 TMP results maps shows some corridors appearing to have a worse level of service in the proposed TMP. However, **overall network performance is significantly improved** with an increase in Vehicle Miles Traveled (VMT), increased average speed of nearly 2mph, and a delay reduction of nearly 10%. **The 2019 TMP improves network performance and is moving trips onto regional arterials that are using local and collector streets in the 2015 TMP. This results in accommodating more traffic regionally with less local impacts to the City of Pflugerville.**

	EXISTING TMP	PROPOSED TMP
Daily Vehicle-Miles Traveled	3,404,648 mi	3,574,864 mi
Daily Vehicle-Hours Traveled	116,676 hrs	115,360 hrs
Average Speed	29.18 mph	30.99 mph
Daily Delay in Hours	51,496 hrs	47,635 hrs
Average Trip Length in Miles	8.70 mi	9.00 mi

Based on the seven objectives outlined in Chapter 3, the following are addressed through the travel demand modeling.

Congestion – improve travel times, reduce delay, increased average speed

Ultimate state – tested the network for build out conditions

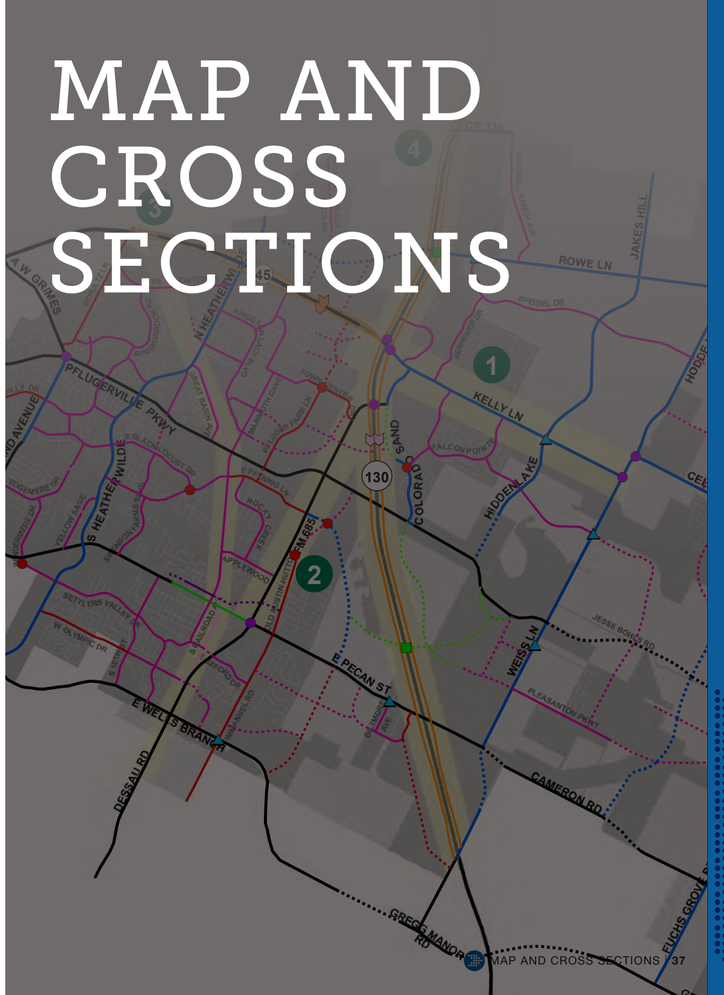
Implementable projects – identified new projects to improve system performance

Connect Destinations - identified new connections to connect Pflugerville to the region by moving trips off local and collector streets

5

MAP AND CROSS SECTIONS

This chapter details the function of all roadways in Pflugerville, reflective of the ultimate needs of the transportation system. The recommended functional classifications in the Map, typical cross sections of roadways, and identified critical intersections are intended to guide future transportation decisions. In addition, critical gaps in the pedestrian and bicycle networks in the city are identified for connectivity purposes.



MAP DEVELOPMENT

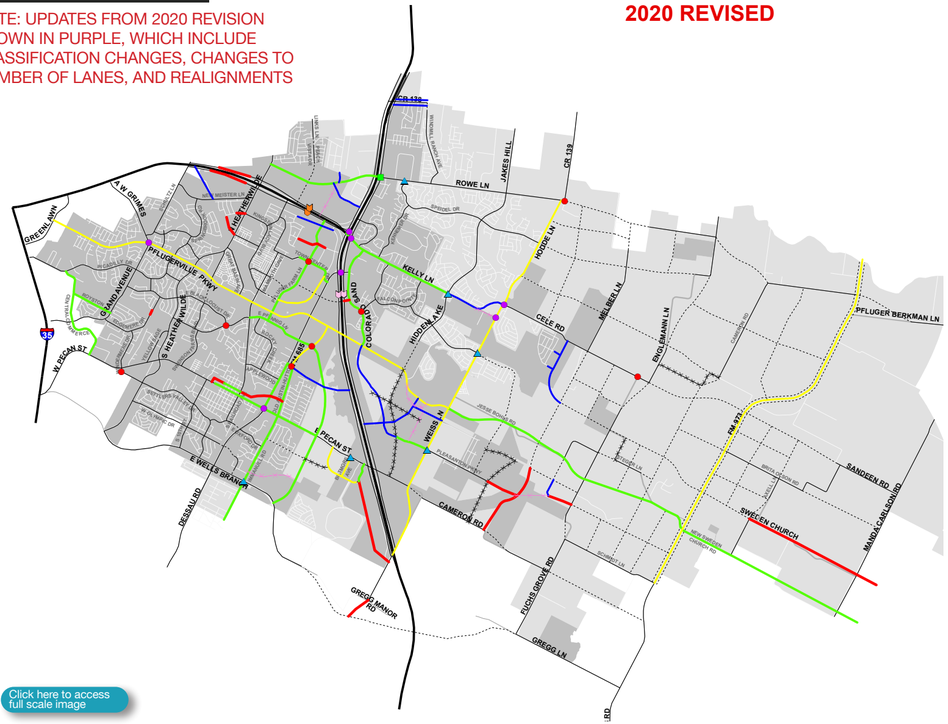
The Thoroughfare Plan serves to guide future transportation investments in Pflugerville by assigning functional classifications to the future road network and identifying critical intersections for further study. The map was verified through scenario planning in the previous chapter to ensure the transportation system would fulfill the needs of Pflugerville.

Map development relied on a data-driven approach using travel demand modeling and scenario planning described in the previous chapter. Identification of existing deficiencies laid the groundwork for determining where roadway function may need to change. Intersections with significant entering volumes or geometric challenges were identified as candidates for future signals, roundabouts, or innovative intersections where these traditional traffic control measures may be insufficient.

EDITS TO 2015 TMP

NOTE: UPDATES FROM 2020 REVISION SHOWN IN PURPLE, WHICH INCLUDE CLASSIFICATION CHANGES, CHANGES TO NUMBER OF LANES, AND REALIGNMENTS

2020 REVISED



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LEGEND

2019 TMP INTERSECTION PROJECTS
- INNOVATIVE
- NEW OVERPASS
- NEW RAMP
- NEW SIGNAL
- RAMP REVERSAL
- NEW ROUNDABOUT

2019 ROADWAY PROJECTS
- 2020 REMOVE
- 2020 REALIGN
- 2020 RECLASSIFY
- REMOVE
- RECLASSIFY
- NEWLY IDENTIFIED ALIGNMENT

2019 ROADWAYS
- EXISTING ROADWAY
- FUTURE ROADWAY

2020 REVISION

THOROUGHFARE PLAN

The Thoroughfare Plan map identifies ultimate roadway cross sections, right-of-way needs, critical intersections, and access changes desired for SH 130 and SH 45.

The Thoroughfare Plan result is a comprehensive planning process to evaluate the needs of Pflugerville's transportation system to meet the objectives outlined in this plan:

Modeling was completed considering a full build-out of the City.

Consideration has been given to regional connections and the planning efforts of surrounding municipalities and agencies.

Identification of critical intersections for further study acknowledges that the nodes of the transportation system can often become bottlenecks resulting in congestion.

Development of the map and cross sections considered the community's desire for a safe multimodal system, providing for the needs of all road users, which are reflected in the cross sections and critical pedestrian and bike connections later in this chapter.

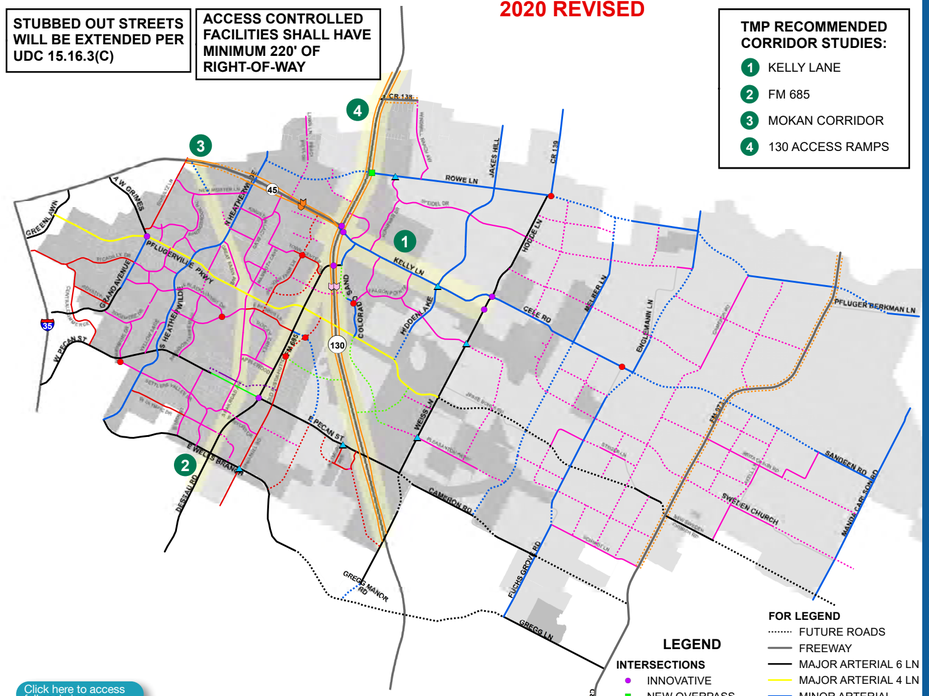
FINAL TMP PLAN

STUBBED OUT STREETS WILL BE EXTENDED PER UDC 15.16.3(C)

ACCESS CONTROLLED FACILITIES SHALL HAVE MINIMUM 220' OF RIGHT-OF-WAY

2020 REVISED

TMP RECOMMENDED CORRIDOR STUDIES:
1. KELLY LANE
2. FM 685
3. MOKAN CORRIDOR
4. 130 ACCESS RAMPS



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LEGEND

INTERSECTIONS
- INNOVATIVE
- NEW OVERPASS
- NEW RAMP
- NEW SIGNAL
- RAMP REVERSAL
- NEW ROUNDABOUT

FOR LEGEND
- FUTURE ROADS
- FREEWAY
- MAJOR ARTERIAL 6 LN
- MAJOR ARTERIAL 4 LN
- MINOR ARTERIAL
- MAJOR COLLECTOR
- MINOR COLLECTOR
- URBAN MAIN ST
- URBAN 3-LANE

FUNCTIONAL CLASSIFICATION

Functional classifications indicate the nature of roadways in a transportation network. Each functional class balances mobility and access differently, based on the context of the adjacent land uses and capacity needs for the system.

The functional classification of a roadway is based on the amount of demand anticipated for the link in the system. Local and collector roads typically have a higher demand for access to residences, businesses, or civic land uses adjacent to the roadway. Arterials typically have a higher demand for vehicle throughput, with some access needs, but usually at greater distances and intervals between points of access to limit conflicts. Highways or freeways are predominantly access controlled due to being regional connections between Pflugerville and surrounding communities. Highways and freeways are not described in detail, as they are controlled by other agencies.

LOCAL STREETS

Local streets generally serve exclusively residential land uses, with a few exceptions serving small retail or mixed-use developments. These streets are intended to provide access to land and operate at low speeds, providing access to higher classification streets. When parking is allowed on these facilities, vehicles yield to one another to pass.

MINOR COLLECTORS

Minor collectors serve as the spine roads of neighborhoods and connect residences to the rest of the transportation system. These streets provide some access to local retail, business, and community services and are ideal for pedestrian and bicycle routes.

MAJOR COLLECTORS

Major collectors balance mobility and access, with access to local and neighborhood businesses. Major collectors serve as residential access facilities for higher density residential land uses. These roadways connect commercial districts to the arterial system.

MINOR ARTERIALS

Minor arterials predominantly serve to connect destinations across the city and provide access to regional thoroughfares. These facilities typically begin and end within the City and provide connectivity between residences and other activities to other areas in the City.

MAJOR ARTERIALS

Major arterials provide access to nearby communities and carry the highest capacity of vehicles in the City. These facilities provide more limited access to adjacent land uses, which are often accomplished through access on lower classification streets. Existing major arterials would be retrofitted through extensive public input.

SPECIAL CLASSIFICATIONS

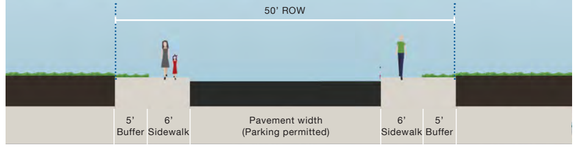
The Main Street and Urban 3 Lane 80’ are special functional classifications developed for achieving specific goals in different city contexts.

CROSS SECTIONS

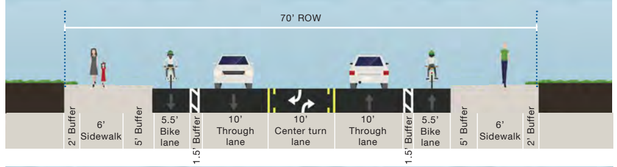
Cross sections indicate the intended configuration of each roadway on the transportation network, including the number of vehicular lanes, access control, pedestrian and bicycle facilities, and streetscape. Actual design of streets may vary based on local conditions.

The cross sections on the following pages are illustrative examples of typical configurations of each functional classification in Pflugerville. Specific local conditions such as topography, drainage considerations, and adjacent land uses may lead to variation in ultimate design of these facilities. However, the intended vehicular capacity, access type (presence of a center turn lane or median), parking, and pedestrian and bicycle facility type and width are intended to be preserved unless other priorities dictate a reason for deviation. **The cross sections develop focus on safety by changing the recommended lane widths to 11', adding bike facilities and ensuring separation between modes is maintained.**

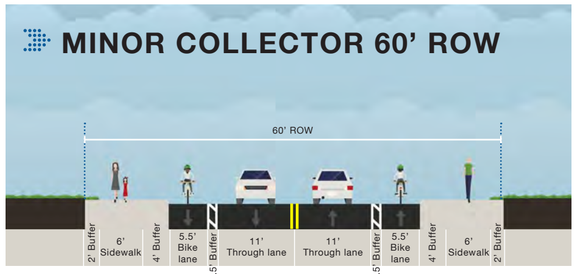
LOCAL 50' ROW



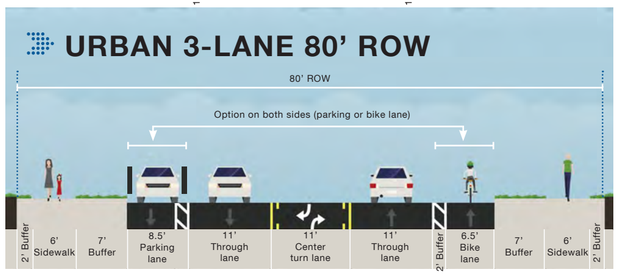
MAJOR COLLECTOR 70' ROW



MINOR COLLECTOR 60' ROW



URBAN 3-LANE 80' ROW

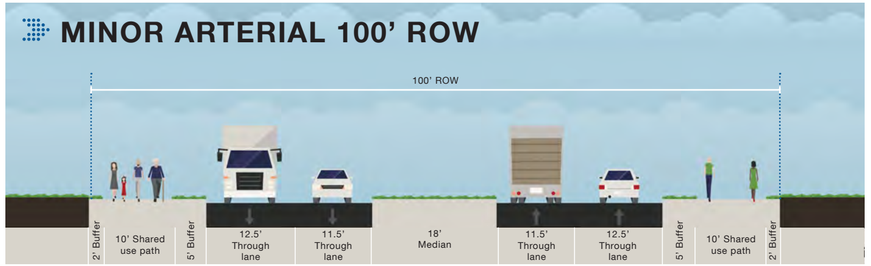


Note - all dimensions shown are from face of curb or center of stripe. It is assumed that all pavement sections include an 18" gutter pan and 6" curb behind the dimension on both sides of the pavement section.

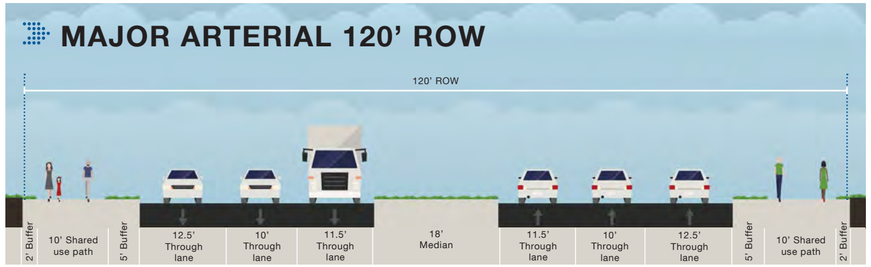
In addition to safety, these cross sections recognize that collector type facilities often have high turning demands and therefore provide a center turn lane on Major Collectors to **reduce conflicts and improve congestion.**

All street cross sections are shown within an urbanized context, including curb and gutter with underground drainage facilities. It is assumed that the ultimate state of all roadways in Pflugerville, except for those under control of other jurisdictional authority, will be urban in context when Pflugerville is **fully built out.**

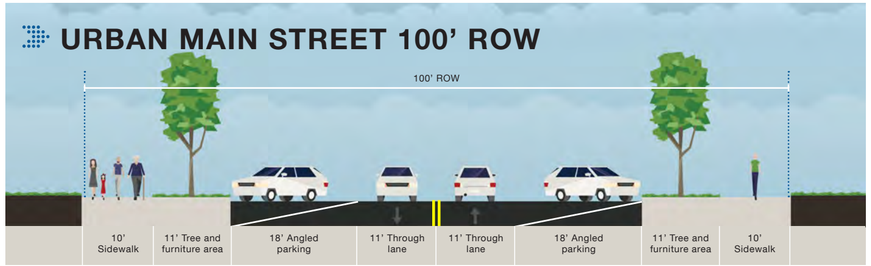
MINOR ARTERIAL 100' ROW



MAJOR ARTERIAL 120' ROW



URBAN MAIN STREET 100' ROW

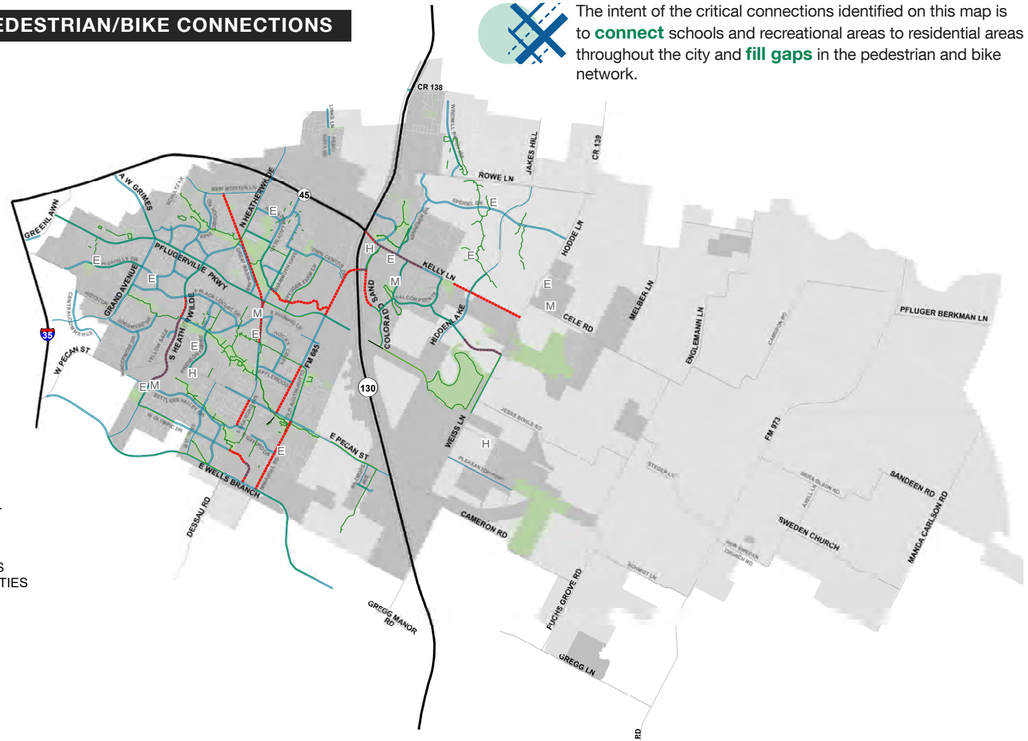


PEDESTRIANS AND BIKES

The TMP provides for future pedestrian facilities on all functional classifications, and bicycle accommodations on all non-local streets in the TMP Map. However, the existing bicycle and pedestrian network has some critical gaps resulting in a lack of connectivity, which is identified in the map on this page. Project development and prioritization for filling gaps in connectivity are recommended for future study, see Chapter 8.

CRITICAL PEDESTRIAN/BIKE CONNECTIONS

The intent of the critical connections identified on this map is to **connect** schools and recreational areas to residential areas throughout the city and **fill gaps** in the pedestrian and bike network.



LEGEND

- E — ELEMENTARY SCHOOL
- H — HIGH SCHOOL
- M — MIDDLE SCHOOL
- CRITICAL CONNECTION
- EXISTING TRAILS AND BIKE FACILITIES
- EXISTING PEDESTRIAN FACILITIES
- CITY PARKS

Click here to access full scale image

The Bike System Plan is aspirational and envisions a complete and **connected network** of bicycle facilities throughout the City of Pflugerville at **build out.** On all arterial roadways, the preferred bicycle facility is an off street shared use path to **ensure the safety of bicyclists.**

BIKE SYSTEM PLAN

The City of Pflugerville supports a regional hike and bike trail facility within the Mokan right of way, providing connectivity between the cities of Round Rock, Pflugerville, and Austin and requests Travis County and the City of Austin support [for] this improvement within the Mokan corridor for the overall health and wellness of the region.

LEGEND

- OFF-STREET TRAILS
- ROADWAY WITH ON-STREET BICYCLE FACILITIES
- ROADWAY WITH SHARED-USE FACILITIES
- ROADWAY WITH NO PLANNED BICYCLE FACILITIES
- CITY PARKS
- MOKAN CORRIDOR

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6

CAPITAL IMPROVEMENT PLANNING

A component of the TMP process was the refinement of the City's 5-year Capital Improvement Plan (CIP) for transportation projects from FY 2019-2023 based on public feedback. This involved prioritizing both previously identified projects and newly identified projects and developing planning level cost estimates.

PRIORITIZATION

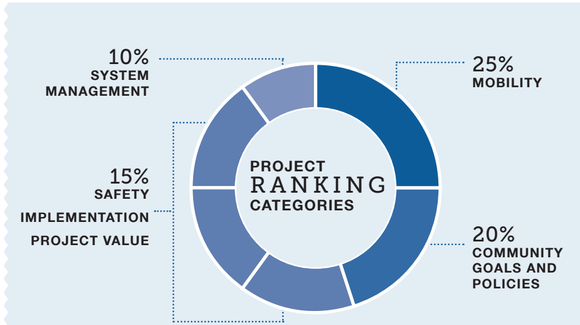
The City of Pflugerville previously prioritized projects in its 5-year CIP for FY 2019-2023. The TMP refined criteria and updated weights for criteria within specific community goals based on input from the public.

At the first Open House on April 30 2019, the public participated in an activity to prioritize community goals arranged in a pyramid. The resulting feedback was then used to help reassign weighting to the community goals used in previous prioritization activities by the City. The community goals presented for the priority pyramid activity are shown in **Figure 15**.

The pie chart on this page shows the assigned percentages for each community goal assessed in project prioritization. In addition to feedback received at the Open House on April 30, the community was given the opportunity to present feedback through an interactive online map (Wikimap). Bonus points were given to projects that had higher frequency of comments from the online engagement. In addition, project rankings were further calibrated through an activity at the second Open House on September 17 by allowing participants to vote projects up or down in priority order using arrow stickers. The cumulative sum of these arrows (positive for up and negative for down orientation) were adjusted to reflect community priorities.

Project scoring and ranking was based in part on evaluation criteria developed to determine the 2019-2023 5-Year CIP in late 2018. Criteria evaluated includes evaluation of mobility improvement to key zones, crash history and safety concerns, proximity to economic development focus areas, project readiness (including funding already allocated), return on investment, and existing pavement condition. These criteria are grouped into the project ranking categories displayed on this page and weights were determined through community feedback during the project process which resulted in an **implementable Capital Improvements Plan.**

Figure 15



SELECTING PROJECTS IS A CRUCIAL STEP IN IMPLEMENTING THE VISION OF A TRANSPORTATION MASTER PLAN.

PROJECT SCREENING

The map on this page shows the projects evaluated using a refined prioritization methodology previously used to determine the 5-year CIP. Projects were pre-screened by collecting projects identified in the current CIP and adding new projects through public feedback. Projects were refined through input from the TPOC and City staff.

LEGEND

- ✱ INTERSECTION PROJECTS
- EXISTING ROAD
- FUTURE ROAD

Click here to access full scale image

Intersection projects were determined based on locations where the highest entering volumes from the model were observed in build-out conditions or where significant feedback was received from the community related to congestion. These locations should be studied through corridor studies or Intersection Control Evaluation to determine both operational and **safety improvements** to address high frequency of crashes identified in Chapter 1.

PROJECT RANKING

The following table provides a summary of the results of public prioritization activities, grouping projects into high, medium or low priority categories. Intersection projects identified on the map on the previous page were identified as the most critical intersections for improvements and are all considered high priority projects.

PROJECT ID	NAME	DESCRIPTION	LIMITS	PRIORITY
H	SH 45 Frontage Roads	Connect Frontage Road gaps on SH 45 EBFR / WBFR	Schultz to Heatherwilde	High
E	Kelly Ln. Phase 3	Widen to an urban four-lane section	Moorlynch Ave. to Weiss Ln.	High
Y	Kelly Ln.	Corridor and Interchange Study at SH 130 / FM 685	SH 130 to W Falcon Pointe Blvd.	High
F	E Pflugerville Pkwy.	Widen to an urban four-lane section	Colorado Sand Dr. to Weiss Ln.	High
J	Rowe Ln. Extension	Corridor Study	Heatherwilde Blvd. to SH 130	High
U	Cameron Rd. Realignment	New two-lane urban section (half of four-lane)	Pecan St. to SH 130	High
Z	FM 685	Corridor Study	SH 130 to E Pecan St.	High
A	Picadilly Dr.	Widen to an urban three-lane section	City Limits to Central Commerce Dr.	High
N	SH 130 Connections	New Collectors	Pfennig Extension to E Pflugerville Pkwy.	Medium
B	Central Commerce Dr.	Widen to an urban three-lane section	Picadilly Dr. to Royston Ln.	Medium
I	Immanuel Rd.	Widen to an urban three-lane section	E Pecan St. to Wells Branch Pkwy.	Medium
L	Cele Rd.	Widen to an urban four-lane section	Weiss Ln. to Cameron Rd.	Medium
M	Impact Way Extension	New urban three-lane section	Helios Way to Cameron Rd.	Medium
D	Pfluger Farm Ln. North	Extend urban three-lane roadway to the north	Town Center Dr. to SH 45 EBFR	Medium
S	Main St.	New urban two-lane section	N Railroad Ave. to Old Austin-Hutto	Medium
T	Rowe Ln.	Widen to an urban four-lane section	SH 130 to Hodde Ln./CR 139	Medium
K	Old Austin-Hutto Rd. Ext	New urban three-lane section	E of FM 685 to Pflugerville Pkwy.	Medium
G	Melber Ln.	New two-lane urban section (half of four-lane)	Pecan St. to Pleasanton Pkwy.	Low
C	Royston Ln.	Widen to an urban three-lane section	Central Commerce Dr. to Grand Ave Pkwy.	Low
R	Town Center Dr.	Access Management Study and associated improvements	Limestone Commercial Driveway to FM 685	Low
P	Schultz Ln.	Widen to an urban four-lane section	300' North of Springbook to City Limits	Low
V	Terrell Ln. Extension	New urban three-lane section	S of Town Center to E Pflugerville Pkwy.	Low
Q	Wilke Ridge Ln.	Widen to an urban three-lane section	Pflugerville Pkwy. to Heatherwilde Blvd.	Low
W	Pfennig Ln.	New urban four-lane section	450' E of FM 685 to E Pecan St.	Low
X	Pfennig Ln.	New urban three-lane section	E Pecan St. to Wells Branch Pkwy.	Low
O	N-S Collector W of Melber Ln.	New urban three-lane section	Cele Rd. to Collector	Low

Project priority of High, Medium and Low was determined by a systematic process using public feedback to help refine project priority, breaking the projects up into three tiers. The prioritization process previously described was adjusted based on the priority pyramid exercise results from the first Open House resulting the percentages shown on Page 47. Wikimap feedback received online was used to give bonus points to projects, and similarly the up voting and down voting of projects in the 2nd Open House were used to adjust project priorities further. Intersection projects are included on the following page to address bottlenecks and congestion, but are not shown in a specific order because many of these will be studied in identified corridor studies.

PROJECT COST

The following table provides a summary of planning level costs determined for each corridor. Costs were determined using unit costs for other projects in the area and are based on recommended cross sections identified in Chapter 5.

CAPITAL IMPROVEMENTS ROADWAY AND INTERSECTION PROJECTS

Note: Project labels do not indicate priority. ***Costs do not include right-of-way.***

PROJECT ID	FUNCTIONAL CLASS	PROJECT NAME	DESCRIPTION	PROJECT COST
H	Frontage Road	SH 45 Frontage Roads	New Frontage (40' pavement)	$7,080,000
E	Minor Arterial	Kelly Ln. Phase 3	Widen four-lane	$10,240,000
Y	Minor Arterial	Kelly Ln.	Corridor Study	$350,000
F	Minor Arterial	E Pflugerville Pkwy.	Widen four-lane	$15,257,000
J	Minor Arterial	Rowe Ln. Extension	Widen four-lane	$27,174,000
U	Minor Arterial	Cameron Rd. Realignment	New two-lane (1/2 four Lane)	$2,561,000
Z	Major Arterial	FM 685	Corridor Study	$500,000
A	Major Collector	Picadilly Dr.	Widen three-lane	$3,680,000
N	3-Lane Urban	SH 130 Connections	New Road	$16,399,000
B	Major Collector	Central Commerce Dr.	Widen three-lane	$3,820,000
I	Major Collector	Immanuel Rd.	Widen three-lane	$6,653,000
L	Minor Arterial	Cele Rd.	Widen four-lane	$28,015,000
M	Major Collector	Impact Way Extension	New three-lane	$6,460,000
D	Major Collector	Pfluger Farm Ln. North	New three-lane	$3,960,000
S	Local	Main St.	New two-Lane	$4,981,000
T	Minor Arterial	Rowe Ln.	Widen four-lane	$34,951,000
K	Major Collector	Old Austin-Hutto Rd. Ext	New three-lane	$10,986,000
G	Minor Arterial	Melber Ln.	New two-lane (1/2 four Lane)	$6,762,000
C	Major Collector	Royston Ln.	Widen three-lane	$3,634,000
R	Major Collector	Town Center Dr.	Signal and Access Management	$743,000
P	Major Collector	Schultz Ln.	Widen four-lane	$2,860,000
V	Major Collector	Terrell Ln. Extension	New three-lane	$7,801,000
Q	Major Collector	Wilke Ridge Ln.	Widen three-lane	$2,530,000
W	Minor Arterial	Pfennig Ln.	New four-lane	$13,661,000
X	Major Collector	Pfennig Ln.	New three-lane	$10,068,000
O	Major Collector	N-S Collector W of Melber Ln.	New three-lane	$5,803,000
	Intersection	Kelly Ln. at Jakes Hill Rd.	New Signal	$350,000
	Intersection	SH 130 at CR 138, E Pflugerville Pkwy. at FM 685, Heatherwilde Blvd. at Pecan St., FM 685 at Pecan St., FM 685/Copper Mine Dr. Overpass, Hodde/Weiss at Cele Rd.	Innovative Intersection	*$TBD
	Multimodal and Connectivity Study	Mokan Corridor	First step of a lengthy process to bring regional partners together to determine the impacts and feasibility of ramp reversals	$500,000
	Corridor Study	SH 130 Access Ramps		$500,000

Total: **$238,279,000***

High Priority Projects
$66,842,000

The cost to address current needs on existing roadways totals $111,542,000 not including intersection projects. This leaves $127,737,000 in projects in the CIP to address future needs.

Medium Priority Projects
$116,225,000

Low Priority Projects
$53,862,000

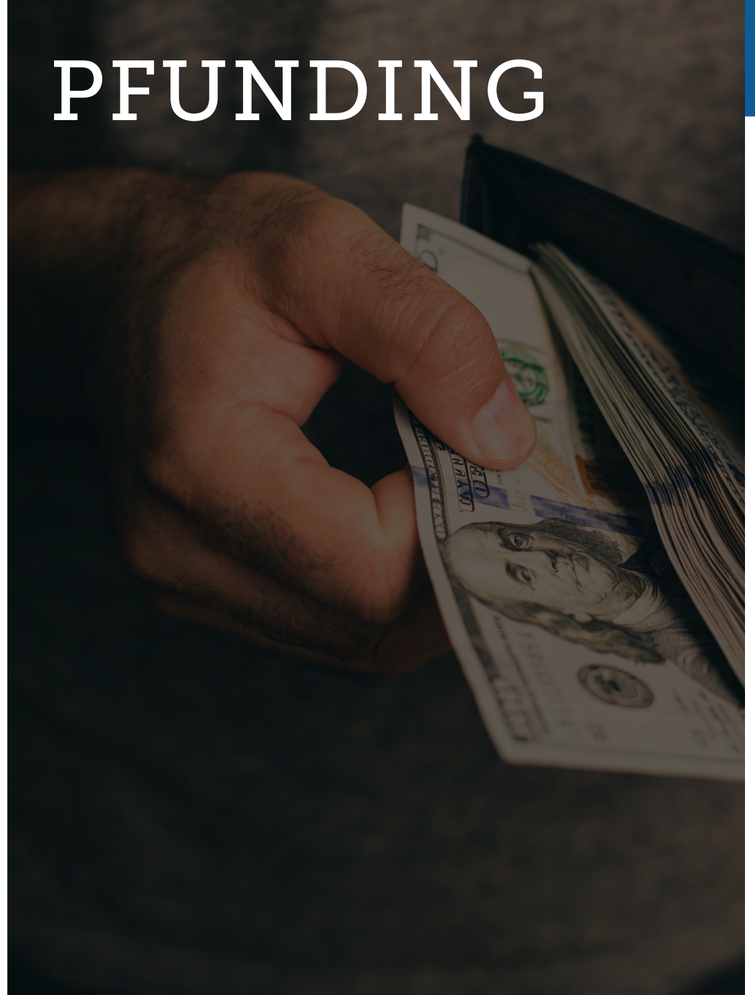
Intersection/Corridor Projects
$1,350,000

*Innovative intersections may include grade separation, continuous flow intersections, or other major investments at significant cost. Recommend budgeting $2,000,000 per year until Intersection Control Evaluation is performed.

7

PFUNDING

There is a recognition that transportation investments are an expensive endeavor, and that cities are increasingly looking for ways to help Pfund improvements and leverage resources from both funding mechanisms available to the City and through outside sources. This chapter documents identified funding opportunities available to the City of Pflugerville to pay for projects.



SOURCES

The purpose of this section is to provide information for the City to help develop a funding strategy for transportation infrastructure and studies. This section begins the process of identifying funding options and opportunities.

Funding that is available for projects can be categorized based on the project phase, the target user, and the funder. Each project phase can be funded separately and from different sources. For example, a project is often identified initially during a planning process such as the one resulting in this plan. **As priority projects progress through implementation, there are funding opportunities for design phases and for construction.**

Target users is another way to identify funding sources. For example, there are opportunities that focus on pedestrian and bicycle facilities, while others are for transit systems. The funder, whether the City itself, an outside entity, or a combination thereof can also influence project selection based on eligibility for grants or other funding, as well as project readiness.

Projects in growth areas may have a developer contribution to build their adjacent roadways. The City of Pflugerville could consider a Roadway Impact Fee to provide contribution from all future developments that is equitable across all developments and flexible in spending. Streets do not have a dedicated enterprise fund like certain underground utilities to ensure continued maintenance of facilities, however some cities in Texas have begun to implement an enterprise fund (Street Maintenance Fee) to cover funding needs for maintenance of infrastructure. This fee typically appears on a water bill and ties directly to maintenance projects identified in the City's CIP.

Funding sources can generally be broken into four buckets: City fees and taxes, developer contributions, special districts, and outside sources as summarized below.

DEVELOPER CONTRIBUTIONS

SOURCE	DESCRIPTION
Roadway Impact Fees	A one-time charge assessed to new development and redevelopment, calculated with the methodology outlined in Chapter 395 of the Texas Local Government Code within city limits.
Chapter 380 Agreements	These agreements are governed by Chapter 380 of the Local Government Code and are generally known as "Developer Agreements". They are used to reimburse or share the cost of development.
Traffic Study Improvements	A traffic study or traffic impact assessment (TIA) can be used to identify the responsible party for the construction of new infrastructure to support a development. The cost may be responsibility of the developer, City, or both.

CITY FEES AND TAXES

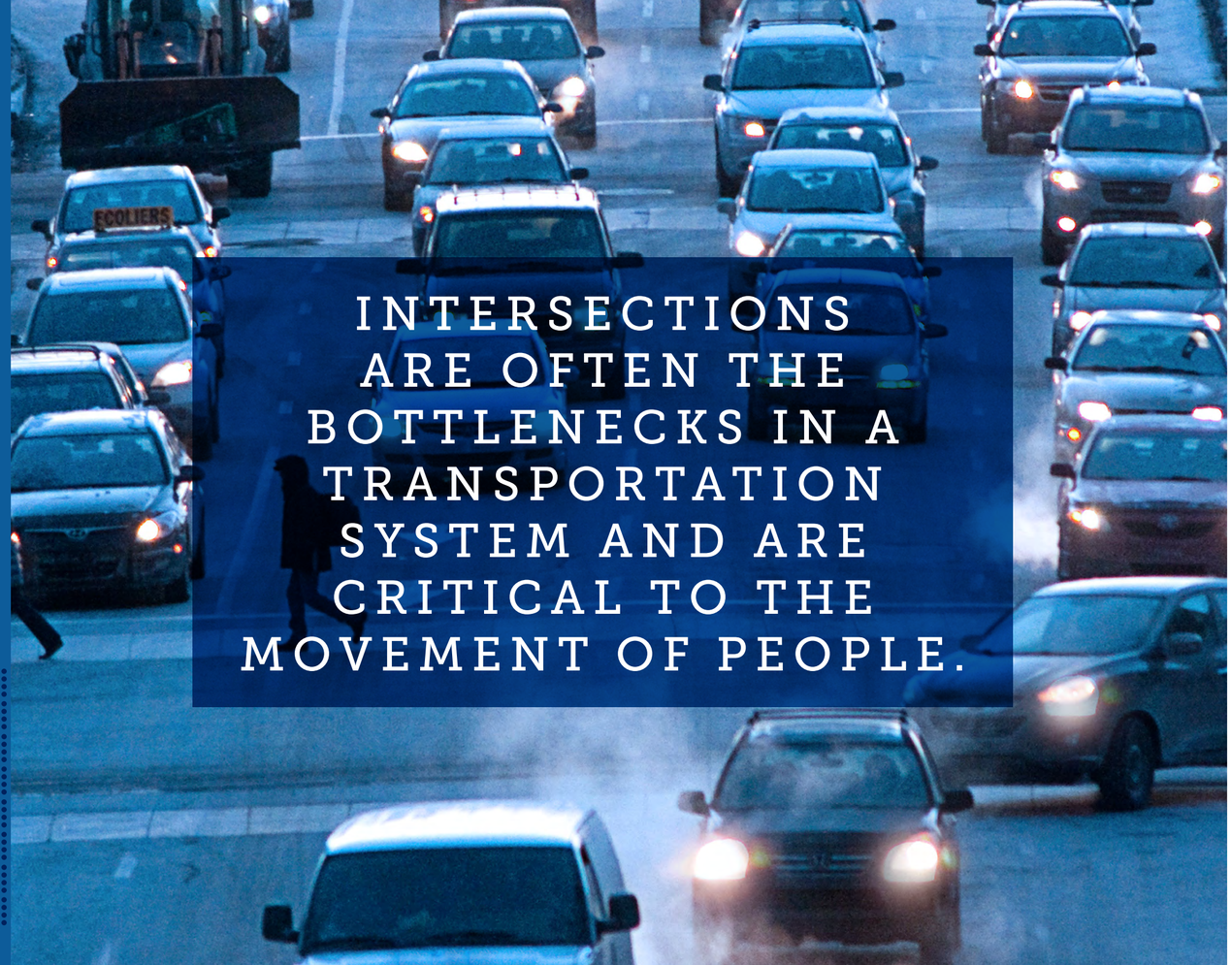
SOURCE	DESCRIPTION
City Bond Programs (GO Bonds)	Bond programs generally are used for large capital investments in infrastructure at one time. Bonds are typically submitted as propositions on a ballot and voted on by the public. Previous roadway bond programs were approved in Pflugerville in 2014 and 2018.
City General Funds (Property Taxes)	General funds are flexible for cities to spend as they see fit. Any roadway infrastructure project could be funded through general funds or used as a match for other funding. Certificates of Obligation (CO) Bonds fall into this category and are not the same as General Obligation (GO) Bonds.
Street Maintenance Fee	A source of revenue to fund street system maintenance based on use of the street system by residential and commercial properties

SPECIAL DISTRICTS

SOURCE	DESCRIPTION
Public Improvement District (PID)	A defined geographical area established to provide specific types of improvements or maintenance which are financed by assessments against the property owners within the area.
Tax-Increment Finance (TIF) or Tax-Increment Reinvestment Zone (TIRZ)	Sidewalk and streetscape improvements can often be included as part of larger efforts of business improvements and retail district beautification. TIFs collect levies on businesses in order to fund area-wide improvements that benefit businesses and improve access for customers.

OUTSIDE SOURCES

SOURCE	DESCRIPTION
Pflugerville Community Development Corporation (PCDC)	The PCDC can directly pay for transportation projects as an incentive for development to pay for infrastructure.
Unified Planning Work Program (UPWP)	This funding source is managed by the Capital Area MPO and provides funding for various transportation studies in the region.
MPO Call for Projects	Capital Area MPO submits a call for projects on a bi-annual basis with funding for studies, design, and construction to offer matches to local funding for transportation projects and are competitively awarded.
State and Federal Grants	Several grants exist at the state and federal level, such as the Highway Safety Improvement Program (HSIP) for safety projects.
Active Transportation Funding	Several different federal and state level programs exist for funding pedestrian, bike, and transit facilities.



INTERSECTIONS ARE OFTEN THE BOTTLENECKS IN A TRANSPORTATION SYSTEM AND ARE CRITICAL TO THE MOVEMENT OF PEOPLE.

8

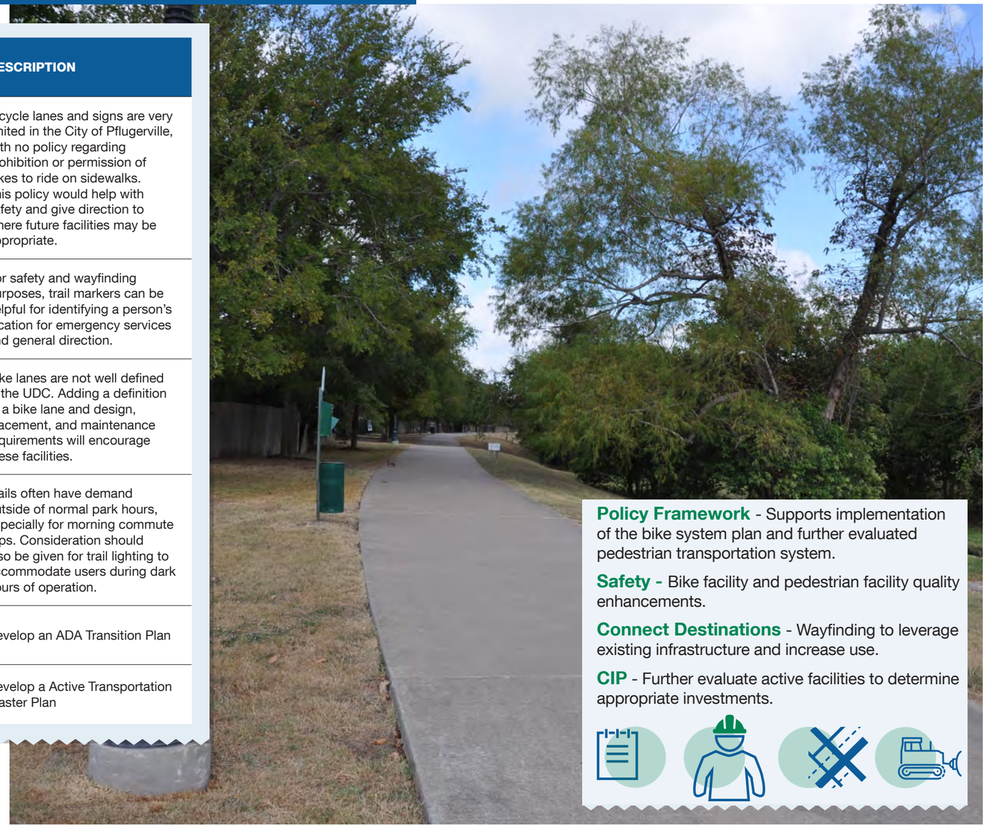
POLICIES

This chapter shows recommended policy directives for implementation. Policies are categorized by subject matter and shown in order of priority based on community feedback.

ACTIVE FACILITIES

Active facilities include modes of transportation that do not involve vehicles. The policies outlined on this page are generally related to pedestrian and bicycle travel in the City of Pflugerville.

CONSIDERATION	DESCRIPTION
Develop policy regarding where motorized and non-motorized bicycles are permitted to ride.	Bicycle lanes and signs are very limited in the City of Pflugerville, with no policy regarding prohibition or permission of bikes to ride on sidewalks. This policy would help with safety and give direction to where future facilities may be appropriate.
Add policy requiring trail location markers	For safety and wayfinding purposes, trail markers can be helpful for identifying a person's location for emergency services and general direction.
Update Unified Development Code (UDC) to define bike lane and where these on-street facilities are allowed.	Bike lanes are not well defined in the UDC. Adding a definition of a bike lane and design, placement, and maintenance requirements will encourage these facilities.
Consider different operating hours for trails and parks	Trails often have demand outside of normal park hours, especially for morning commute trips. Consideration should also be given for trail lighting to accommodate users during dark hours of operation.
ADA Compliance	Develop an ADA Transition Plan
CIP for active facilities	Develop a Active Transportation Master Plan



Policy Framework - Supports implementation of the bike system plan and further evaluated pedestrian transportation system.

Safety - Bike facility and pedestrian facility quality enhancements.

Connect Destinations - Wayfinding to leverage existing infrastructure and increase use.

CIP - Further evaluate active facilities to determine appropriate investments.

INTERSECTIONS

Intersections are often the bottlenecks in a transportation system and are critical to the movement of people. This page details policies related to improving intersections and setting the City up for future success in accommodating capacity at these critical locations.

CONSIDERATION	DESCRIPTION
Add policy that requires dedication of additional right-of-way at intersections for future capacity improvements.	Intersections often act as bottlenecks in the transportation system and are challenged with space for building capacity improvements. Requiring additional right-of-way near intersections will allow for space for future turn lanes or other capacity improvements. Per **Figure 19** below. Distances in Figure 19 are based on NCHRP Report 780 Design Guidance for Intersection Auxiliary Lanes.
Develop criteria for evaluating intersections to determine the appropriate traffic control type (All-Way Stop, Traffic Signal, Roundabout, etc.).	Traditionally, intersections are considered as either a stop-controlled intersection or studied for a traffic signal. Developing criteria to evaluate the appropriate control type will allow for other intersection types, like roundabouts or traffic circles, to be considered.
Develop an program that addresses Intersection Safety	Intersections are often the location of crashes, developing a strategy to proactively mitigate or prevent crashes to achieve zero fatalities.

Policy Framework - Setting up future intersections for success to avoid bottlenecks.

Relieves Congestion - Space reserved for additional capacity.

CIP - Further evaluate intersections to determine appropriate investments.

Safety - Intersection enhancements.

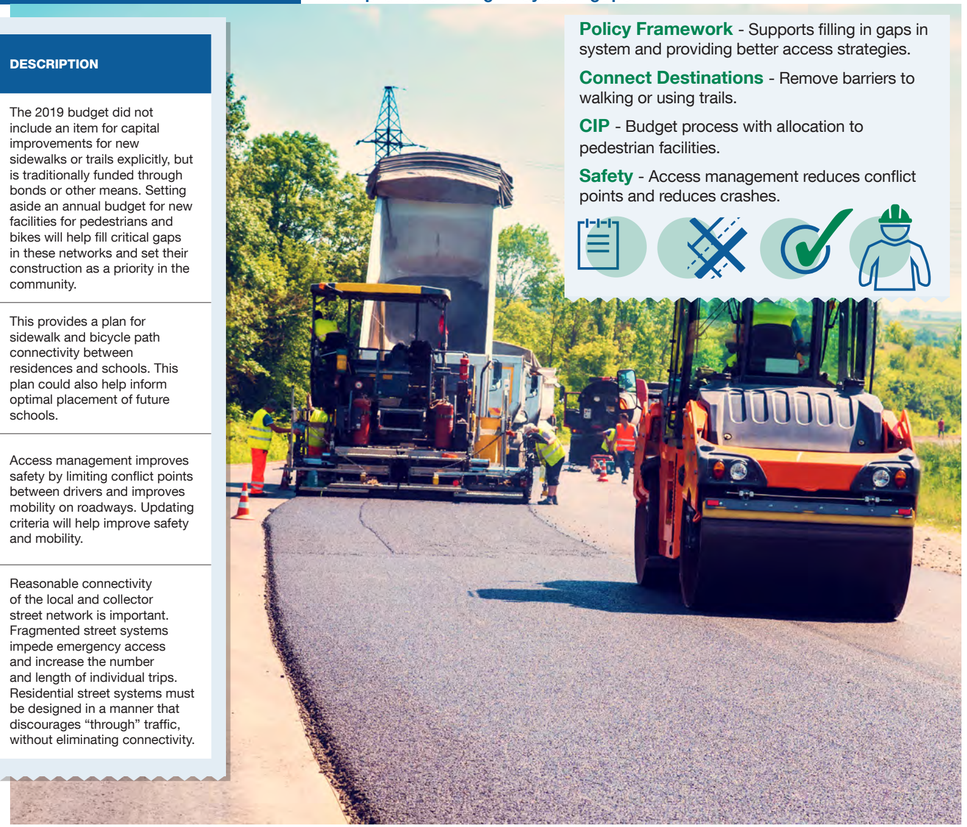
Figure 19

LENGTH OF ADDITIONAL RIGHT-OF-WAY FOR TURNS AT INTERSECTIONS	
Major Arterial	465 Feet
Minor Arterial	390 Feet
Major Collector	220 Feet
Minor Collector	200 Feet
Local	200 Feet

CONNECTIVITY

Connectivity policies help ensure that the different transportation modal networks are completed and provide adequate access to higher classification streets and regional roadways. This page shows policies that promote filling in system gaps.

CONSIDERATION	DESCRIPTION
Develop a set aside annual budget item for capital improvements for new sidewalks and trails.	The 2019 budget did not include an item for capital improvements for new sidewalks or trails explicitly, but is traditionally funded through bonds or other means. Setting aside an annual budget for new facilities for pedestrians and bikes will help fill critical gaps in these networks and set their construction as a priority in the community.
Develop a city-wide safe routes to school plan in conjunction with PfISD.	This provides a plan for sidewalk and bicycle path connectivity between residences and schools. This plan could also help inform optimal placement of future schools.
Revise Engineering Design Manual to achieve City's goals for appropriate driveway spacing, median placement, joint/cross access, and other access management strategies.	Access management improves safety by limiting conflict points between drivers and improves mobility on roadways. Updating criteria will help improve safety and mobility.
Incorporate connectivity requirement into Pflugerville's Unified Development Code	Reasonable connectivity of the local and collector street network is important. Fragmented street systems impede emergency access and increase the number and length of individual trips. Residential street systems must be designed in a manner that discourages "through" traffic, without eliminating connectivity.



Policy Framework - Supports filling in gaps in system and providing better access strategies.

Connect Destinations - Remove barriers to walking or using trails.

CIP - Budget process with allocation to pedestrian facilities.

Safety - Access management reduces conflict points and reduces crashes.

OTHER POLICIES

Policy Framework - Supports new modes of travel.

Ultimate State - Considers potential future with need for travel choice.

Safety - Strategies to reduce speeds.

Connect Destinations - Complete stub-outs from neighborhoods to reduce load on local and collector streets.

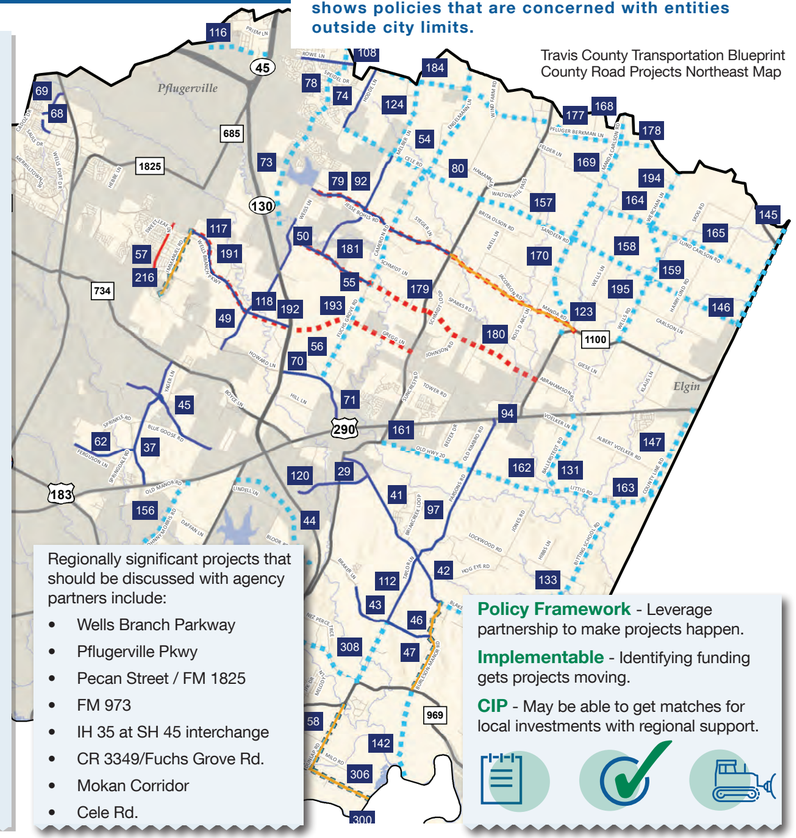
CONSIDERATION	DESCRIPTION
Update Engineering Design Manual	Manual update to include recommendations for an emphasis on safety, connectivity, enhanced intersection design, and ultimate build out of the roadway. Should include pavement design recommendations to maximize life cycle costs.
Develop a transit system plan	The Pflugerville Citizens Survey and TMP Open House in April both had a high response rate for adding transit services in Pflugerville. This directive would help Pflugerville assess the appropriate vehicle type and frequency of transit vehicles, and the cost of entering into services from the local transit agency such as Capital Metro.
Initiate a neighborhood traffic management/ calming program.	The City would create a program for installing devices for speed management in neighborhoods based on community input.
Develop a Traffic Management Plan Requirement in Pflugerville	During site planning a school would be required to develop a traffic management plan that evaluates on-site queuing and circulation as well as major pedestrian crossing points to the school. Plan should be re-certified every three years.
Ensuring public input is gathered on all projects	Develop a standard process for which the public is engaged on all planning and infrastructure projects.
TMP updates	Develop a policy for updating the TMP on an ongoing basis.

REGIONAL PARTNERS

Outside network connections are just as important as the connections within the City. Being actively involved with regional projects should be a priority for the City both now and in the future. This page shows policies that are concerned with entities outside city limits.

CONSIDERATION	DESCRIPTION
Evaluate opportunities to extend planned roadways from Williamson County aiding in regional mobility and economic development.	Increasing connections outside of the City helps with mobility region-wide. In addition, exploring economic development in these connections encourages visitors and strengthens partnerships with the County in the future.
Pursue partnerships with neighboring cities and regional entities such as Austin, Hutto, Round Rock, CAMPO, and TxDOT.	Regional coordination with outside entities is essential to providing the most efficient transportation network for the City. This coordination can include inviting members of these organizations to sit on plan advisory boards or to attend planning workshops. By doing this, the City has a stronger chance of building strong relationships and improving connectivity to the rest of the region.
Review and coordinate projects with the plans set by the adopted Travis County Transportation Blueprint plan.	The Travis County Blueprint is a long-range transportation plan that identifies transportation needs and solutions of the unincorporated areas in Travis County. This area includes Pflugerville's ETJ, therefore, it would benefit the City greatly to ensure these plans match the county's in this and future versions of the plan.
Review and coordinate projects with the Regional Arterials Study completed by CAMPO.	The regional arterial study evaluated the Mokan Corridor. The City Council provided a resolution to develop a Locally Preferred Alternative for the Mokan Corridor.

Travis County Transportation Blueprint
County Road Projects Northeast Map



Regionally significant projects that should be discussed with agency partners include:

- Wells Branch Parkway
- Pflugerville Pkwy
- Pecan Street / FM 1825
- FM 973
- IH 35 at SH 45 interchange
- CR 3349/Fuchs Grove Rd.
- Mokan Corridor
- Cele Rd.

Policy Framework - Leverage partnership to make projects happen.

Implementable - Identifying funding gets projects moving.

CIP - May be able to get matches for local investments with regional support.

GLOSSARY

Pflugerville Acronyms				
#	Acronym	Stands For	Definition	On Page(s)
1	TPOC	Transportation Planning Oversight Committee	a committee consisting of community stakeholders that was established at project inception to provide feedback during the planning process on a bi-monthly basis	2,14,17,21,49
2	CIP	Capital Improvements Plan	a short-range plan, usually of four to ten years, which identifies capital projects, provides a planning schedule, and identifies options for financing the plan	3,17,19,21,47,49 51,56,58,59,60
3	PUD	Planned Unit Development	a type of building development that designs groupings of compatible land uses within one contained subdivision	7
4	CRIS	Crash Records Information System	an online database provided by TxDOT that provides a central system to access all reported crash data within the state of Texas	10,11
5	TxDOT	Texas Department of Transportation	the Texas government agency that oversees the highway, aviation, rail, and public transportation systems in the state	9,10,11,17,60
6	PM	Public Meeting		14
7	PCDC	Pflugerville Community Development Corporation	the organization charged with promoting the economic development of the City of Pflugerville	17,53
8	PfISD	Pflugerville Independent School District	the public school district in Pflugerville, TX	58
9	MIS	Major Investment Study	designed to provide decision makers with more complete information on the options available for addressing transportation problems before making investment decisions	19
10	TAZ	Traffic Analysis Zone	a special area delineated by state and/or local transportation officials for tabulating traffic-related data	23
11	CAMPO	Capital Area Metropolitan Planning Organization	the regional transportation planning organization encompassing Bastrop, Burnet, Caldwell, Hays, Travis, and Williamson counties in Texas	23,25,60
12	LOS	Level of Service	a qualitative measure used to relate the quality of motor vehicle traffic service on a scale of A-F. LOS A-C generally represents acceptable conditions, while LOS D reflects deteriorating conditions. LOS E/F represents unacceptable. conditions where demand is exceeding capacity on system roadway links.	23,29,31,33,35
13	V/C	Volume to Capacity Ratio	a measurement of the operating capacity of a roadway where the number of vehicles passing through is divided by the number of vehicles that could fit at capacity	23
14	ETJ	Extraterritorial Jurisdiction	the legal ability of a city government to exercise planning authority beyond its normal boundaries	21,26,60
15	ITE	Institute of Transportation Engineers	an international educational and scientific association of transportation professional who are responsible for meeting mobility and safety needs	25

GLOSSARY

16	FHWA	Federal Highway Administration	a division of the United States Department of Transportation (USDOT) that specializes in highway transportation	11,26,27
17	NCHRP	National Cooperative Highway Research Program	a national program that researches problem areas that affect highway planning, design, construction, operation, and maintenance in the US	53
18	GO	General Obligation Bond	a common type of municipal bond that is secured by a state or local government's pledge to use legally available resources such as tax revenues to repay bond holders	53
19	CO	Certificates of Obligation	an instrument of public debt that is backed by tax revenue, fee revenues, or combination of the two	32
20	VMT	Vehicle Miles Traveled	a measure of the amount of travel for all vehicles in a geographic region over a given period of time	36
21	ROW	Right-of-Way	the private property or easement granted by a public agency that is set aside for transportation or utility purposes	42,43
22	FY	Fiscal Year	a year that is as reckoned for budgeting and accounting purposes, not always measured from January 1 to December 31	46,47
23	PVMT	Pavement		51
24	PID	Public Improvement District	a defined geographical area established to provide specific types of improvements or maintenance which are financed by the property owners within the area	53
25	TIF	Tax-Increment Finance	a public financing method that is used as a subsidy for redevelopment, infrastructure, and other community-improvement projects	53
26	TIRZ	Tax-Increment Reinvestment Zone	a political subdivision of a municipality or county in the state of Texas created to implement tax-increment financing	53
27	UPWP	Unified Planning Work Program	details CAMPO planning programs for a two-year time period	53
28	HSIP	Highway Safety Improvement Program	a core Federal-aid program with the purpose of achieving significant reduction in traffic fatalities and serious injuries on all public roads	53
29	UDC	Unified Development Code	a document that consolidates all development-related regulations	56

PFLUGERVILLE

PFORWARD

TRANSPORTATION MASTER PLAN

PFLUGERVILLE
PFORWARD
TRANSPORTATION MASTER PLAN

Kimley»Horn

EXISTING CONDITIONS INVENTORY

LAND USE AND ZONING

LEGEND

- DOWNTOWN PFLUGERVILLE
- STONE HILL TOWN CENTER
- SINGLE FAMILY RESIDENTIAL
- MULTI-FAMILY RESIDENTIAL
- PLANNED UNIT DEVELOPMENT
- COMMERCIAL
- GENERAL BUSINESS/OFFICE
- NEIGHBORHOOD SERVICES
- INDUSTRIAL
- AGRICULTURAL
- OTHER
- ETJ

Click here to return to main document

PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

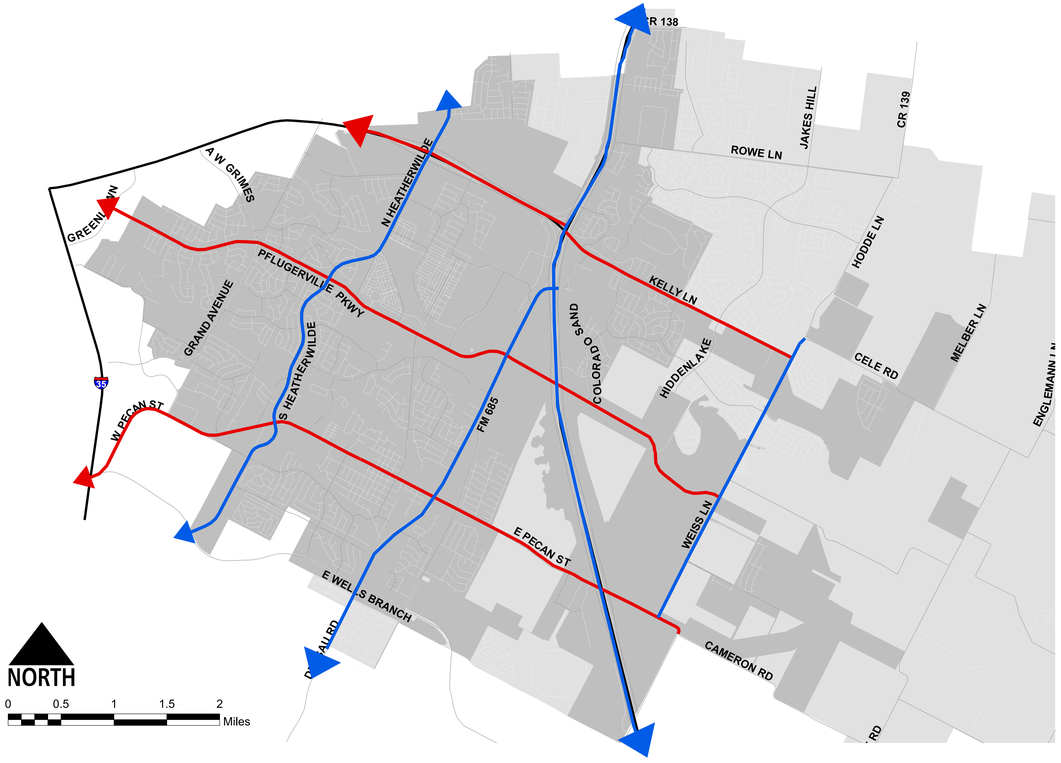
Kimley»Horn

EXISTING CONDITIONS INVENTORY

MAJOR REGIONAL CONNECTIONS

LEGEND

- NORTH-SOUTH CONNECTIONS
- EAST-WEST CONNECTIONS



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PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

Kimley»Horn

EXISTING CONDITIONS INVENTORY

EXISTING TRAFFIC CONTROL

LEGEND

- SIGNAL
- ALL-WAY STOP

Click here to return to main document

PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

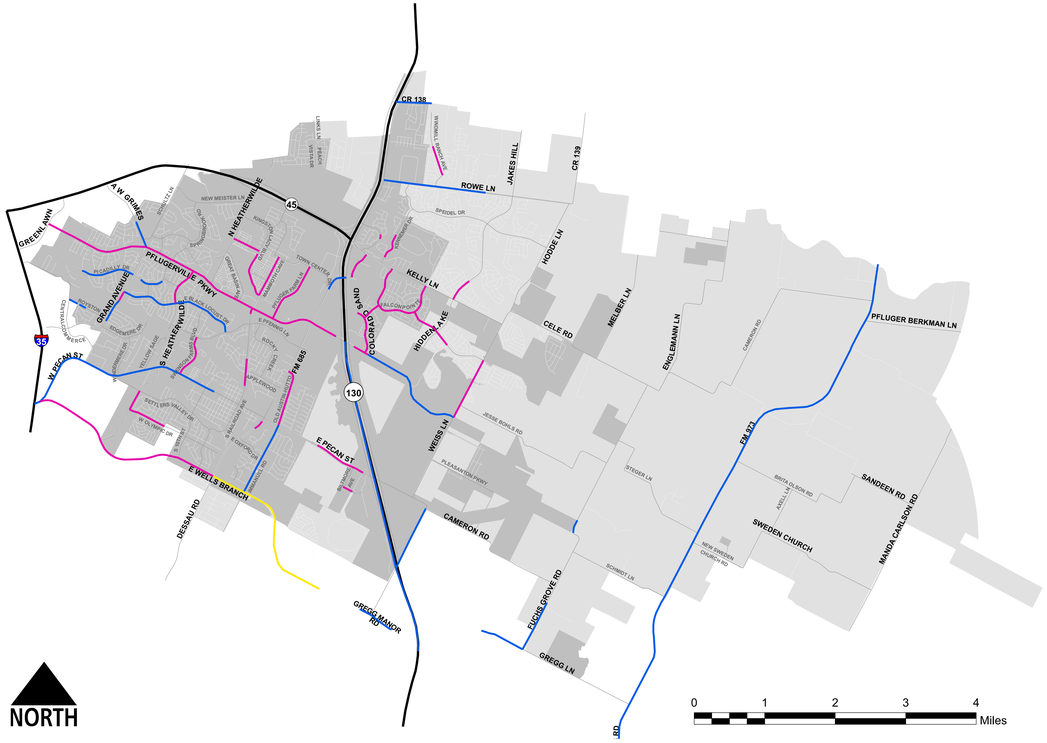
Kimley»Horn

EXISTING CONDITIONS INVENTORY

EXISTING BICYCLE FACILITIES

LEGEND

- SHOULDER
- BIKE LANE
- SHARED-USE PATH



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PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

Kimley»Horn

EXISTING CONDITIONS INVENTORY

EXISTING PEDESTRIAN NETWORK

LEGEND

- TRAILS
- PEDESTRIAN GAPS

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PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

Kimley»Horn

WIKIMAP PUBLIC INPUT

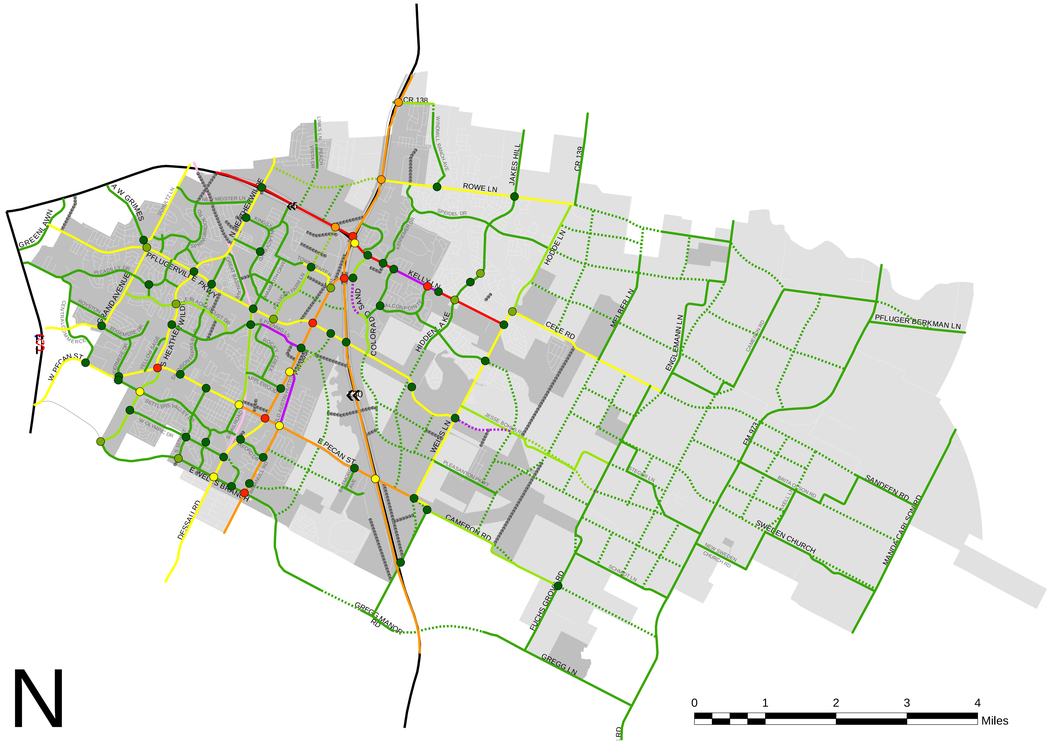
EXISTING CONDITIONS COMMENTS

LEGEND

INTERSECTION COMMENTS
- 0 - 5
- 6 - 10
- 11 - 15
- 16 - 25
- 26 - 45

ROADWAY COMMENTS
- 0 - 5
- 6 - 10
- 11 - 25
- 26 - 60
- 61 - 101
- Bond New Alignment
- Bond Widening
- Comment New Alignment
- Mokan Corridor

Click here to return to main document



PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

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2018 EXISTING DAILY VOLUMES

EXISTING DEFICIENCIES MAP

LEGEND
- A - C
- D
- E - F

Click here to return to main document

Level of Service
Represents Daily Volumes

PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

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2019 TRANSPORTATION MASTER PLAN

CONNECTIONS PLUS SCENARIO

LEGEND

- EXISTING ROADS
- NEW CONNECTIONS

Click here to return to main document

PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

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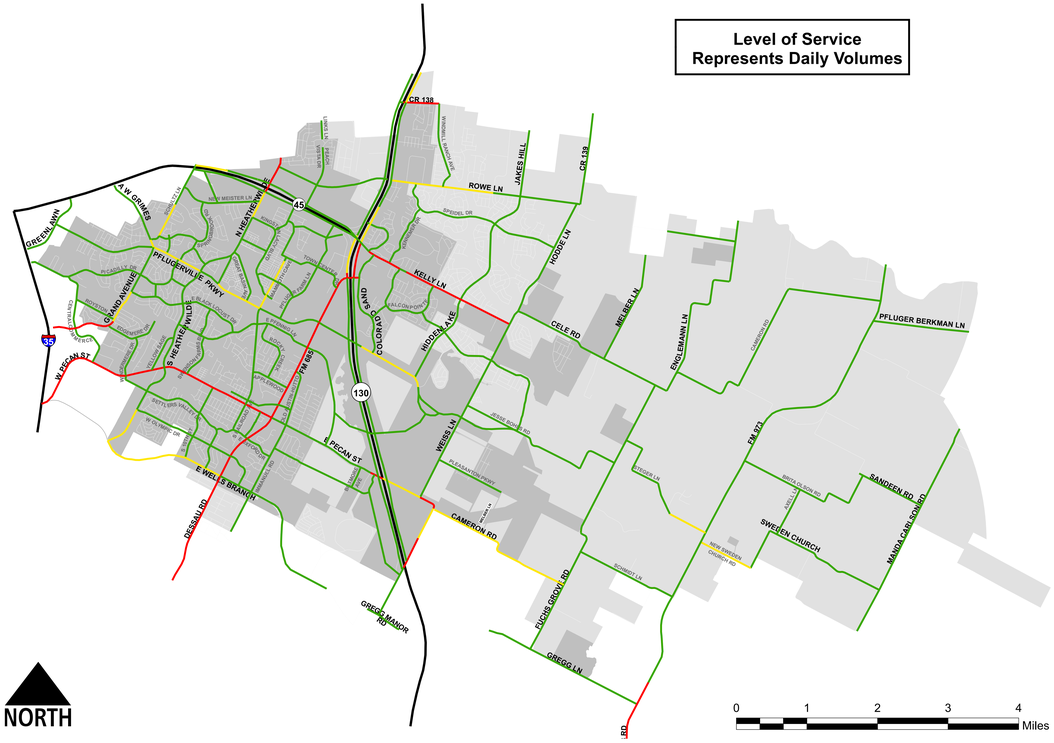
2019 TRANSPORTATION MASTER PLAN

CONNECTIVITY MODEL RESULTS

LEGEND

- A - C
- D
- E - F

Level of Service Represents Daily Volumes



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PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

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2019 TRANSPORTATION MASTER PLAN

FISCALLY CONSTRAINED SCENARIO

LEGEND

- EXISTING ROADS
- 2018 CO/GO BOND PROJECTS

Click here to return to main document

PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

Kimley»Horn

2019 TRANSPORTATION MASTER PLAN

FISCALLY CONSTRAINED SCENARIO RESULTS

LEGEND

- A - C
- D
- E - F

Level of Service Represents Daily Volumes

Click here to return to main document

PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

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2015 TRANSPORTATION MASTER PLAN DAILY VOLUMES

2015 TMP MODEL RESULTS

LEGEND

- A - C
- D
- E - F

Level of Service Represents Daily Volumes

Click here to return to main document

PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

Kimley»Horn

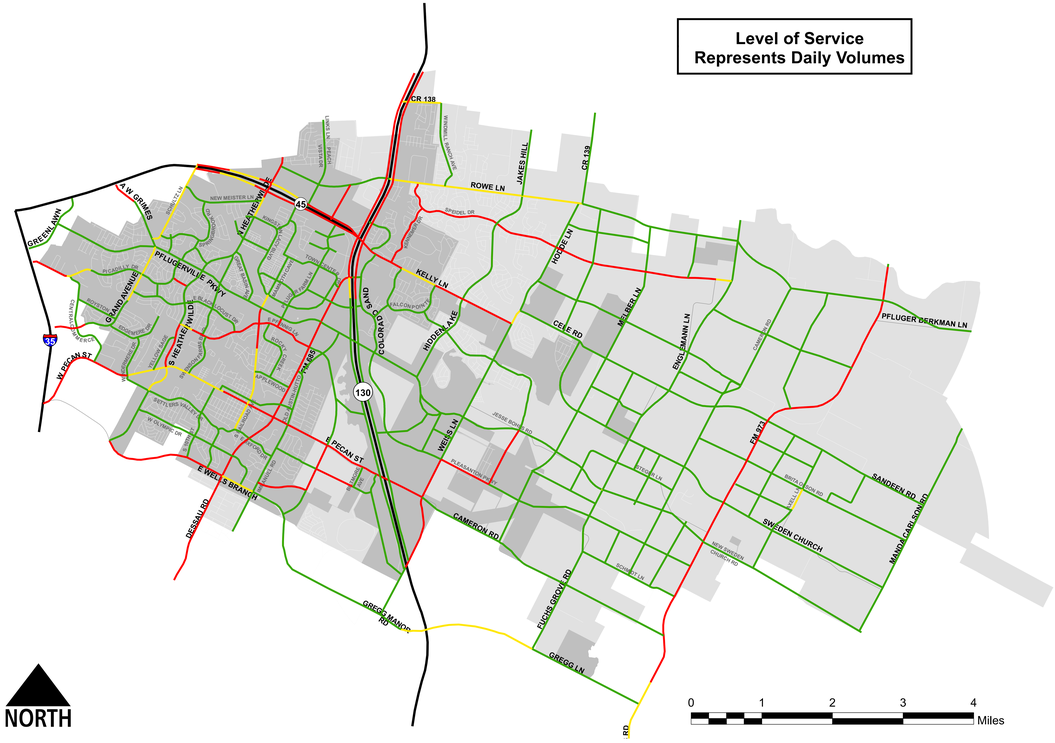
2019 TRANSPORTATION MASTER PLAN DAILY VOLUMES

2019 TMP MODEL RESULTS

LEGEND

- A - C
- D
- E - F

Level of Service Represents Daily Volumes



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PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

Kimley»Horn

2019 TRANSPORTATION MASTER PLAN (2020 REVISED)

EDITS TO TMP

LEGEND

2019 TMP INTERSECTION PROJECTS
- INNOVATIVE
- NEW OVERPASS
- NEW RAMP
- NEW SIGNAL
- RAMP REVERSAL
- NEW ROUNDABOUT

2019 ROADWAY PROJECTS
- 2020 REMOVE
- 2020 REALIGN
- 2020 RECLASSIFY
- REMOVE
- RECLASSIFY
- NEWLY IDENTIFIED ALIGNMENT

2019 ROADWAYS
- EXISTING ROADWAY
- FUTURE ROADWAY

2020 REVISION

Click here to return to main document

PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

Kimley»Horn

2019 TRANSPORTATION MASTER PLAN (2020 REVISED)

2019 TRANSPORTATION MASTER PLAN MAP

LEGEND

INTERSECTIONS
- INNOVATIVE
- NEW OVERPASS
- NEW RAMP
- NEW SIGNAL
- RAMP REVERSAL
- NEW ROUNDABOUT

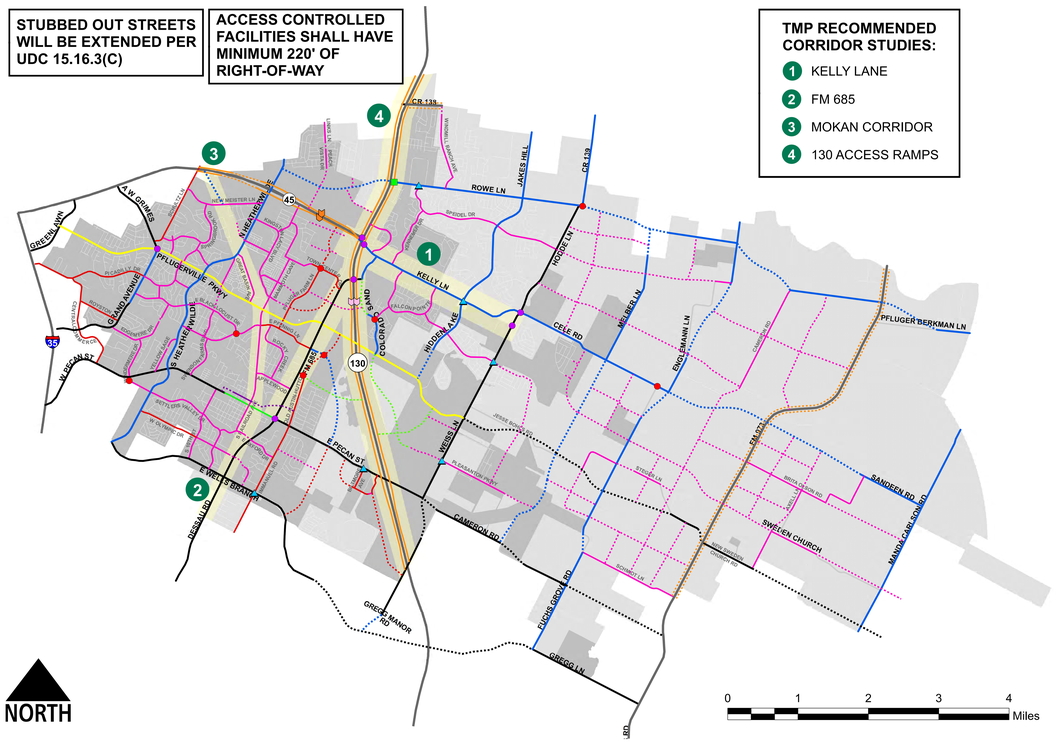
FOR LEGEND
- FUTURE ROADS
- FREEWAY
- MAJOR ARTERIAL 6 LN
- MAJOR ARTERIAL 4 LN
- MINOR ARTERIAL
- MAJOR COLLECTOR
- MINOR COLLECTOR
- URBAN MAIN ST
- URBAN 3-LANE
- FRONTAGE ROAD

Click here to return to main document

STUBBED OUT STREETS WILL BE EXTENDED PER UDC 15.16.3(C)

ACCESS CONTROLLED FACILITIES SHALL HAVE MINIMUM 220' OF RIGHT-OF-WAY

TMP RECOMMENDED CORRIDOR STUDIES:
1. KELLY LANE
2. FM 685
3. MOKAN CORRIDOR
4. 130 ACCESS RAMPS



PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

Kimley»Horn

2019 TRANSPORTATION MASTER PLAN

CRITICAL BIKE/PED FACILITY CONNECTIONS

LEGEND

- E — ELEMENTARY SCHOOL
- H — HIGH SCHOOL
- M — MIDDLE SCHOOL
- CRITICAL CONNECTION
- EXISTING TRAILS AND BIKE FACILITIES
- EXISTING PEDESTRIAN FACILITIES
- CITY PARKS

Click here to return to main document

PFLUGERVILLE PFORWARD TRANSPORTATION MASTER PLAN

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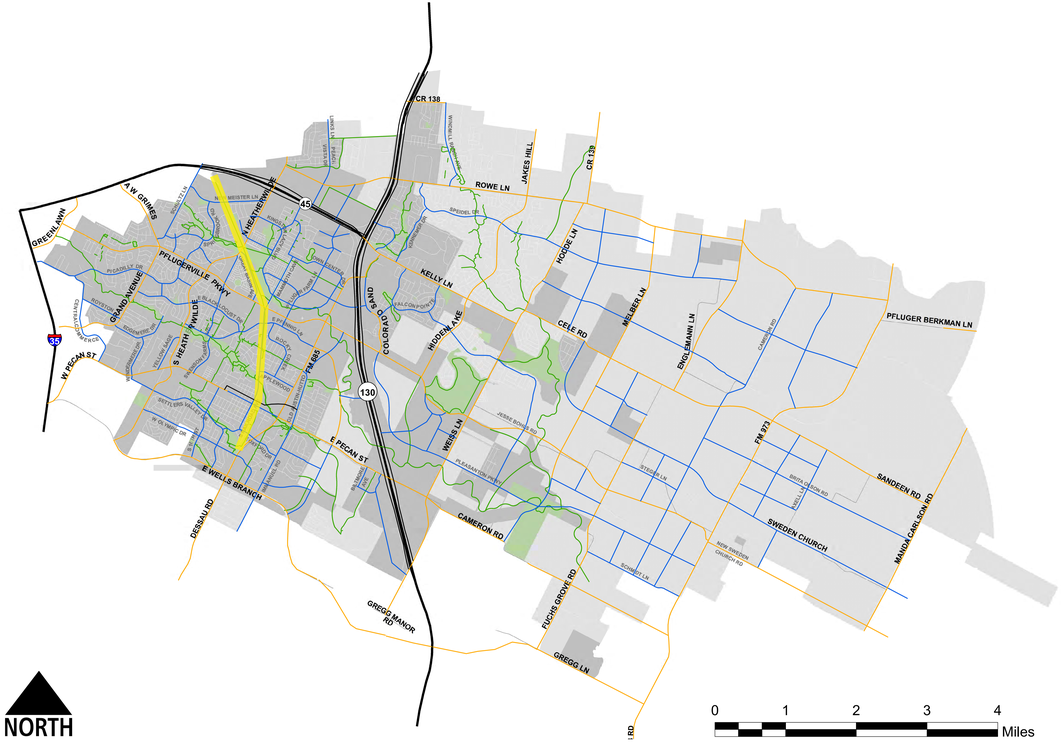
2019 TRANSPORTATION MASTER PLAN

PROPOSED BIKE/PED FACILITIES

LEGEND

- ON-STREET BICYCLE
- SHARED-USE PATH
- OTHER
- OFF-STREET TRAILS
- CITY PARKS
- MOKAN CORRIDOR



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PFLUGERVILLE
PFORWARD
TRANSPORTATION MASTER PLAN

Kimley»Horn

2019 TRANSPORTATION MASTER PLAN

PROJECT SCREENING

LEGEND

- ✱ INTERSECTION PROJECTS
- EXISTING ROAD
- FUTURE ROAD

NORTH

Click here to return to main document

Appendix E

District Metered Areas

Close existing pressure reducing valve

Close existing pressure reducing valve

See Inset 1

See Inset 2

See Inset 3

See Inset 4

Manville East

WTP

WTP EST

Gildas Path

Weiss Ln

Mangan Way

Cele Rd

RESERVE AT WESTCREEK

VILLAGES OF HIDDEN LAKES

SORENTO COMMUNITY

Lake Pflugerville

E Pflugerville Pkwy

Jesse Bohls Dr

Wolf Park Dr

Antioch Ave

Inset 1

Hidden Lake Xing

Install unidirectional flow meter

Open existing pressure reducing valve and bypass valve

Inset 2

Install unidirectional flow meter

Open existing pressure reducing valve and bypass valve

Papaveri Way

Inset 3

Install unidirectional flow meter

Install unidirectional flow meter

Inset 4

Avalar Ave

Open existing pressure reducing valve

Install bidirectional flow meter

Station

- Elevated Storage Tank
- Pump Station
- Standpipe
- WTP — Water Treatment Plant
- Well Station
- Wholesale

Existing Valve

- Pressure Reducing Valve
- Flow Control Valve
- Zone Valve

Proposed District Meter

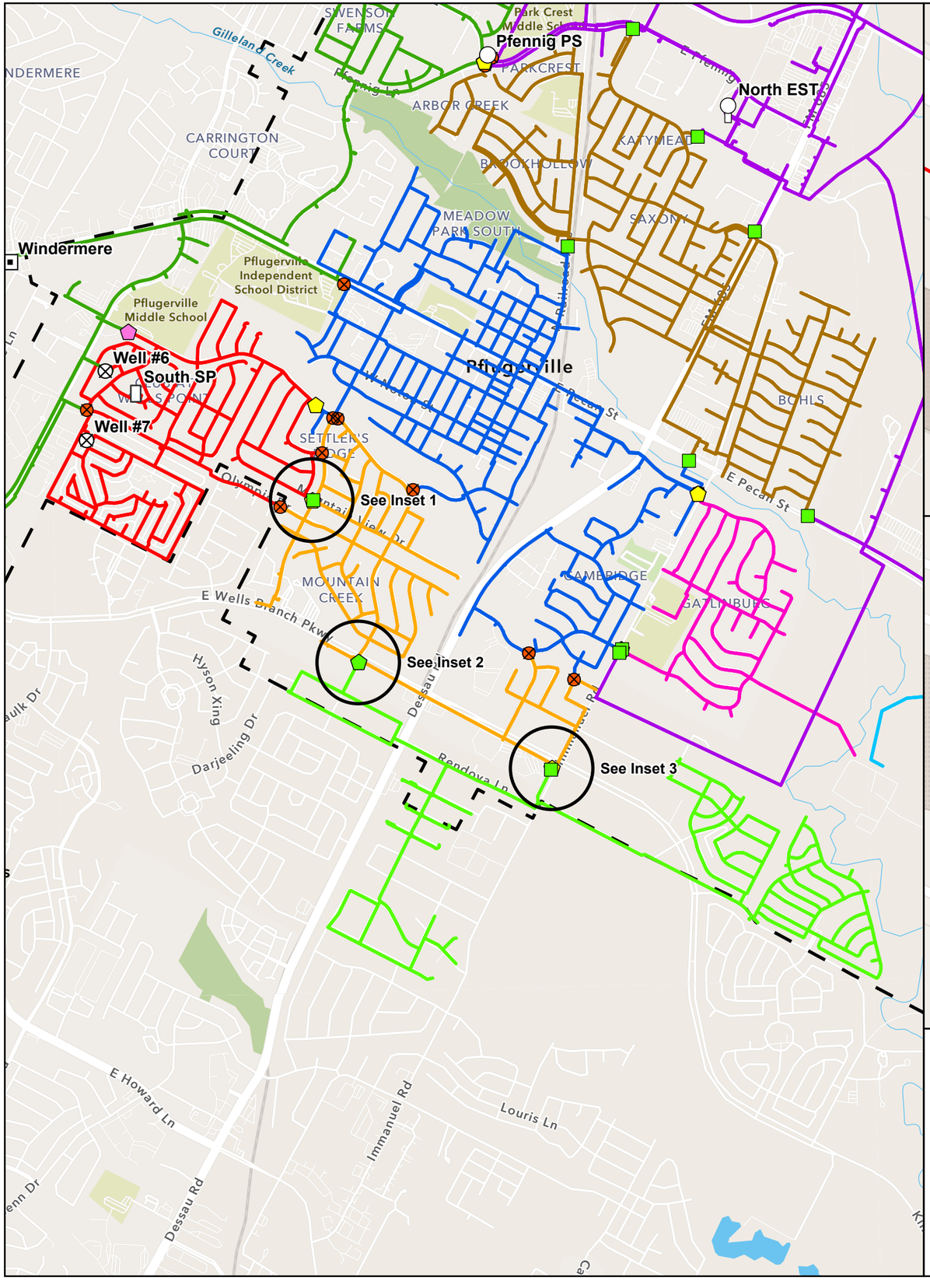
- District Meter
- Pressure Reducing Valve
- Zone Valve

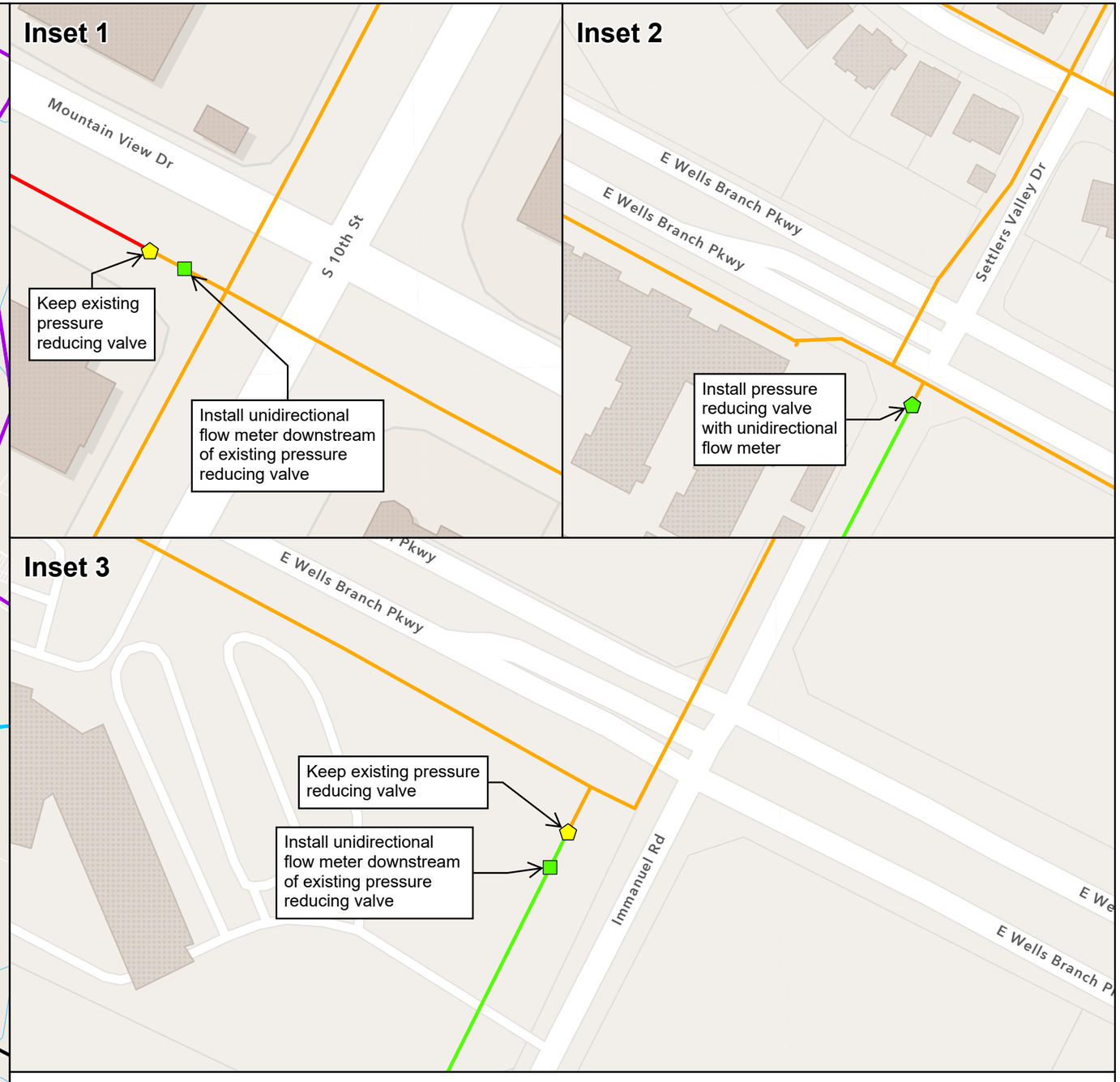
District Metered Area

- East 794 1
- East 794 2
- East 794 3
- Pflugerville Water CCN

East 794 Zone District Metered Areas

N





Station

- Elevated Storage Tank
- Pump Station
- Standpipe
- WTP Water Treatment Plant
- Well Station
- Wholesale

Existing Valve

- Pressure Reducing Valve
- Flow Control Valve
- Zone Valve

Proposed District Meter

- District Meter
- Pressure Reducing Valve
- Zone Valve

District Metered Area

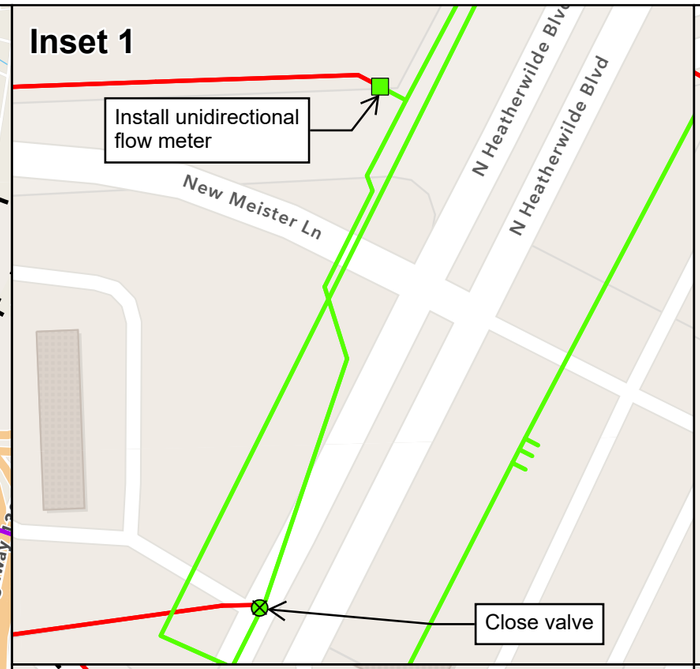
- West 942 1
- West 942 2
- West 942 3
- Pflugerville Water CCN

West 942 Zone District Metered Areas

N

West 960 Zone District Metered Areas

Inset 1



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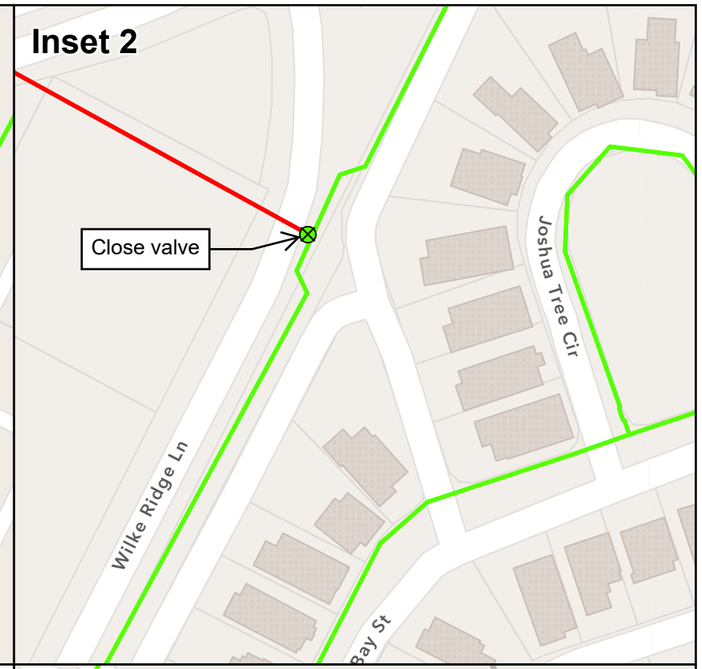

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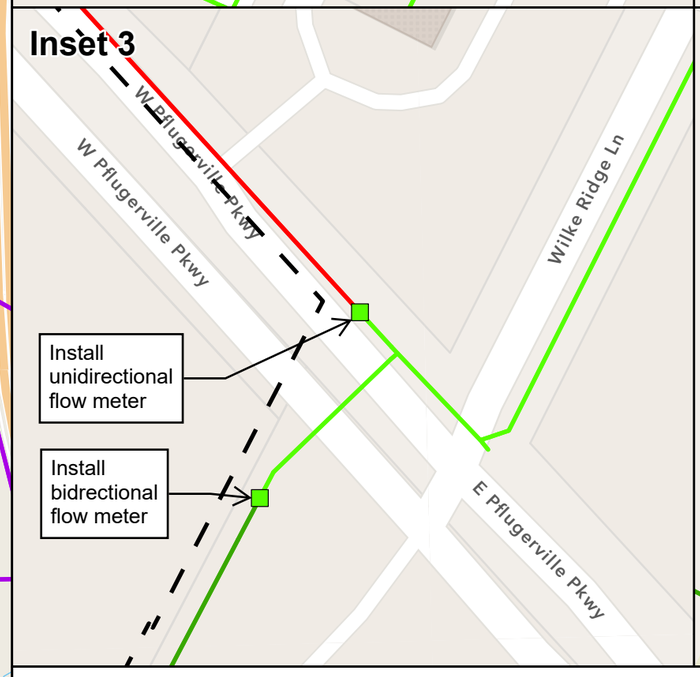

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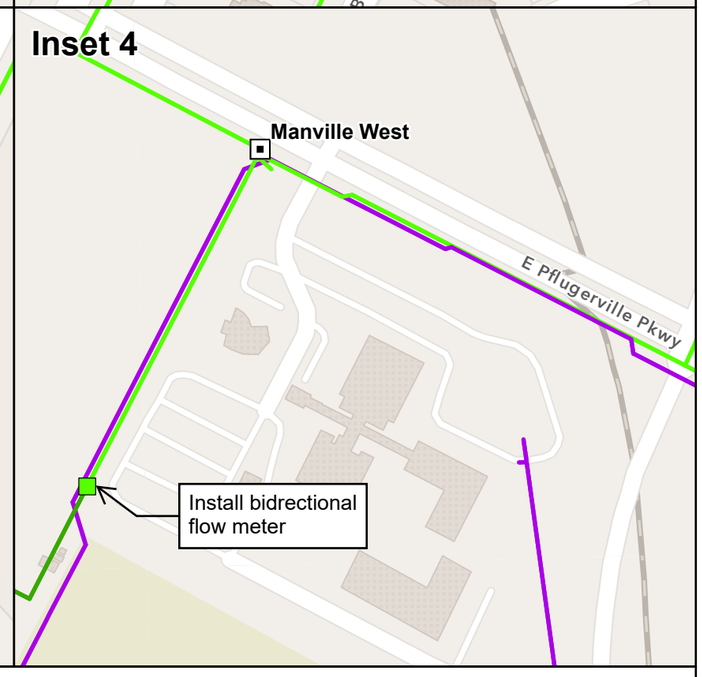
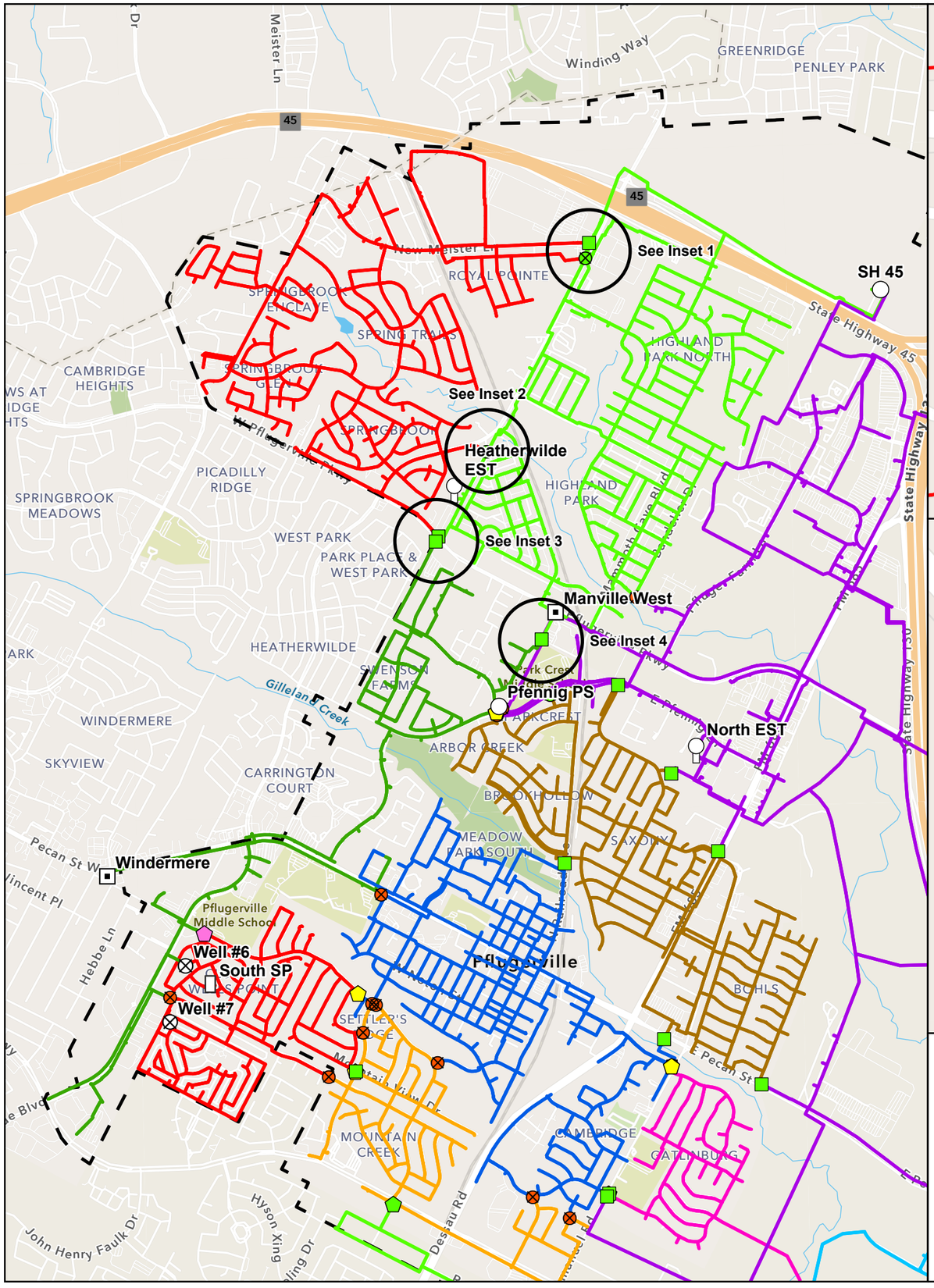




Station

- Elevated Storage Tank
- Pump Station
- Standpipe
- WTP — Water Treatment Plant
- Well Station
- Wholesale

Existing Valve

- Pressure Reducing Valve
- Flow Control Valve
- Zone Valve

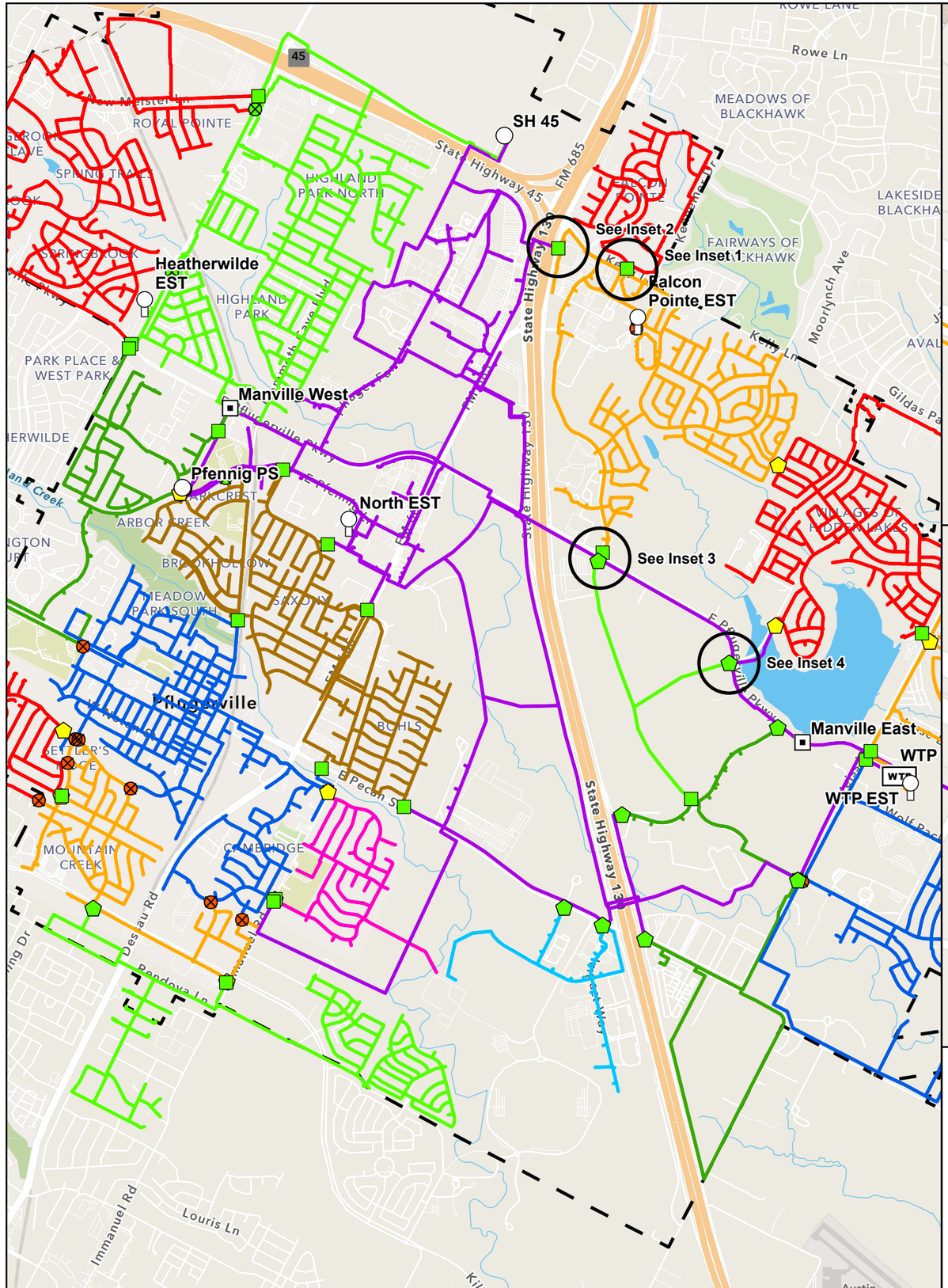
Proposed District Meter

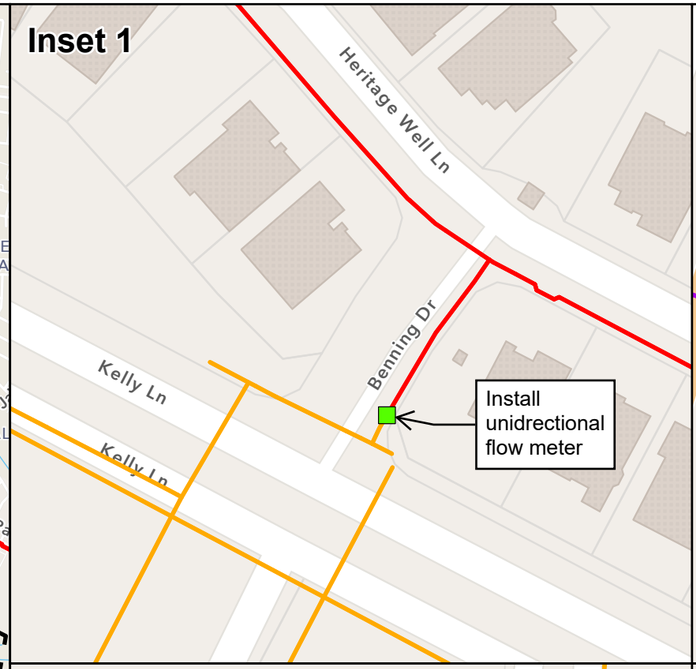
- District Meter
- Pressure Reducing Valve
- Zone Valve

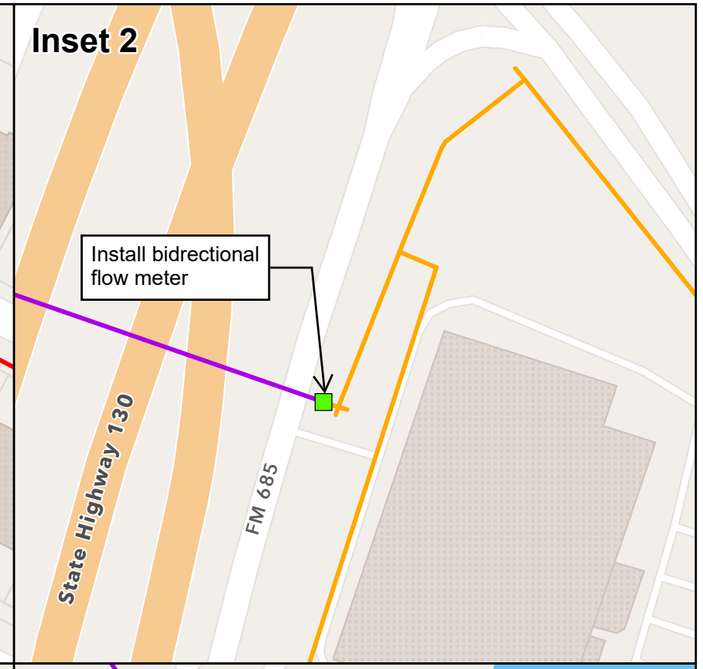
District Metered Area

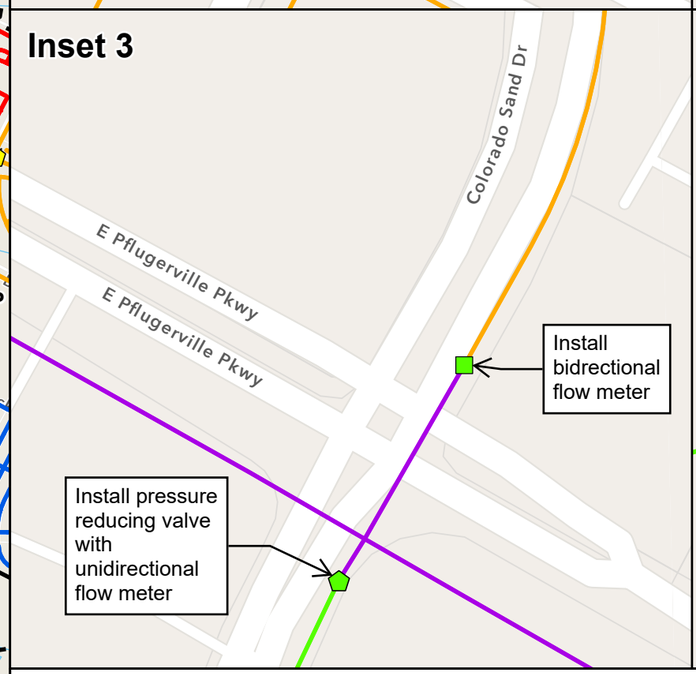
- West 960 1
- West 960 2
- West 960 3
- Pflugerville Water CCN

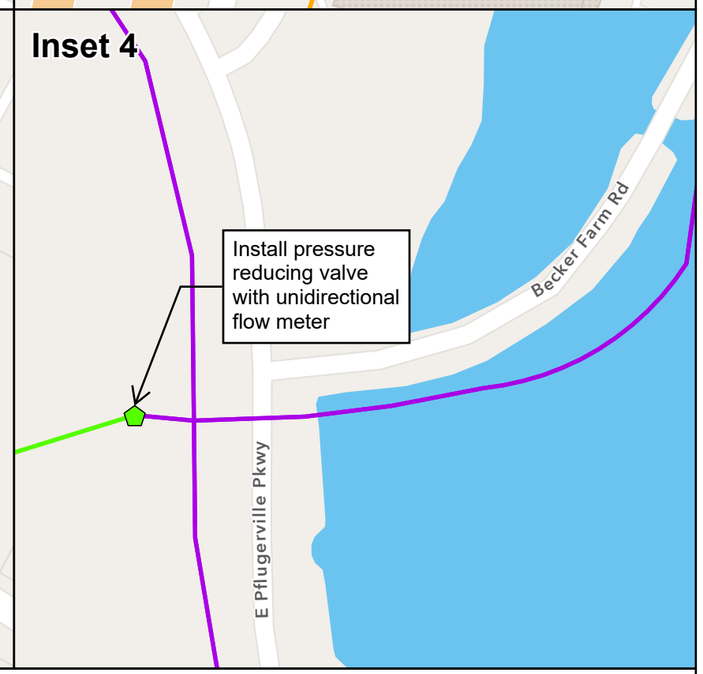
N











Station
- Elevated Storage Tank
- Pump Station
- Standpipe
- WTP — Water Treatment Plant
- Well Station
- Wholesale

Existing Valve
- Pressure Reducing Valve
- Flow Control Valve
- Zone Valve

Proposed District Meter
- District Meter
- Pressure Reducing Valve
- Zone Valve

District Metered Area
- Central 888 1
- Central 888 2
- Central 888 3
- Central 888 4
- Central 888 5
- Central 888 6
- Central 888 7
- Central 888 8
- Central 888 9
- Pflugerville Water CCN

N

Central 888 Zone District Metered Areas

SH 45
Heatherwilde EST
Manville West
Pfennig PS
North EST
Falcon Pointe EST
Manville East
WTP
WTP EST
See Inset 1
See Inset 2
See Inset 3
See Inset 4
Pflugerville
State Highway 45
State Highway 130
FM 685
E Pflugerville Pkwy
Rowe Ln
MEADOWS OF BLACKHAWK
FAIRWAYS OF BLACKHAWK
LAKESIDE BLACKHA
ROYAL POINTE
SPRINGBROOK
HIGHLAND PARK NORTH
HIGHLAND PARK
PARK PLACE & WEST PARK
ARBOR CREEK
BROOKHOLLOW
MEADOW PARK SOUTH
SAXONY
CAMBRIDGE
MOUNTAIN CREEK
Moorlynch Ave
Kelly Ln
Gilda
Immanuel Rd
Louris Ln
Austin

Inset 1

E Pflugerville Pkwy
Install pressure reducing valve with unidirectional flow meter
Balaton Blvd

Inset 2

State Highway 130
State Highway 130
Balaton Blvd
Install pressure reducing valve with unidirectional flow meter

Inset 3

Install bidirectional flow meter
Balaton Blvd

Inset 4

Close valve and add bypass
Pleasanton Pkwy
Weiss Ln
Weiss Ln
Weiss Ln
Install pressure reducing valve with unidirectional flow meter

Station
- Elevated Storage Tank
- Pump Station
- Standpipe
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Existing Valve
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- District Meter
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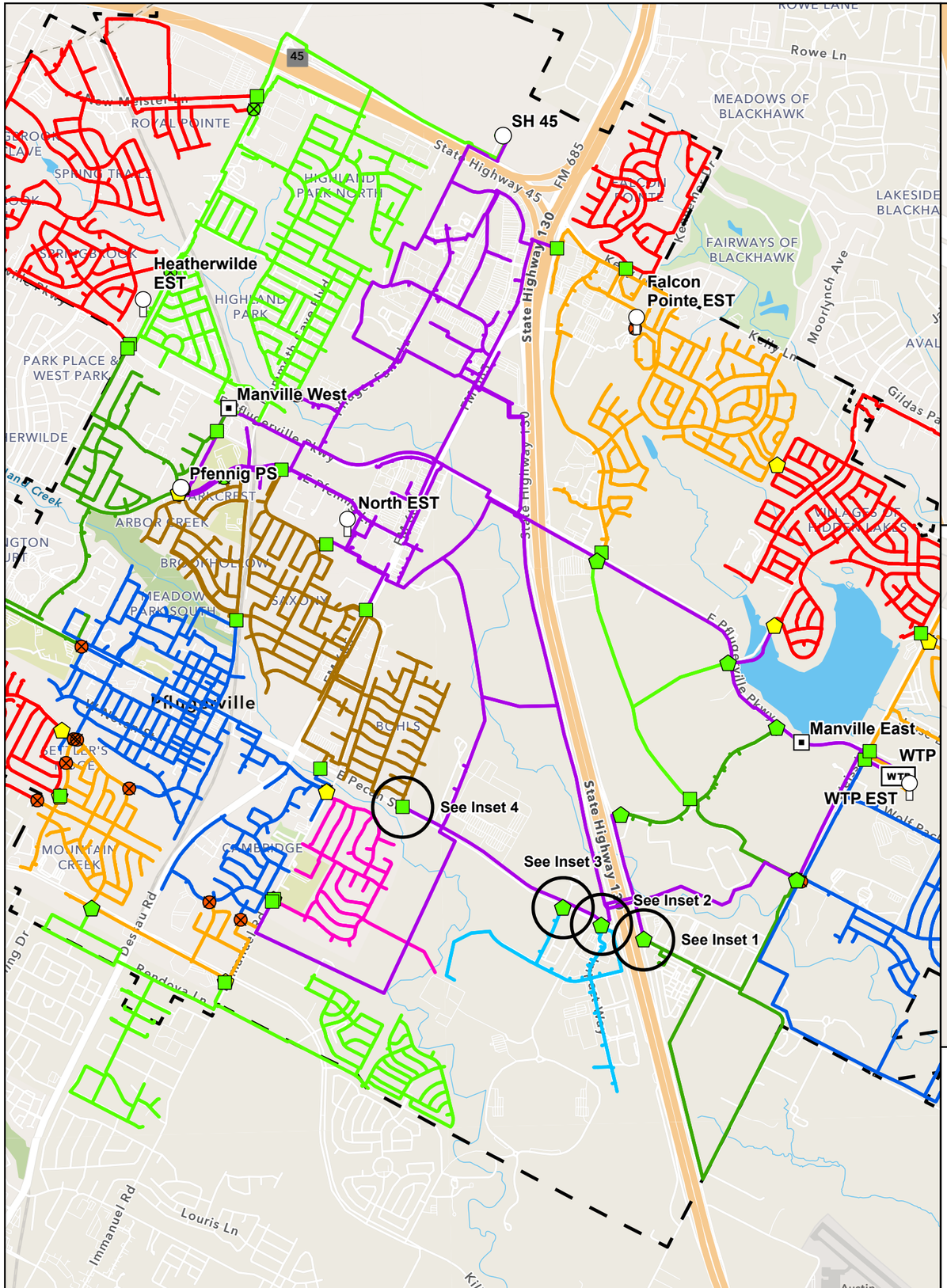
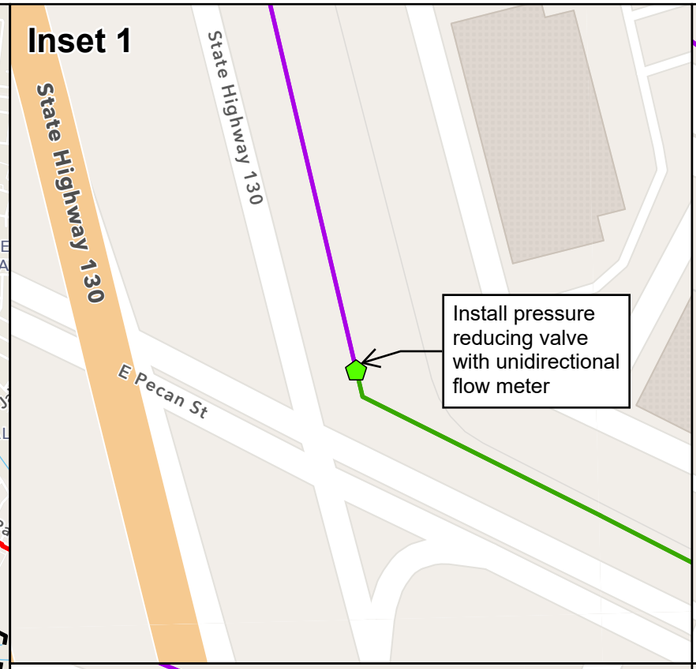
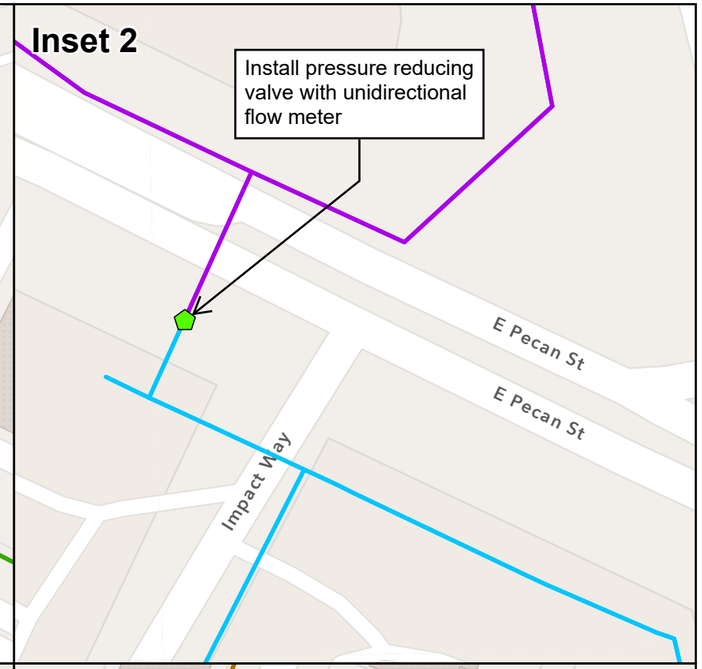
- Central 888 3
- Central 888 4
- Central 888 5
- Central 888 6
- Central 888 7
- Central 888 8
- Central 888 9
- Pflugerville Water CCN

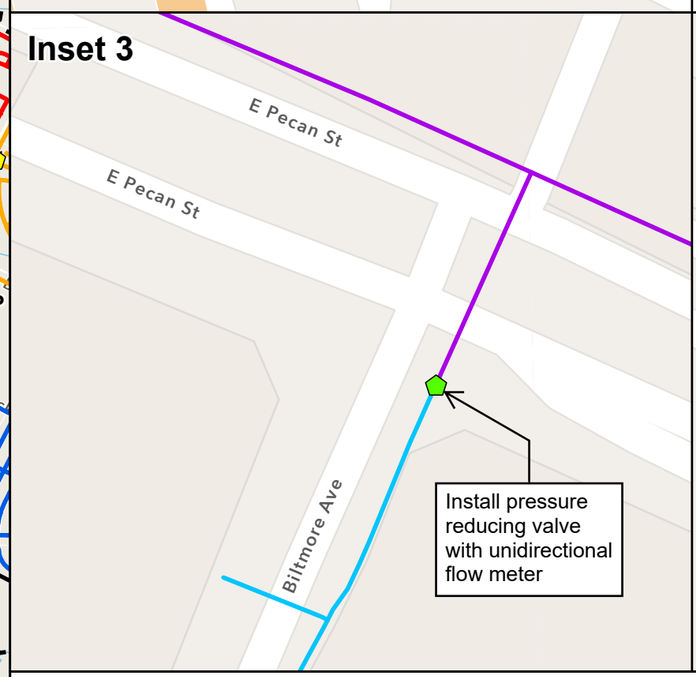
N

Central 888 Zone District Metered Areas









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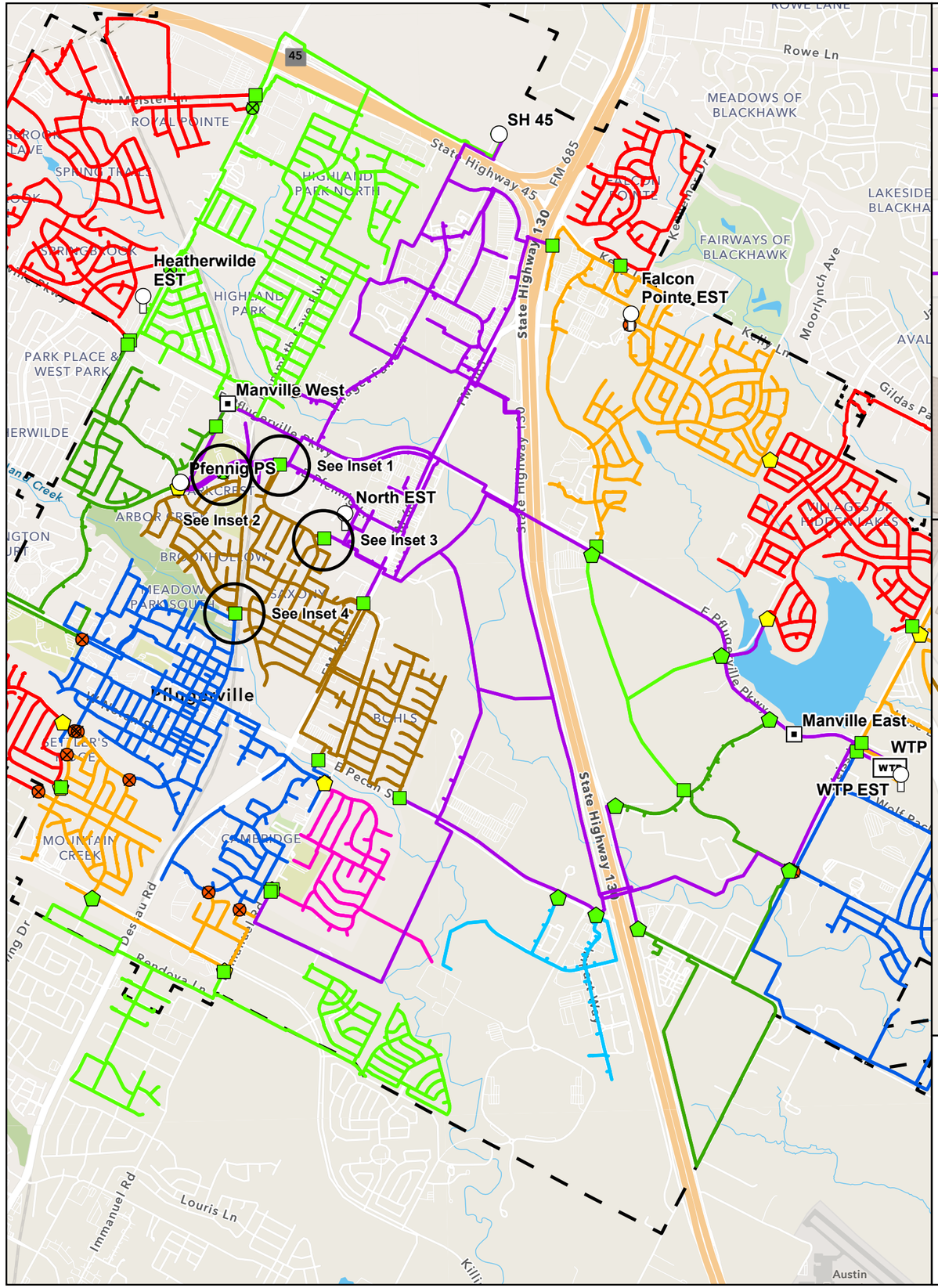
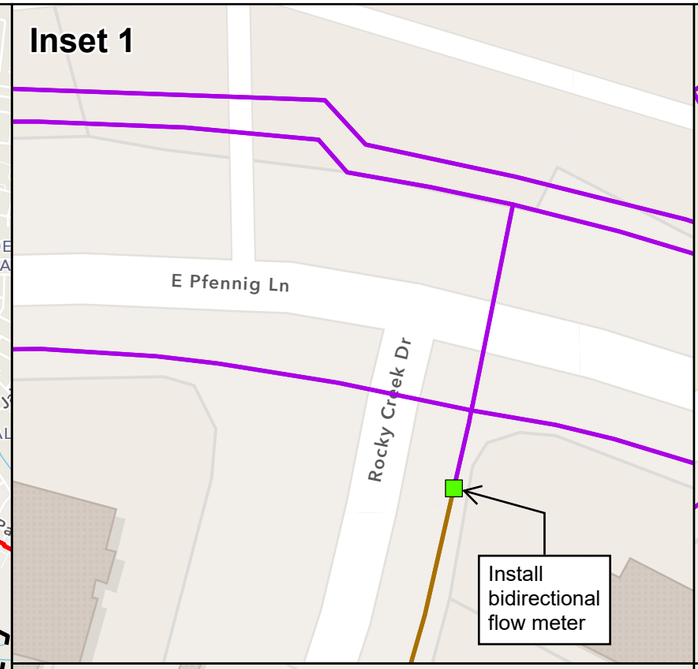
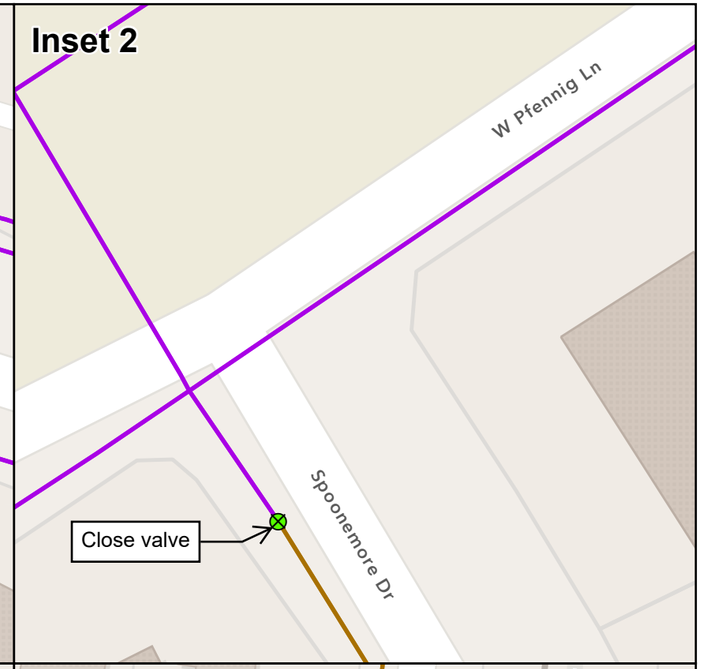
- Central 888 9
- Pflugerville Water CCN

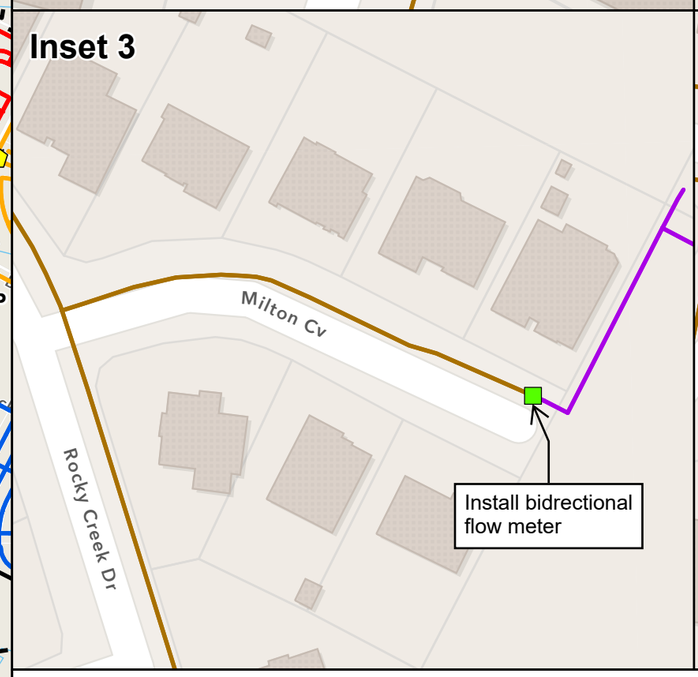
N

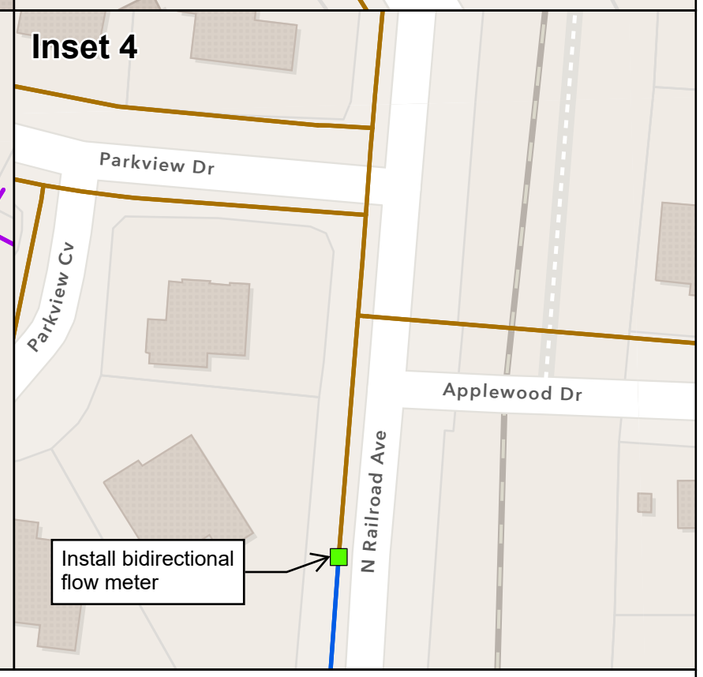
Central 888 Zone District Metered Areas











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Existing Valve
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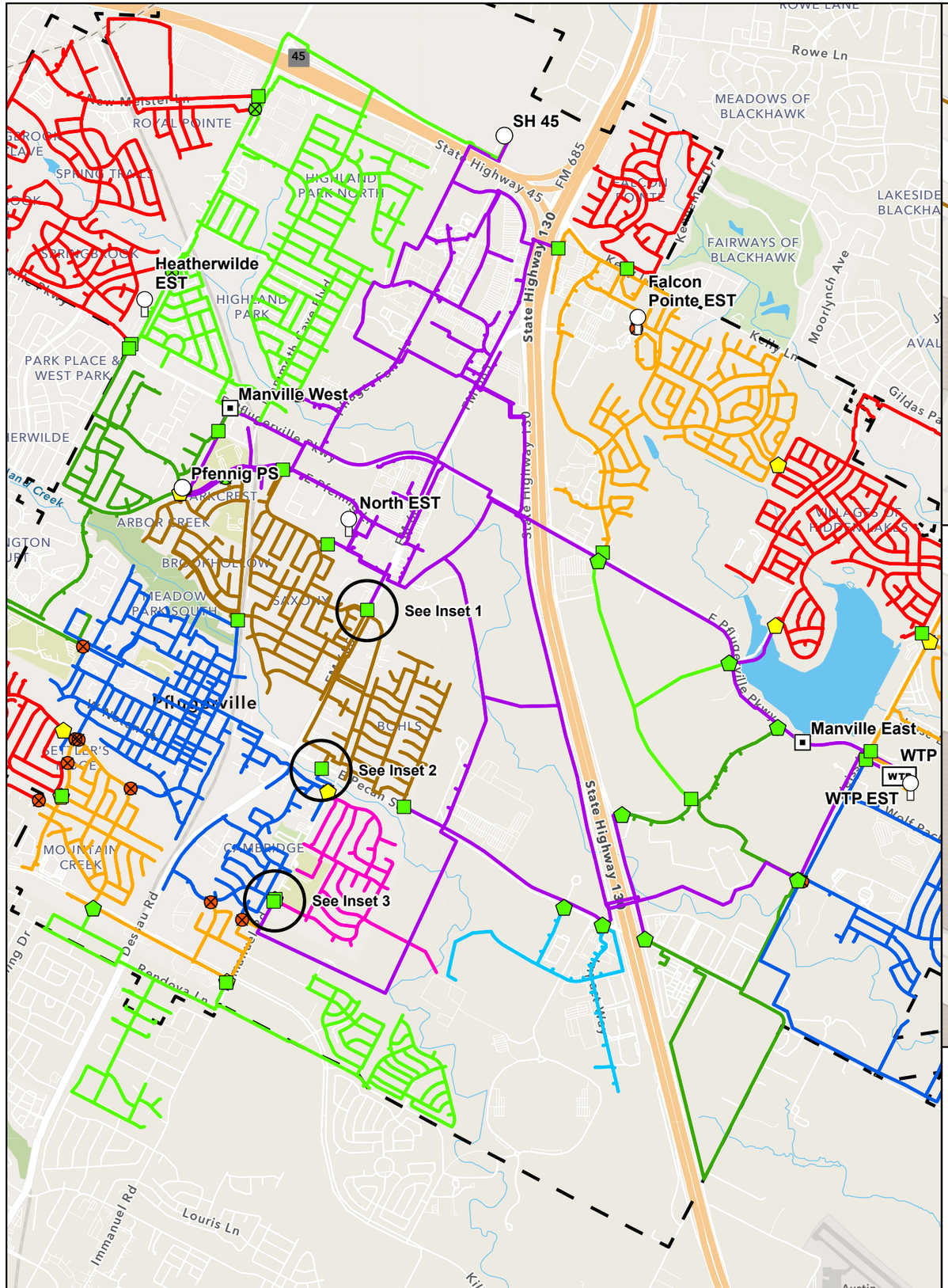
- Central 888 2
- Central 888 3
- Central 888 4
- Central 888 5
- Central 888 6
- Central 888 7
- Central 888 8
- Central 888 9
- Pflugerville Water CCN

N

Central 888 Zone District Metered Areas



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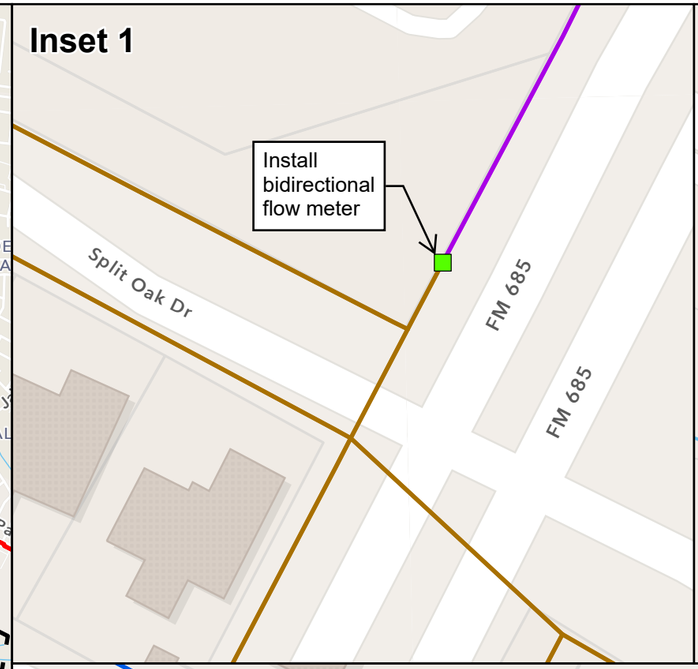

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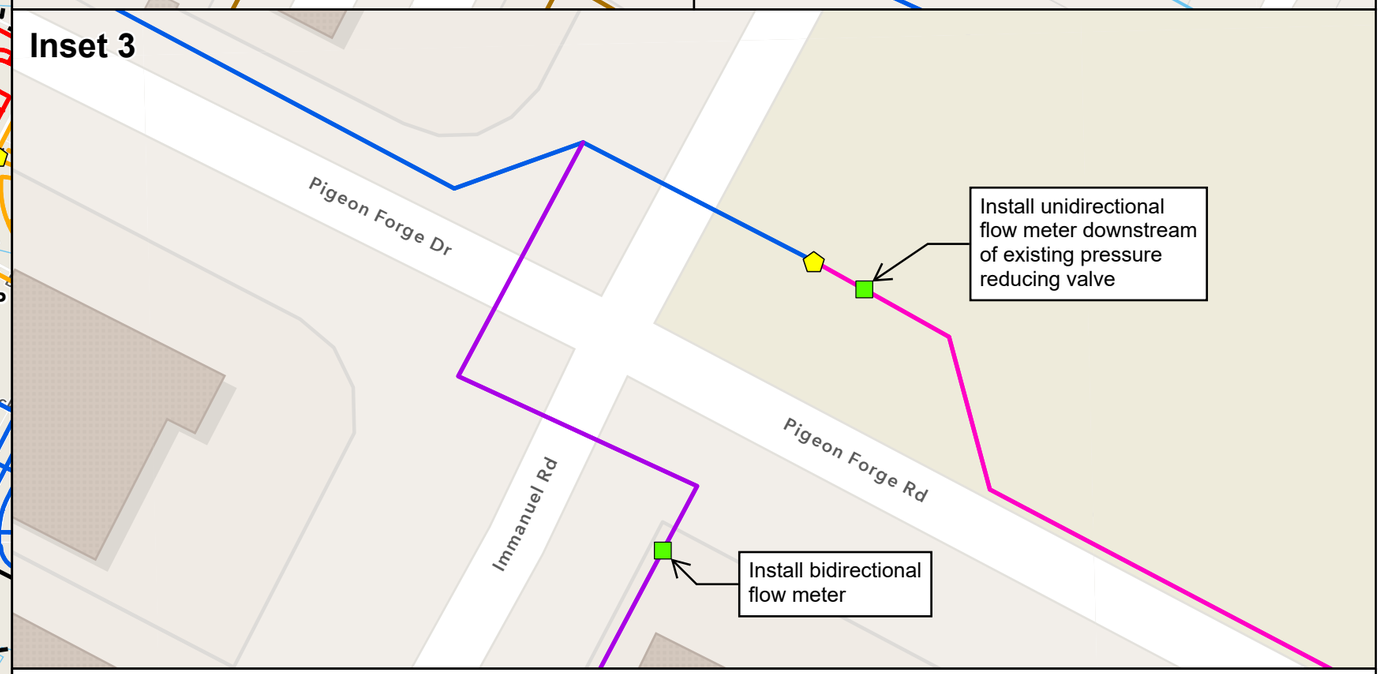

Station

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- Pump Station
- Standpipe
- WTP — Water Treatment Plant
- Well Station
- Wholesale

Existing Valve

- Pressure Reducing Valve
- Flow Control Valve
- Zone Valve

Proposed District Meter

- District Meter
- Pressure Reducing Valve
- Zone Valve

District Metered Area

- Central 888 1
- Central 888 2
- Central 888 3
- Central 888 4
- Central 888 5
- Central 888 6
- Central 888 7
- Central 888 8
- Central 888 9
- Pflugerville Water CCN

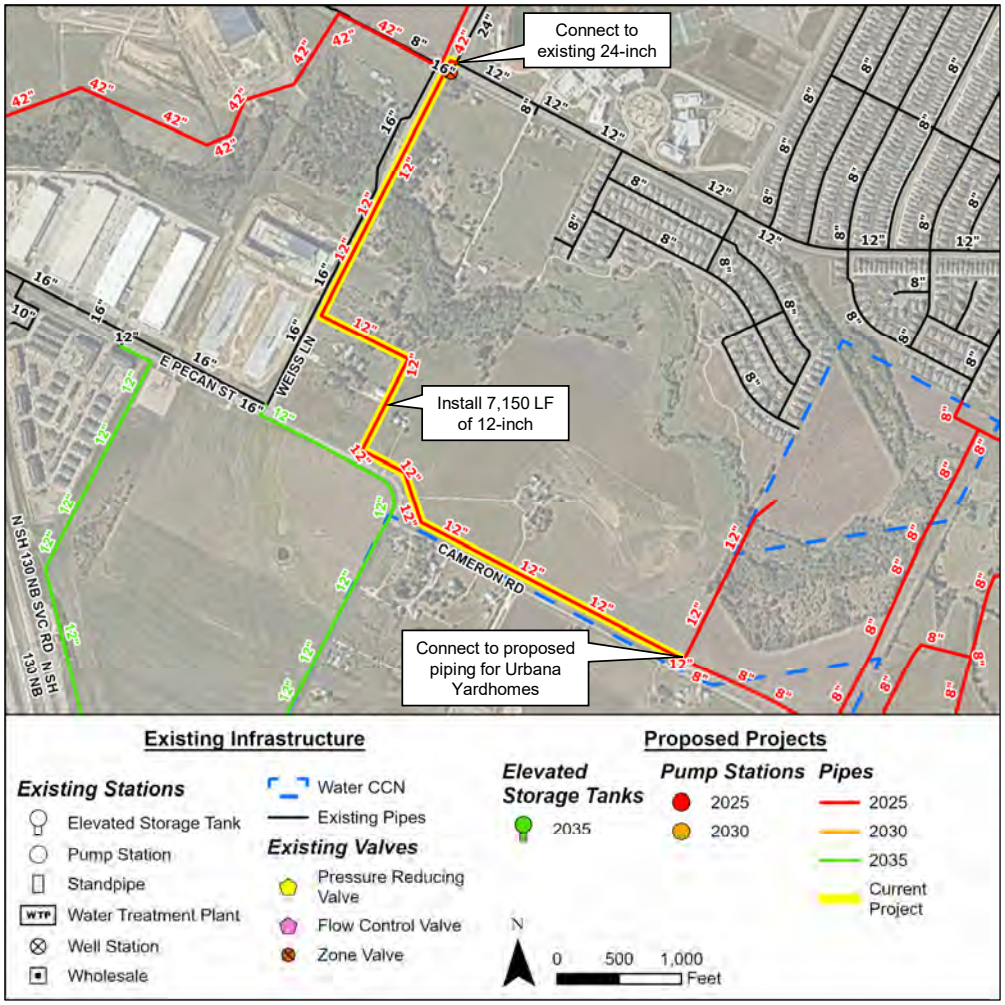
N

Central 888 Zone District Metered Areas

Appendix F

Capital Improvement Plan Project Sheets

Project 1: 12-inch Water Line Looping Improvements



Project Description

Install approximately 7,150 LF of 12-inch water line along Weiss Ln, E Pecan St, and Cameron Rd from the existing 24-inch water line at Weiss Ln and Pleasanton Pkwy to Urbana Yardhomes.

Project Drivers & Triggers

This project serves as a southern loop for the new East 794 Zone.

Other Considerations

This project has already been designed.

East 794 Zone

Capital Improvement	2025 Horizon

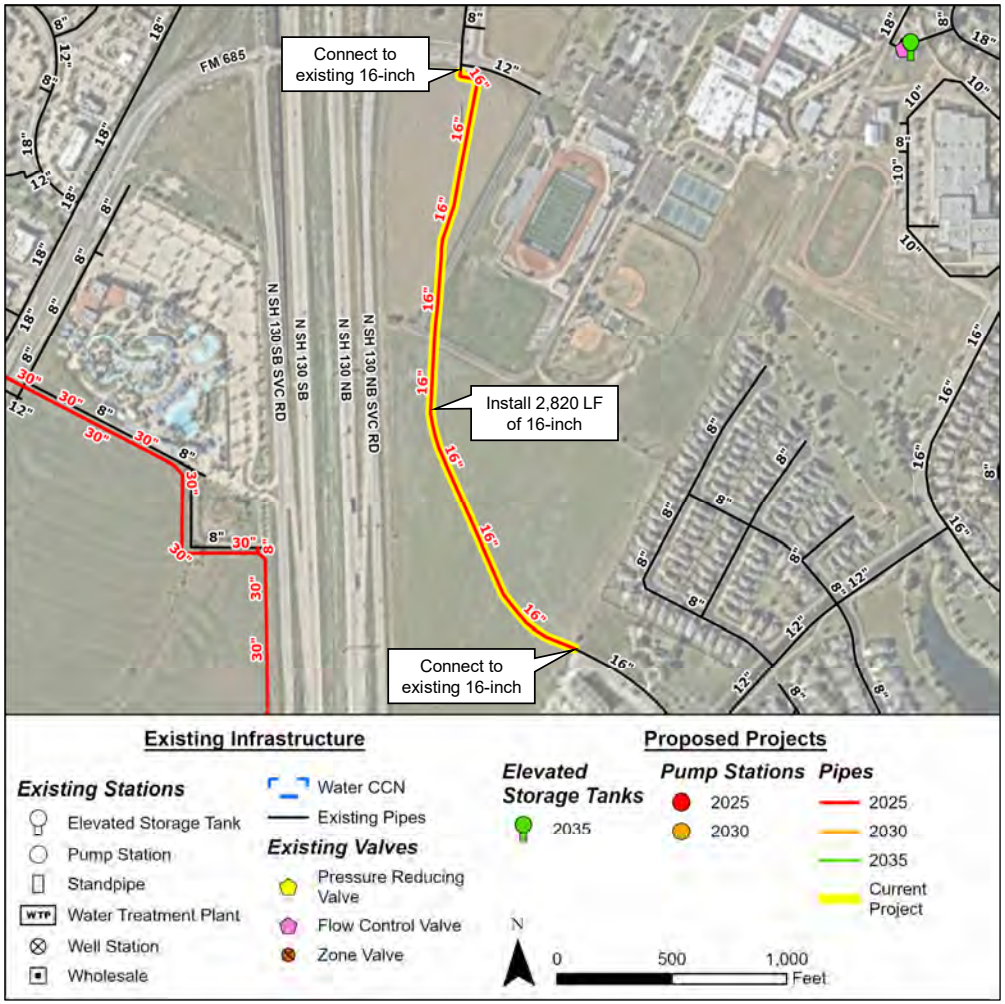
Project Implementation

Engineering & Design	Complete
Construction	15 months
Total Project Duration	15 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	12 inch	7,150 LF	$ 240	$ 1,716,000
2	Connection	12 inch	2 EA	$ 2,000	$ 4,000
3	Misc. Restoration (Pavement, Seeding)		7,150 LF	$ 120	$ 858,000
4	Trench Safety Plan and Implementation		7,150 LF	$ 6	$ 42,900
5	Traffic Control		1 LS	$ 8,000	$ 8,000
6	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 2,641,400
				Contingency (30%)	$ 792,500
				Easement Acquisition (10%)	$ 264,200
				Mobilization (5%)	$ 132,100
				Opinion of Probable Construction Cost	$ 3,830,200

All costs are in 2025 dollars.

Project 2: Colorado Sand Dr



Project Description

Install approximately 2,820 LF of 16-inch water line along Colorado Sand Dr to connect the two existing 16-inch water lines.

Project Drivers & Triggers

This project reduces high velocities through portions of the proposed 30-inch water line to SH 45 to below 5 ft/s and increases transmission capacity to the proposed SH 45 PS.

Other Considerations

This project is part of the Colorado Sand Dr roadway extension and is currently under construction.

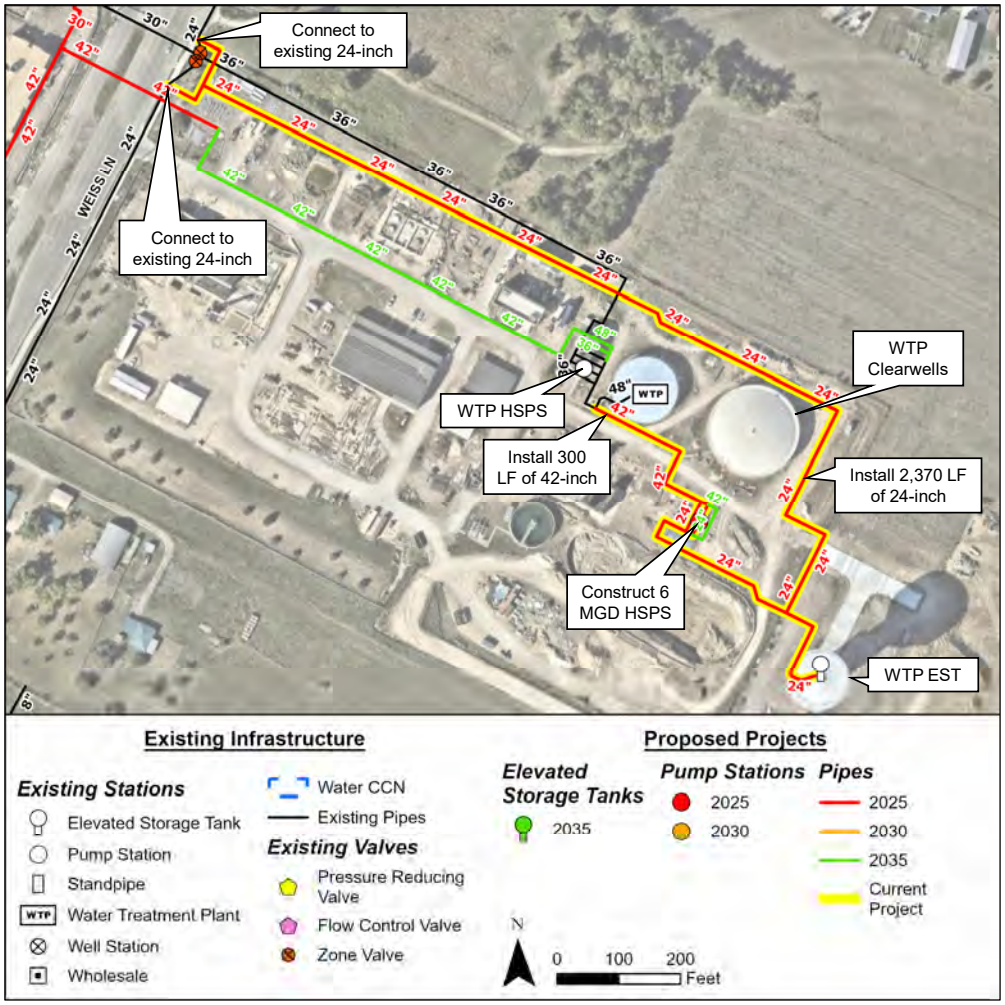
Cost estimate not prepared for this project.

Central 888 Zone	
Capital Improvement	2025 Horizon

Project Implementation

Engineering & Design	Complete
Construction	9 months
Total Project Duration	9 months

Project 3: East Zone High-Service Pump Station



Project Description

Install approximately 300 LF of 42-inch water line from the Clearwell outlet piping to the proposed HSPS.

Construct a new HSPS that will pump to the new East 794 Zone. The HSPS will initially contain two pumps with design points of 4,167 gpm at 130 feet of head and will have a firm capacity of 4,167 gpm (6 MGD).

Install approximately 2,370 LF of 24-inch water line within the HSPS, to the WTP EST, and to the existing 24-inch water line along Weiss Ln.

Project Drivers & Triggers

This project is required to supply the new East 794 Zone.

Other Considerations

This project is currently under construction.

An expansion of the new HSPS is proposed in 2035 to add a third 4,167-gpm pump to the East 794 Zone for a firm capacity of 10 MGD and up to four pumps to the Central 888 Zone.

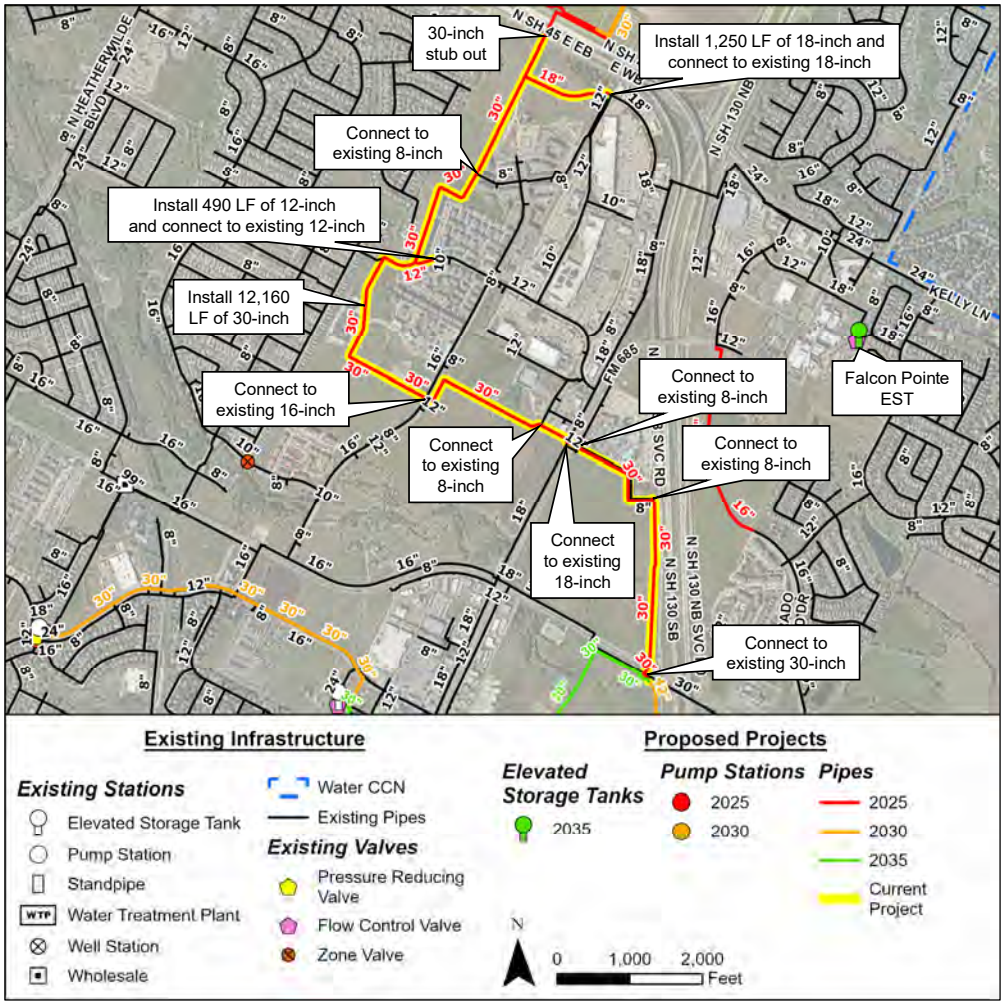
Cost estimate not prepared for this project.

East 794 Zone	
Capital Improvement	2025 Horizon

Project Implementation

Engineering & Design	Complete
Construction	21 months
Total Project Duration	21 months

Project 4: SH 130 (Phase 1)



Project Description

Install approximately 12,160 LF of 30-inch water line from Pflugerville Pkwy to SH 45 with connections to existing pipes as shown in the map.

Project Drivers & Triggers

This project will convey flow to the proposed SH 45 PS that pumps to the West 960 Zone.

Other Considerations

This project is the first phase of transmission pipes along the west side of SH 130.

Central 888 Zone

Capital Improvement	2025 Horizon

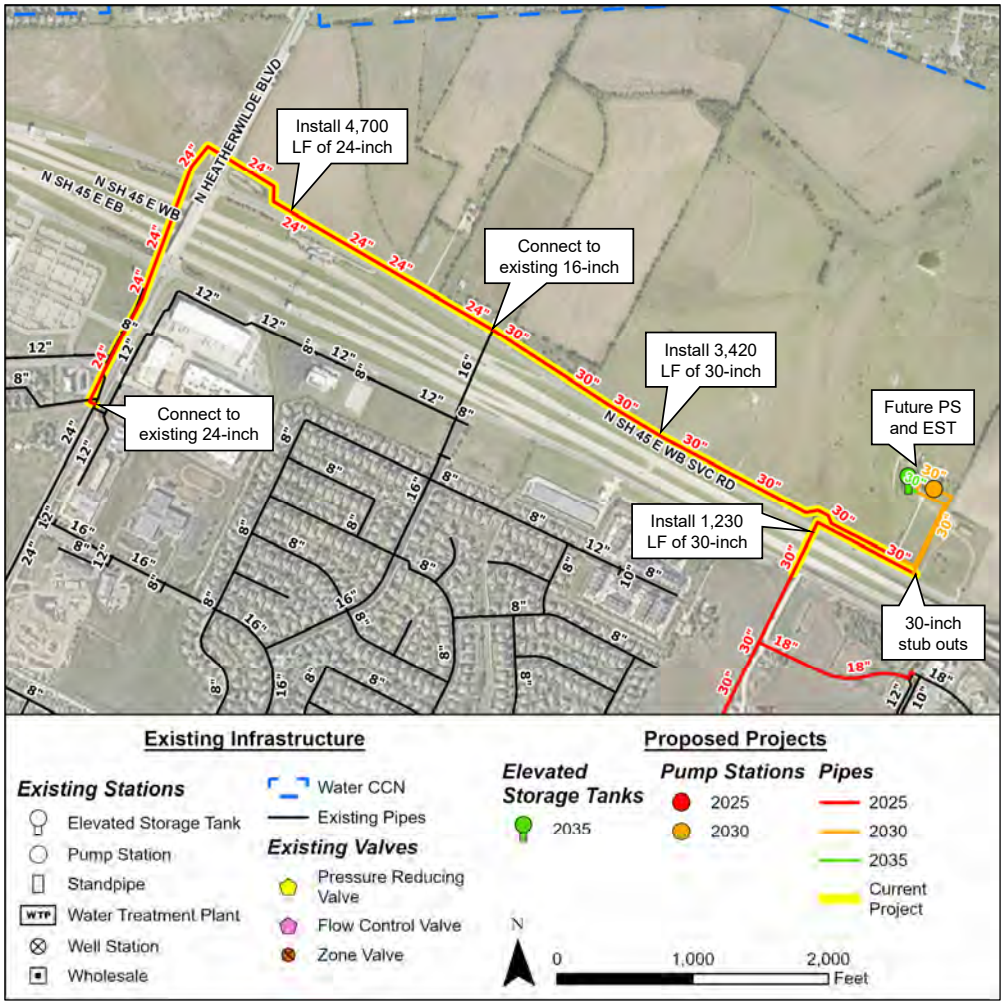
Project Implementation

Engineering & Design	12 months
Construction	18 months
Total Project Duration	30 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	8 inch	30 LF	$ 160	$ 4,800
2	Water Main	12 inch	490 LF	$ 240	$ 117,600
3	Water Main	18 inch	1,250 LF	$ 360	$ 450,000
4	Water Main	30 inch	12,160 LF	$ 750	$ 9,120,000
5	Connection	8 inch	4 EA	$ 1,000	$ 4,000
6	Connection	12 inch	1 EA	$ 2,000	$ 2,000
7	Connection	16 inch	1 EA	$ 3,000	$ 3,000
8	Connection	18 inch	2 EA	$ 5,000	$ 10,000
9	Connection	30 inch	1 EA	$ 15,000	$ 15,000
10	Stub Out	30 inch	1 EA	$ 2,500	$ 2,500
11	Misc. Restoration (Pavement, Seeding)		13,930 LF	$ 120	$ 1,671,600
12	Trench Safety Plan and Implementation		13,930 LF	$ 6	$ 83,600
13	Traffic Control		1 LS	$ 15,000	$ 15,000
14	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 11,511,600
				Contingency (30%)	$ 3,453,500
				Design (18%)	$ 2,072,100
				Easement Acquisition (10%)	$ 1,151,200
				Mobilization (5%)	$ 575,600
				Opinion of Probable Construction Cost	$ 18,764,000

All costs are in 2025 dollars.

Project 5: 30/24-Inch State Highway 45 Pump Station Discharge Line



Project Description

Install approximately 1,230 LF of 30-inch water line across SH 45 to the eastern edge of the future SH 45 PS, approximately 3,420 LF of 30-inch water line from the western edge of the future SH 45 PS to the existing 16-inch crossing of SH 45, and approximately 4,700 LF of 24-inch water line from the existing 16-inch crossing of SH 45 to the existing 24-inch water line along N Heatherwilde Blvd.

Project Drivers & Triggers

This project is required to serve development on the north side of SH 45. In the future, this project will convey flow from the proposed SH 45 PS to the West 960 Zone.

Other Considerations

None.

West 960 Zone	
Capital Improvement	2025 Horizon

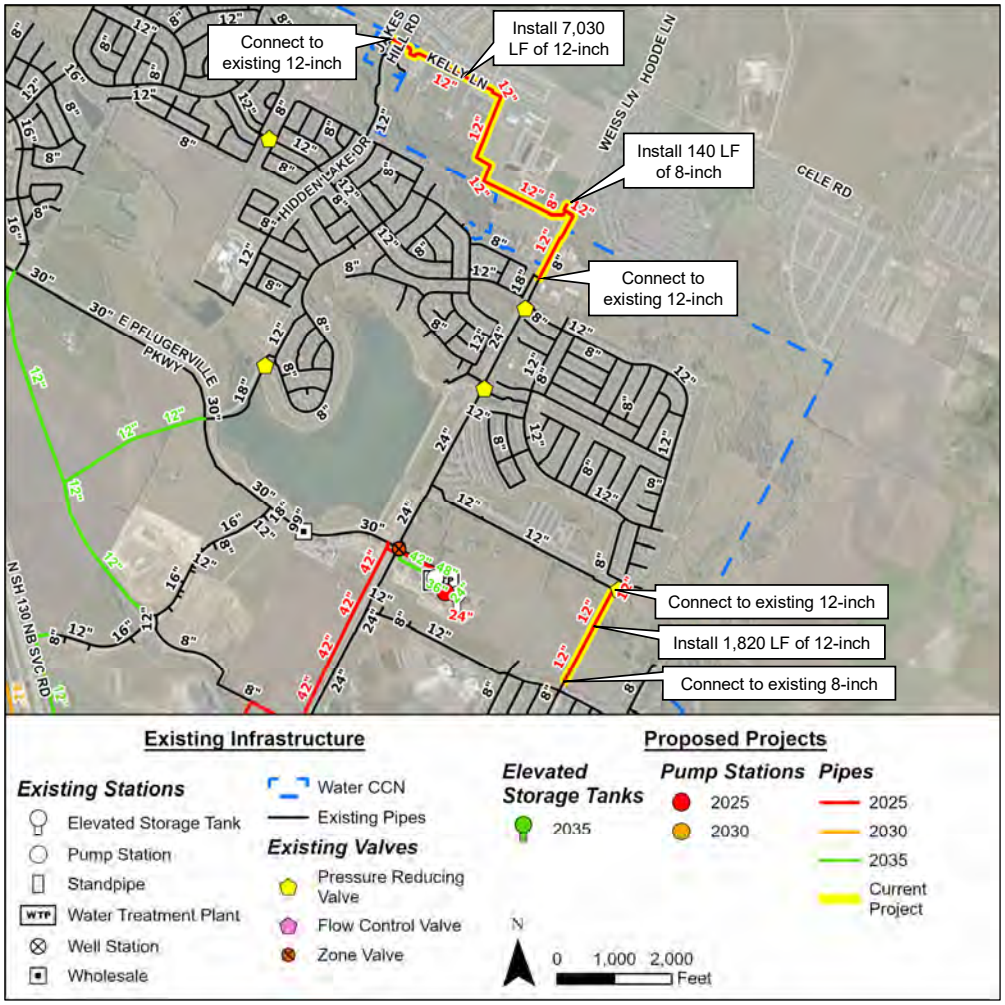
Project Implementation

Engineering & Design	6 months
Construction	15 months
Total Project Duration	21 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	24 inch	4,700 LF	$ 550	$ 2,585,000
2	Water Main	30 inch	4,650 LF	$ 750	$ 3,487,500
3	Connection	16 inch	1 EA	$ 3,000	$ 3,000
4	Connection	24 inch	1 EA	$ 10,000	$ 10,000
5	Stub Out	30 inch	2 EA	$ 7,000	$ 14,000
6	Misc. Restoration (Pavement, Seeding)		9,350 LF	$ 120	$ 1,122,000
7	Trench Safety Plan and Implementation		9,350 LF	$ 6	$ 56,100
8	Traffic Control		1 LS	$ 6,000	$ 6,000
9	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 7,296,100
				Contingency (30%)	$ 2,188,900
				Design (18%)	$ 1,313,300
				Easement Acquisition (10%)	$ 729,700
				Mobilization (5%)	$ 364,900
				Opinion of Probable Construction Cost	$ 11,892,900

All costs are in 2025 dollars.

Project 6: Weiss Ln & Kelly Ln



Project Description

Install approximately 7,030 LF of 12-inch water line and 140 LF of 8-inch water line along Weiss Ln and Kelly Ln and approximately 1,820 LF of 12-inch water line between Jesse Bohls Dr and Wolf Pack Dr.

Project Drivers & Triggers

This project serves as a northern loop and a central loop for the new East 794 Zone.

Other Considerations

This project has already been designed.

East 794 Zone

Capital Improvement	2025 Horizon

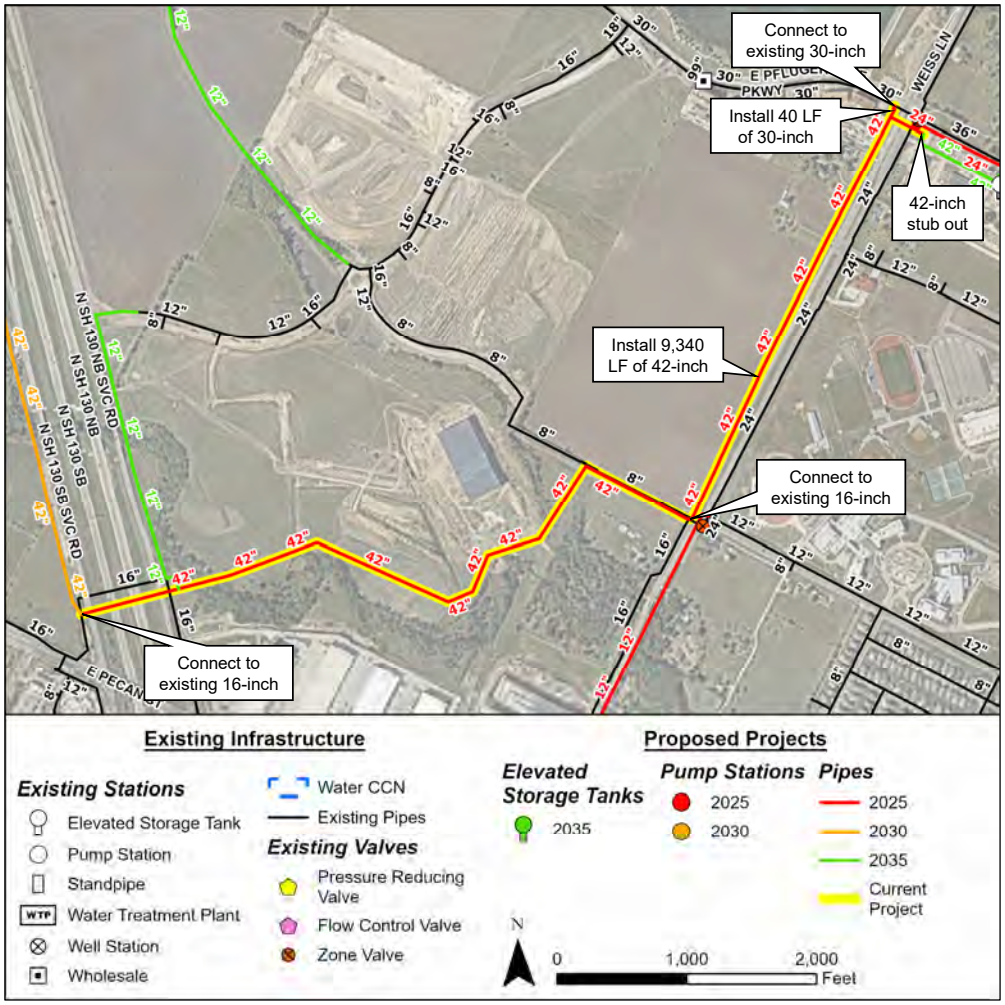
Project Implementation

Engineering & Design	Complete
Construction	12 months
Total Project Duration	12 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	12 inch	8,850 LF	$ 240	$ 2,124,000
2	Water Main	8 inch	140 LF	$ 160	$ 22,400
3	Connection	8 inch	1 EA	$ 1,000	$ 1,000
4	Connection	12 inch	3 EA	$ 2,000	$ 6,000
5	Misc. Restoration (Pavement, Seeding)		8,850 LF	$ 120	$ 1,062,000
6	Trench Safety Plan and Implementation		8,850 LF	$ 6	$ 53,100
7	Traffic Control		1 LS	$ 10,000	$ 10,000
8	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 3,291,000
				Contingency (30%)	$ 987,300
				Easement Acquisition (10%)	$ 329,100
				Mobilization (5%)	$ 164,600
				Opinion of Probable Construction Cost	$ 4,772,000

All costs are in 2025 dollars.

Project 7: Weiss Ln & Pecan St



Project Description

Install approximately 9,340 LF of 42-inch water line along Weiss Ln and across SH 130.

Project Drivers & Triggers

This project increases transmission capacity from the WTP to the western portion of the water system.

Other Considerations

This project has already been designed.

Central 888 Zone

Capital Improvement	2025 Horizon

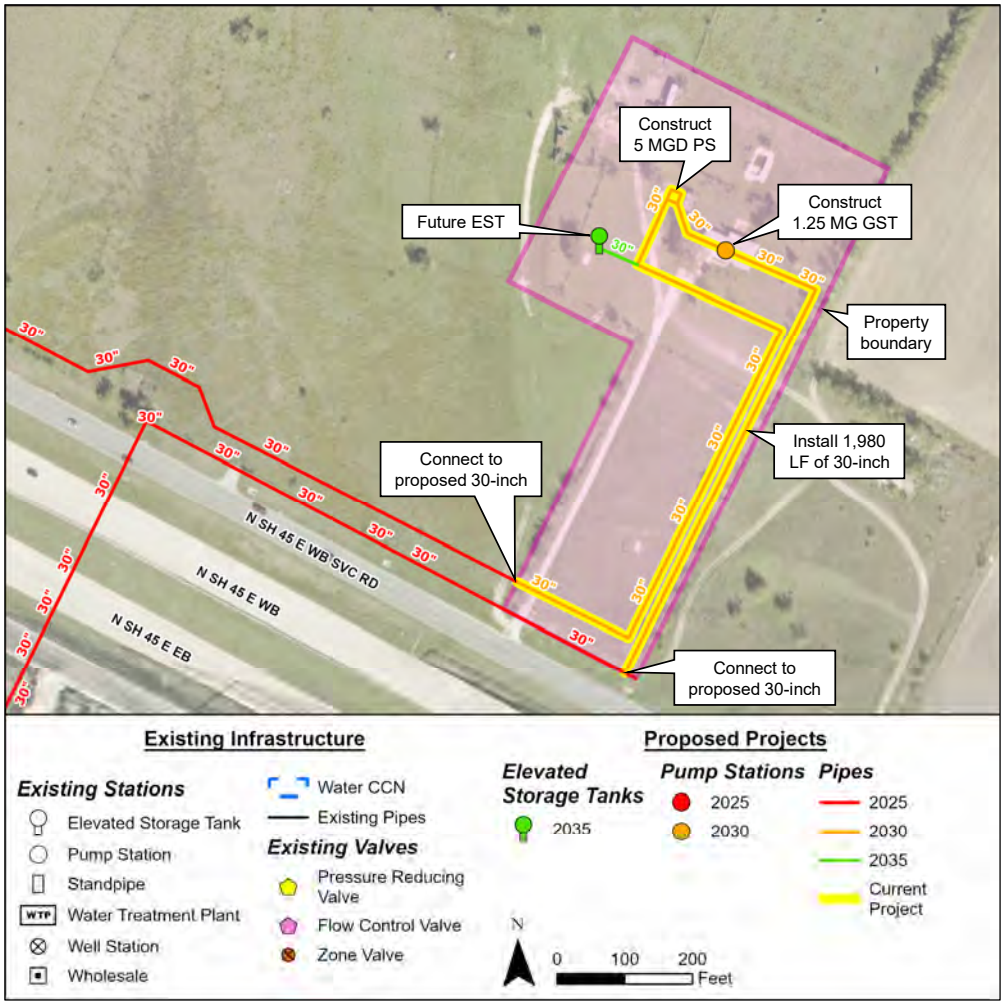
Project Implementation

Engineering & Design	Complete
Construction	24 months
Total Project Duration	24 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	30 inch	40 LF	$ 750	$ 30,000
2	Water Main	42 inch	9,340 LF	$ 1,050	$ 9,807,000
5	Connection	16 inch	2 EA	$ 3,000	$ 6,000
4	Connection	30 inch	1 EA	$ 15,000	$ 15,000
3	Stub Out	42 inch	1 EA	$ 2,500	$ 2,500
6	Misc. Restoration (Pavement, Seeding)		9,380 LF	$ 120	$ 1,125,600
7	Trench Safety Plan and Implementation		9,380 LF	$ 6	$ 56,300
8	Traffic Control		1 LS	$ 15,000	$ 15,000
9	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 11,069,900
				Contingency (30%)	$ 3,321,000
				Easement Acquisition (10%)	$ 1,107,000
				Mobilization (5%)	$ 553,500
				Opinion of Probable Construction Cost	$ 16,051,400

All costs are in 2025 dollars.

Project 8: SH 45 PS



Project Description

Install approximately 1,980 LF of 30-inch water line from the proposed 30-inch stub out, through the proposed PS, and to the proposed 30-inch stub out.

Construct a new PS that will pump to the West 960 Zone. The PS will contain two pumps with design points of 3,472 gpm at 150 feet of head and have a firm capacity of 3,472 gpm (5 MGD).

Construct a new 1.25 MG GST at the PS.

Project Drivers & Triggers

This project is needed to maintain pumping capacity to the West 960 Zone above 0.6 gpm/connection as required by TCEQ.

Other Considerations

The PS property has already been acquired. A future EST is proposed at the PS.

West 960 Zone

Capital Improvement	2030 Horizon

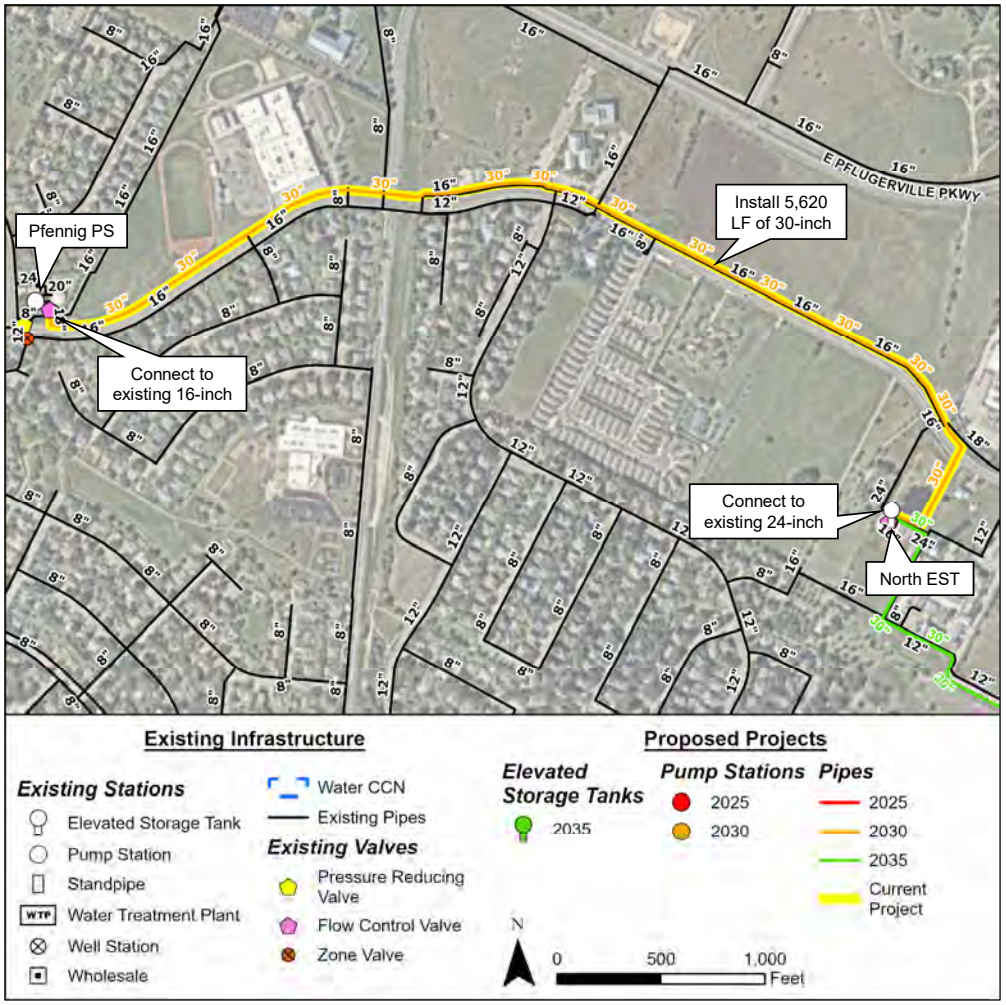
Project Implementation

Engineering & Design	9 months
Construction	24 months
Total Project Duration	33 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	30 inch	1,980 LF	$ 750	$ 1,485,000
2	Pumps (Design Point of 3,472 gpm at 150 ft)	3,472 gpm	2 LS	$ 1,200,000	$ 2,400,000
3	Ground Storage Tank	1,250,000 gal	1 LS	$ 1,960,000	$ 1,960,000
4	High Service Pump Station Building		1 LS	$ 4,500,000	$ 4,500,000
5	Site Improvements (Fencing, Paving)		1 LS	$ 500,000	$ 500,000
6	Misc. Restoration (Pavement, Seeding)		1,980 LF	$ 120	$ 237,600
7	Trench Safety Plan and Implementation		1,980 LF	$ 6	$ 11,900
8	SWPPP		1 LS	$ 15,000	$ 15,000
				Subtotal	$ 11,109,500
				Contingency (30%)	$ 3,332,900
				Design (18%)	$ 1,999,800
				Mobilization (5%)	$ 555,500
				Opinion of Probable Construction Cost	$ 16,997,700

All costs are in 2025 dollars.

Project 9: Pfennig Ln (Phase 1)



Project Description

Install approximately 5,620 LF of 30-inch water line from the North EST to Pfennig PS.

Project Drivers & Triggers

This project reduces high velocities through portions of the existing 16-inch water line along Pfennig Ln from above 10 ft/s to just above 5 ft/s and increases transmission capacity to Pfennig PS.

Other Considerations

This project will be a dedicated transmission line with no intermediate connections between the North EST and Pfennig PS.

This is a preliminary alignment. A route study is recommended to identify the best alignment.

Central 888 Zone

Capital Improvement	2030 Horizon

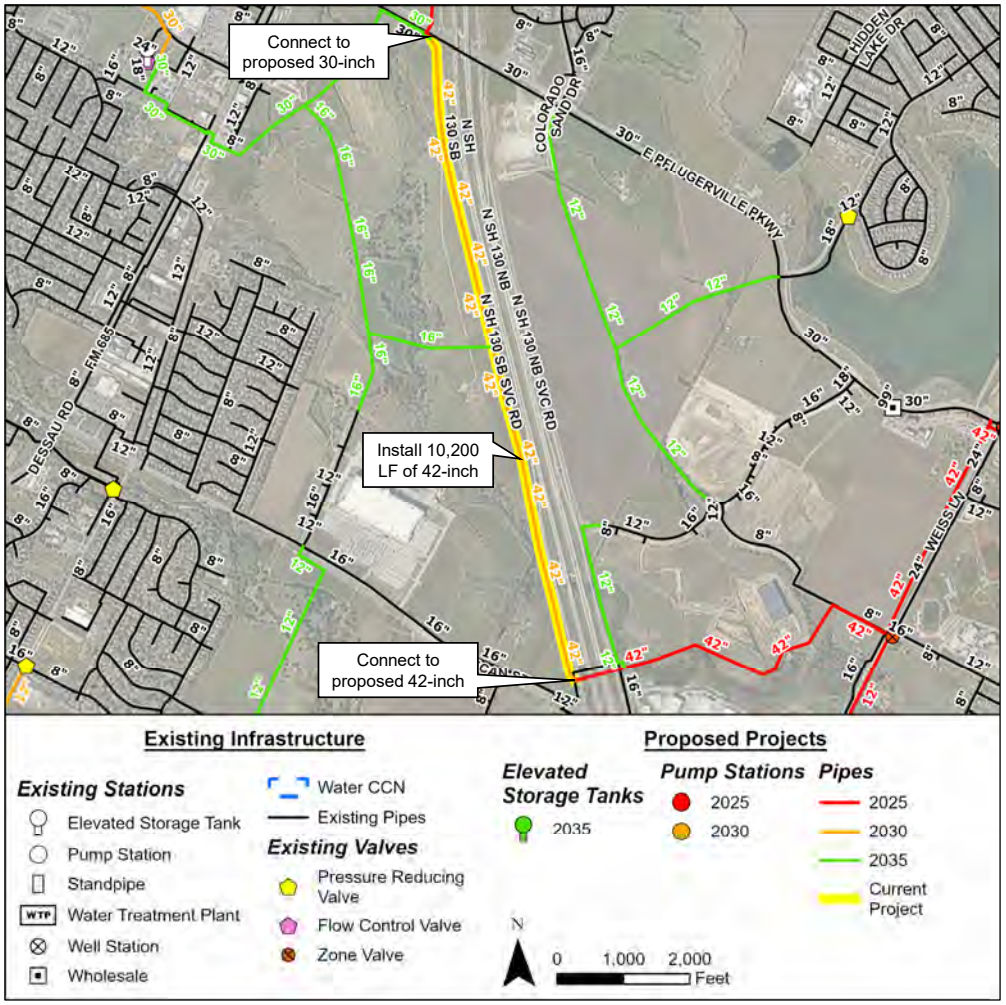
Project Implementation

Engineering & Design	9 months
Construction	12 months
Total Project Duration	21 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	30 inch	5,620 LF	$ 750	$ 4,215,000
2	Connection	16 inch	1 EA	$ 3,000	$ 3,000
3	Connection	24 inch	1 EA	$ 10,000	$ 10,000
4	Misc. Restoration (Pavement, Seeding)		5,620 LF	$ 120	$ 674,400
5	Trench Safety Plan and Implementation		5,620 LF	$ 6	$ 33,800
6	Traffic Control		1 LS	$ 15,000	$ 15,000
7	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 4,963,700
				Contingency (30%)	$ 1,489,200
				Design (18%)	$ 893,500
				Easement Acquisition (10%)	$ 496,400
				Mobilization (5%)	$ 248,200
				Opinion of Probable Construction Cost	$ 8,091,000

All costs are in 2025 dollars.

Project 10: SH 130 (Phase 2)



Project Description

Install approximately 10,200 LF of 42-inch water line along the west side of SH 130 from E Pecan St to E Pflugerville Pkwy.

Project Drivers & Triggers

This project reduces high velocities through the existing 30-inch water line along E Pflugerville Pkwy and the existing 16-inch line along E Pecan St and increases transmission capacity from the WTP to the western portion of the water system.

Other Considerations

This project is the second phase of transmission lines along the west side of SH 130.

Central 888 Zone

Capital Improvement	2030 Horizon

Project Implementation

Engineering & Design	6 months
Construction	15 months
Total Project Duration	21 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	42 inch	10,200 LF	$ 1,050	$ 10,710,000
2	Connection	30 inch	1 EA	$ 15,000	$ 15,000
3	Connection	42 inch	1 EA	$ 20,000	$ 20,000
4	Misc. Restoration (Pavement, Seeding)		10,200 LF	$ 120	$ 1,224,000
5	Trench Safety Plan and Implementation		10,200 LF	$ 6	$ 61,200
6	Traffic Control		1 LS	$ 8,000	$ 8,000
7	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 12,050,700
				Contingency (30%)	$ 3,615,300
				Design (18%)	$ 2,169,200
				Easement Acquisition (10%)	$ 1,205,100
				Mobilization (5%)	$ 602,600
				Opinion of Probable Construction Cost	$ 19,642,900

All costs are in 2025 dollars.

Project 11: Lisso Subdivision

Project Description

Install approximately 4,520 LF of 12-inch water lines along Immanuel Rd and through the Lisso Subdivision.

Project Drivers & Triggers

This project is required to serve future development.

Other Considerations

This project will connect to the future water line along the proposed Pfennig Ln presented in the 2020 Transportation Master Plan.

Central 888 Zone

Developer Improvement	2030 Horizon

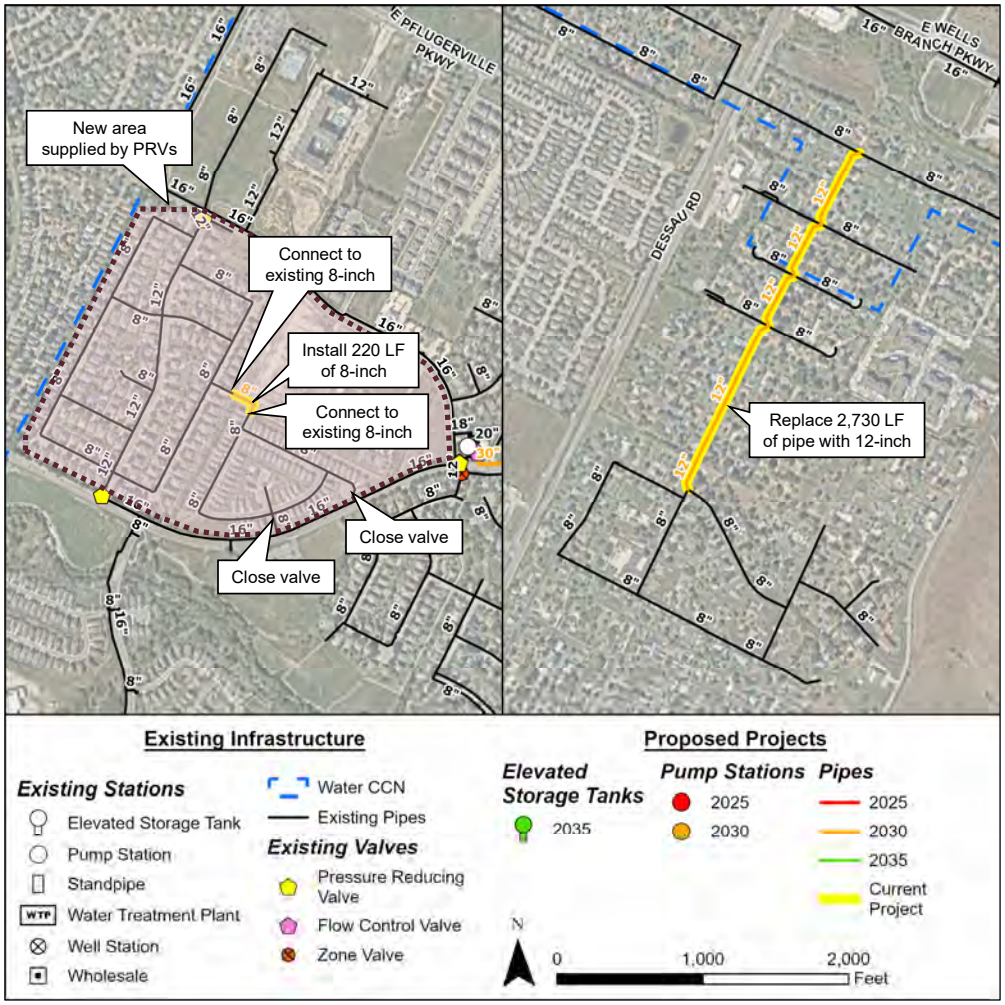
Project Implementation

Engineering & Design	6 months
Construction	9 months
Total Project Duration	15 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	12 inch	4,520 LF	$ 240	$ 1,084,800
2	Connection	16 inch	1 EA	$ 3,000	$ 3,000
3	Stub out	12 inch	1 EA	$ 2,500	$ 2,500
4	Misc. Restoration (Pavement, Seeding)		4,520 LF	$ 120	$ 542,400
5	Trench Safety Plan and Implementation		4,520 LF	$ 6	$ 27,200
6	Traffic Control		1 LS	$ 3,000	$ 3,000
7	SWPPP		1 LS	$ 8,500	$ 8,500
				Subtotal	$ 1,671,400
				Contingency (30%)	$ 501,500
				Design (18%)	$ 300,900
				Easement Acquisition (10%)	$ 167,200
				Mobilization (5%)	$ 83,600
				Opinion of Probable Construction Cost	$ 2,724,600

All costs are in 2025 dollars.

Project 12: Water System Improvements



Project Description

Install approximately 220 LF of 8-inch water line along White Poplar Path to Warm Springs Dr. Close valves at the intersection of Pfennig Ln and Legacy Dr and the intersection of Pfennig Ln and Beechtree Ln.

Replace approximately 2,730 LF of existing 8-inch water line along Zanzibar Ln from Rendova Ln to Peridot Rd with 12-inch water line.

Project Drivers & Triggers

The project at Swenson Farms increases the number of connections served by the Swenson Farms Blvd PRVs which reduces existing high pressures to below 60 psi.

The project at Pflugerville Estates is required to provide at least 1,000 gpm of fire flow to all of Pflugerville Estates.

Other Considerations

City staff are working on amending the water CCN to include Pflugerville Estates.

West 960 & West 942 Zone

Pressure & Fire Flow Improvement	2030 Horizon

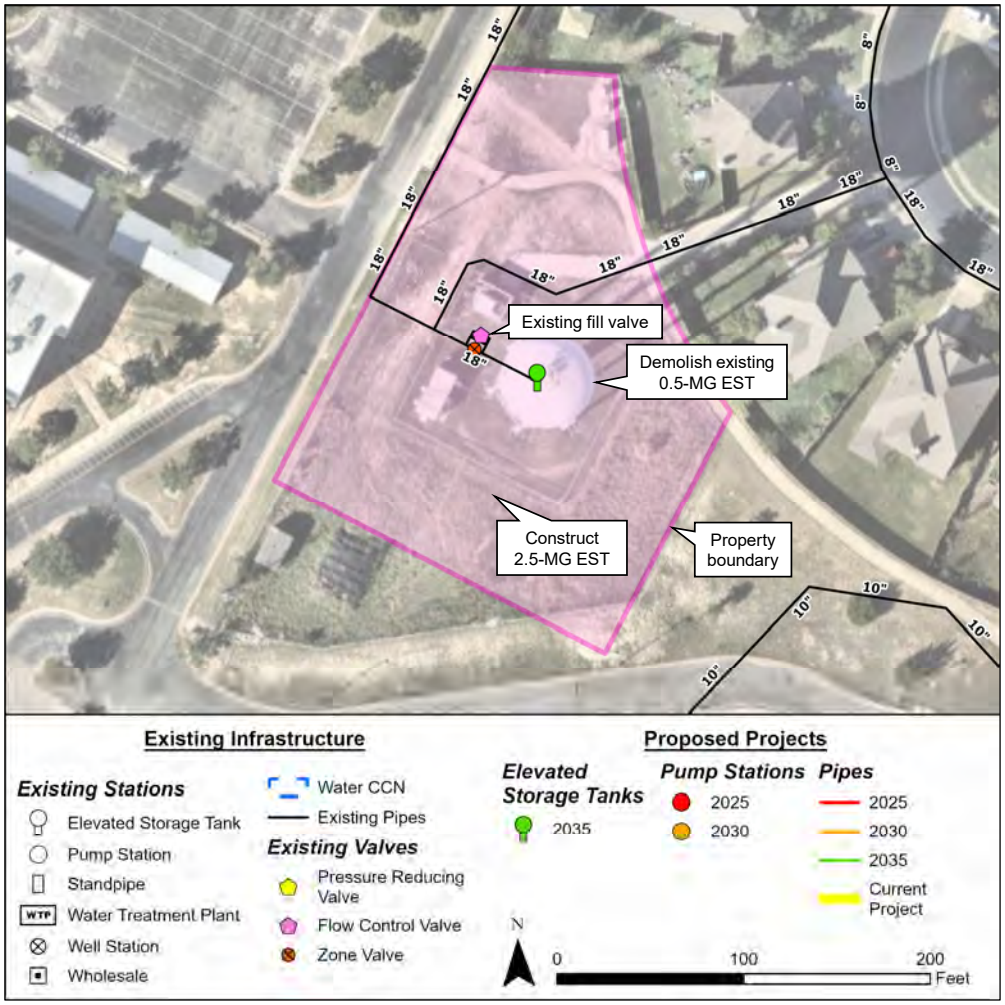
Project Implementation

Engineering & Design	7 months
Construction	7 months
Total Project Duration	14 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	8 inch	220 LF	$ 160	$ 35,200
2	Water Main	12 inch	2,730 LF	$ 240	$ 655,200
3	Connection	8 inch	2 EA	$ 1,000	$ 2,000
4	Remove Existing Water Main	8 inch	2,730 LF	$ 70	$ 191,100
5	Misc. Restoration (Pavement, Seeding)		2,950 LF	$ 120	$ 354,000
6	Trench Safety Plan and Implementation		2,950 LF	$ 6	$ 17,700
7	Traffic Control		1 LS	$ 9,000	$ 9,000
8	SWPPP		1 LS	$ 14,500	$ 14,500
				Subtotal	$ 1,278,700
				Contingency (30%)	$ 383,700
				Design (18%)	$ 230,200
				Easement Acquisition (10%)	$ 127,900
				Mobilization (5%)	$ 64,000
				Opinion of Probable Construction Cost	$ 2,084,500

All costs are in 2025 dollars.

Project 13: Falcon Pointe EST Replacement



Project Description

Replace the existing 0.5-MG EST with a new 2.5-MG EST at Falcon Pointe. The new EST will be approximately 166.5 feet tall and have an overflow elevation of 891.5 feet to match the North EST.

Project Drivers & Triggers

This project is needed to maintain elevated storage capacity for the Central 888 Zone above 200 gal/connection as specified by TCEQ to qualify for the reduced pumping capacity requirement.

Other Considerations

The existing EST can be taken offline prior to construction of the new EST without major impact to system hydraulics or operations. Alternatively, the existing EST can be kept in service during construction of the new EST.

Central 888 Zone

Capital Improvement	2035 Horizon

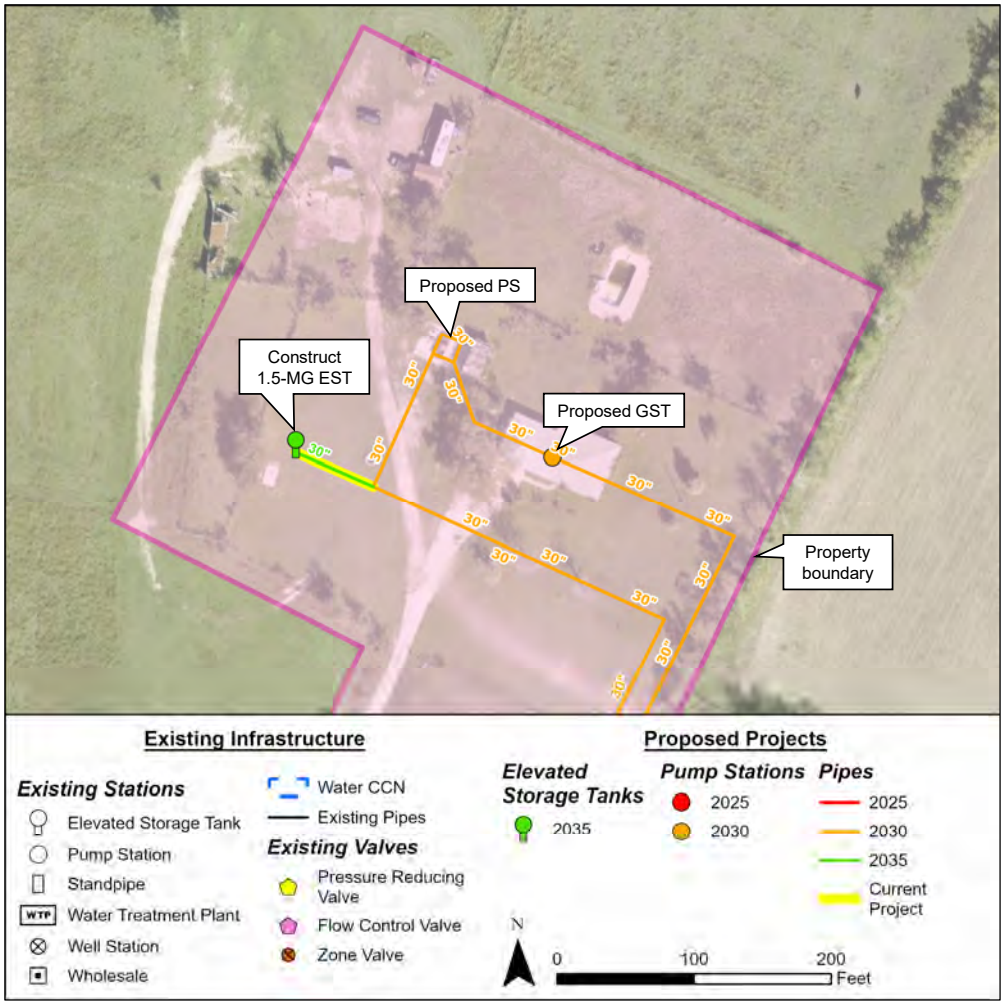
Project Implementation

Engineering & Design	6 months
Construction	21 months
Total Project Duration	27 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	18 inch	90 LF	$ 360	$ 32,400
2	Elevated Storage Tank	2,500,000 gal	1 LS	$ 11,500,000	$ 11,500,000
3	Demolish Existing EST	500,000 gal	1 LS	$ 200,000	$ 200,000
4	Site Improvements (Fencing, Paving)		1 LS	$ 200,000	$ 200,000
5	Misc. Restoration (Pavement, Seeding)		90 LF	$ 120	$ 10,800
6	Trench Safety Plan and Implementation		90 LF	$ 6	$ 600
7	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 11,956,300
				Contingency (30%)	$ 3,586,900
				Design (18%)	$ 2,152,200
				Mobilization (5%)	$ 597,900
				Opinion of Probable Construction Cost	$ 18,293,300

All costs are in 2025 dollars.

Project 14: SH 45 EST



Project Description

Construct a new 1.5-MG EST at the SH 45 PS. The new EST will be approximately 186 feet tall and have an overflow elevation of 960 feet to match the Heatherwilde EST.

West 960 Zone

Capital Improvement | **2035 Horizon**

Project Drivers & Triggers

This project is needed to maintain elevated storage capacity for the West 960 Zone above 200 gal/connection as specified by TCEQ to qualify for the reduced pumping capacity requirement.

Other Considerations

None.

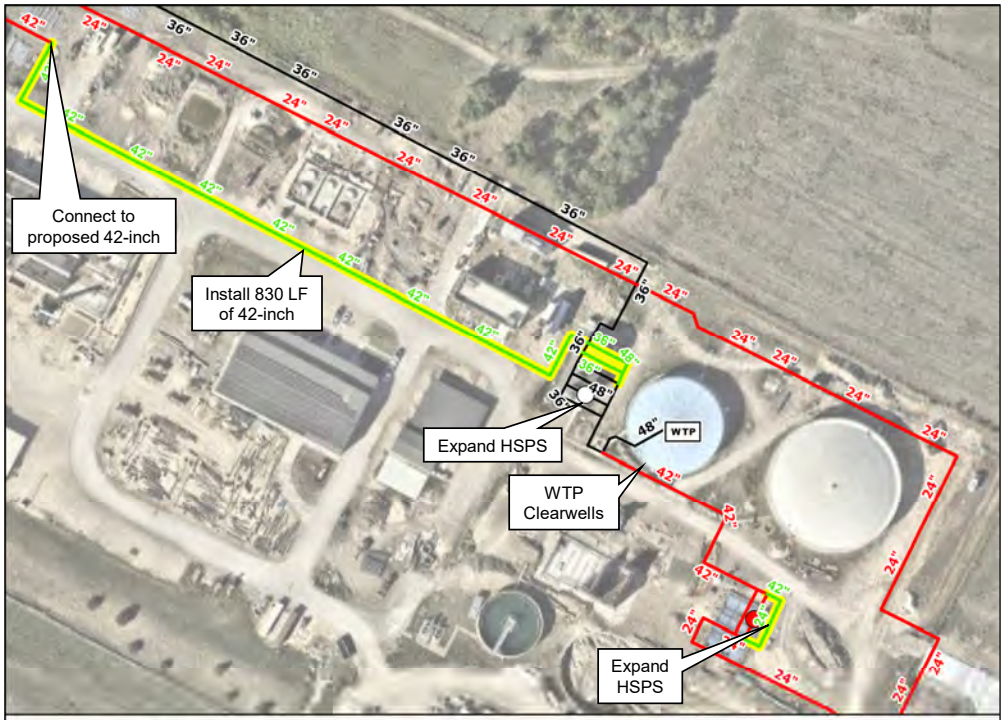
Project Implementation

Engineering & Design	6 months
Construction	24 months
Total Project Duration	30 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	30 inch	70 LF	$ 750	$ 52,500
2	Elevated Storage Tank	1,500,000 gal	1 LS	$ 8,500,000	$ 8,500,000
3	Misc. Restoration (Pavement, Seeding)		70 LF	$ 120	$ 8,400
4	Trench Safety Plan and Implementation		70 LF	$ 6	$ 500
5	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 8,573,900
				Contingency (30%)	$ 2,572,200
				Design (18%)	$ 1,543,400
				Mobilization (5%)	$ 428,700
				Opinion of Probable Construction Cost	$ 13,118,200

All costs are in 2025 dollars.

Project 15: High-Service PS Expansion



Project Description

Expand the HSPS to include one new 4,167 gpm pump at 130 feet of head that will pump to the East 794 Zone and two to four new 5,208 gpm pumps at 315 feet of head that will pump to the Central 888 Zone. Proposed firm capacity to the East 794 Zone will be 12 MGD and proposed firm capacity to the Central 888 Zone will be 37.5 to 52.5 MGD.

Install approximately 830 LF of 42-inch pipe from the existing HSPS to the proposed 42-inch stub out.

Project Drivers & Triggers

This project is needed to maintain pumping capacity to the West 794 Zone and Central 888 Zone above 0.6 gpm/connection as required by TCEQ.

East 794 Zone & Central 888 Zone

Capital Improvement	2035 Horizon

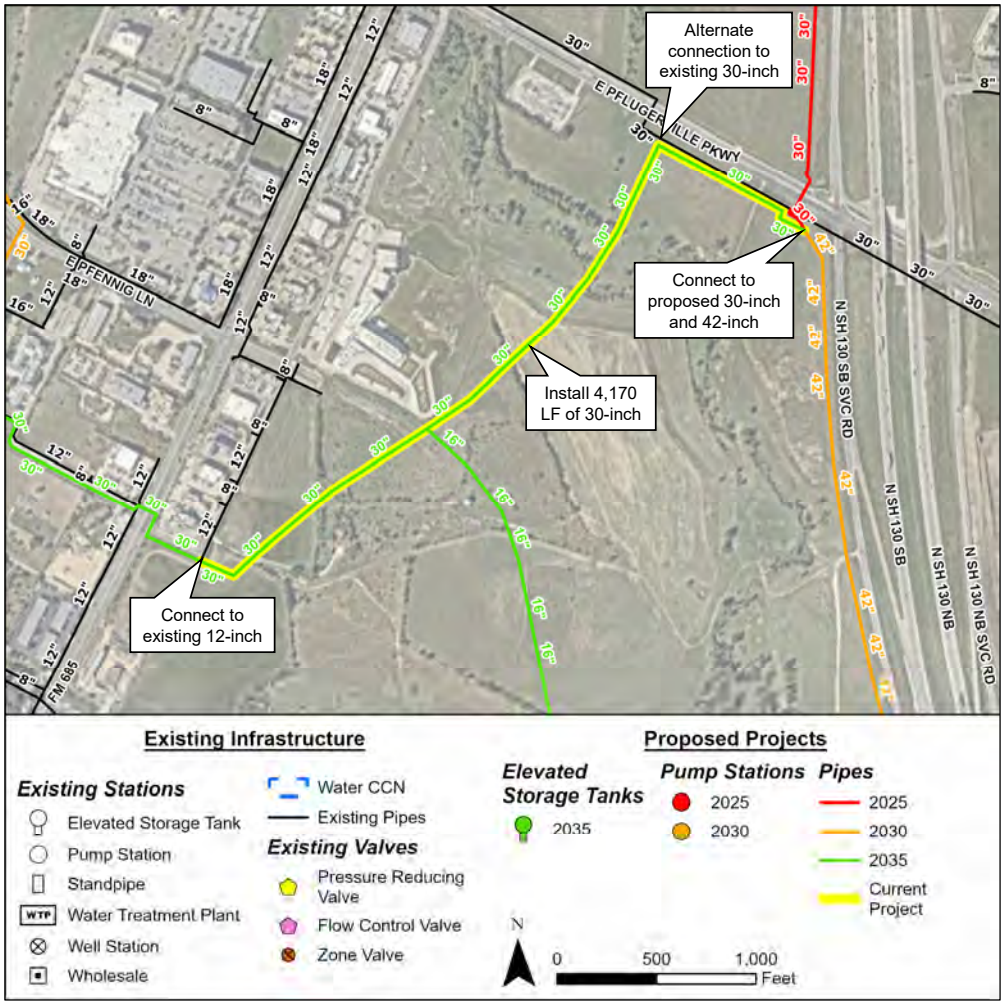
Project Implementation

Engineering & Design	6 months
Construction	18 months
Total Project Duration	24 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	24 inch	80 LF	$ 550	$ 44,000
2	Water Main	36 inch	50 LF	$ 950	$ 47,500
3	Water Main	42 inch	830 LF	$ 1,050	$ 871,500
4	Water Main	48 inch	80 LF	$ 1,150	$ 92,000
5	East Zone Pump (Design Point of 4,167 gpm at 130 ft)	4,167 gpm	1 LS	$ 1,500,000	$ 1,500,000
6	Central Zone Pumps (Design Point of 5,208 gpm at 315 ft)	5,208 gpm	4 LS	$ 1,800,000	$ 7,200,000
7	High Service Pump Station Building Expansion		1 LS	$ 1,750,000	$ 1,750,000
8	Site Improvements (Fencing, Paving)		1 LS	$ 200,000	$ 200,000
9	Misc. Restoration (Pavement, Seeding)		1,040 LF	$ 120	$ 124,800
10	Trench Safety Plan and Implementation		1,040 LF	$ 6	$ 6,300
11	Traffic Control		1 LS	$ 10,000	$ 10,000
12	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 11,858,600
				Contingency (30%)	$ 3,557,600
				Design (18%)	$ 2,134,600
				Mobilization (5%)	$ 593,000
				Opinion of Probable Construction Cost	$ 18,143,800

All costs are in 2025 dollars.

Project 16: Old Austin-Hutto Rd



Project Description

Install approximately 4,170 LF of 30-inch water line from E Pflugerville Pkwy to FM 685.

Project Drivers & Triggers

This project reduces high velocities through the existing 30-inch water line along E Pflugerville Pkwy and increases transmission capacity from the WTP to the North EST.

Other Considerations

This project follows the route of the proposed Old Austin-Hutto Rd as presented in the 2020 Transportation Master Plan and will be jointly bid with the roadway construction.

It is recommended to connect to the proposed 30-inch and 42-inch for added redundancy. However, an alternate connection can be made to the existing 30-inch along Pflugerville Pkwy.

Central 888 Zone

Capital Improvement	2035 Horizon

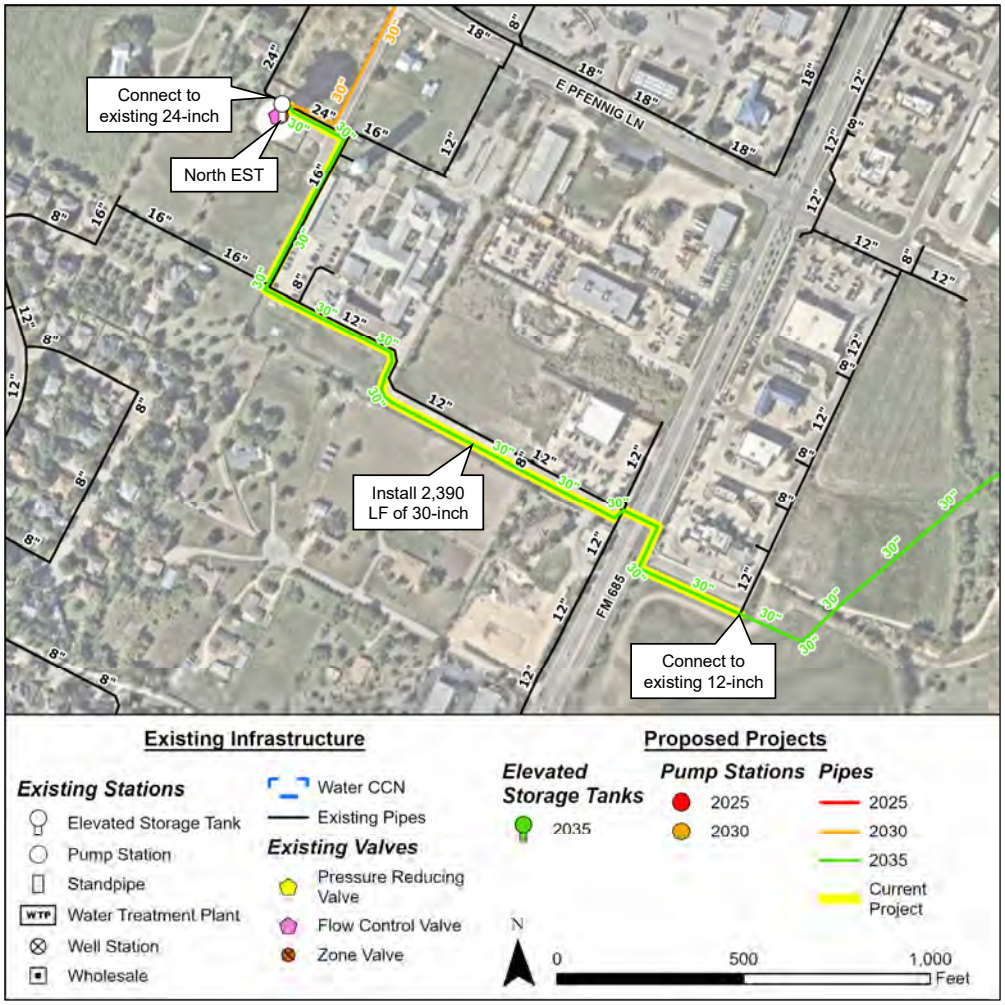
Project Implementation

Engineering & Design	6 months
Construction	9 months
Total Project Duration	15 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	30 inch	4,170 LF	$ 750	$ 3,127,500
2	Connection	30 inch	1 EA	$ 15,000	$ 15,000
3	Connection	12 inch	1 EA	$ 2,000	$ 2,000
4	Misc. Restoration (Pavement, Seeding)		4,170 LF	$ 120	$ 500,400
5	Trench Safety Plan and Implementation		4,170 LF	$ 6	$ 25,100
6	Traffic Control		1 LS	$ 1,500	$ 1,500
7	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 3,684,000
				Contingency (30%)	$ 1,105,200
				Design (18%)	$ 663,200
				Easement Acquisition (10%)	$ 368,400
				Mobilization (5%)	$ 184,200
				Opinion of Probable Construction Cost	$ 6,005,000

All costs are in 2025 dollars.

Project 17: Justice Center Dr



Project Description

Install approximately 2,390 LF of 30-inch water line along Justice Center Dr from FM 685 to the North EST.

Project Drivers & Triggers

This project reduces high velocities through the existing 12-inch water line along Justice Center Dr and the existing 18-inch water line along FM 685 and increases transmission capacity from the WTP to the North EST.

Other Considerations

None.

Central 888 Zone

Capital Improvement	2035 Horizon

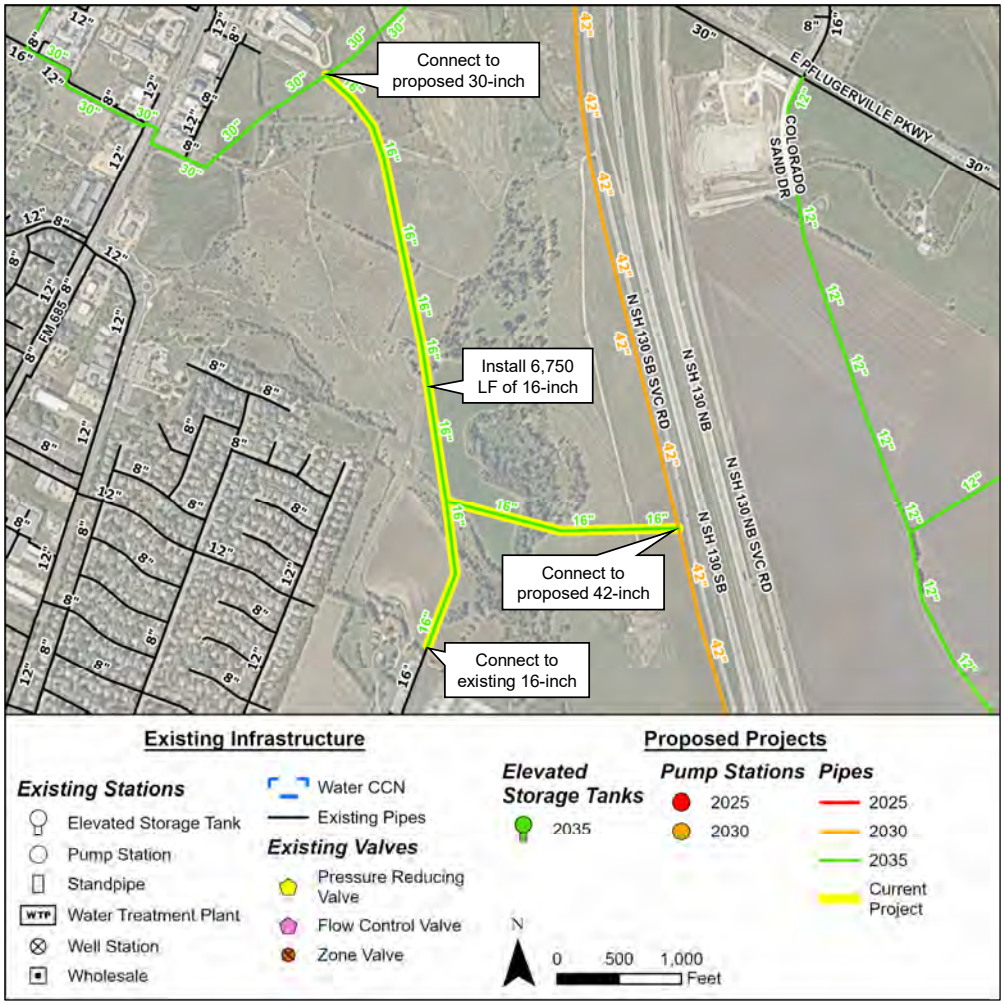
Project Implementation

Engineering & Design	6 months
Construction	9 months
Total Project Duration	15 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	30 inch	2,390 LF	$ 750	$ 1,792,500
2	Connection	24 inch	1 EA	$ 10,000	$ 10,000
3	Connection	12 inch	1 EA	$ 2,000	$ 2,000
4	Misc. Restoration (Pavement, Seeding)		2,390 LF	$ 200	$ 478,000
5	Trench Safety Plan and Implementation		2,390 LF	$ 6	$ 14,400
6	Traffic Control		1 LS	$ 15,000	$ 15,000
7	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 2,324,400
				Contingency (30%)	$ 697,400
				Design (18%)	$ 418,400
				Easement Acquisition (10%)	$ 232,500
				Mobilization (5%)	$ 116,300
				Opinion of Probable Construction Cost	$ 3,789,000

All costs are in 2025 dollars.

Project 18: Pfennig Ln (Phase 2)



Project Description

Install approximately 6,750 LF of 16-inch water line from the existing 16-inch water line near the Amazon warehouse to the proposed 30-inch water line along the future Old Austin-Hutto Rd with a connection to the proposed 42-inch water line along the west side of SH 130.

Project Drivers & Triggers

This project increases transmission capacity from the WTP to the western portion of the water system. This project is required to serve future development along the west side of SH 130.

Other Considerations

This project follows the route of the proposed Pfennig Ln as presented in the 2020 Transportation Master Plan and will be jointly bid with the roadway construction.

Central 888 Zone	
Capital Improvement	2035 Horizon

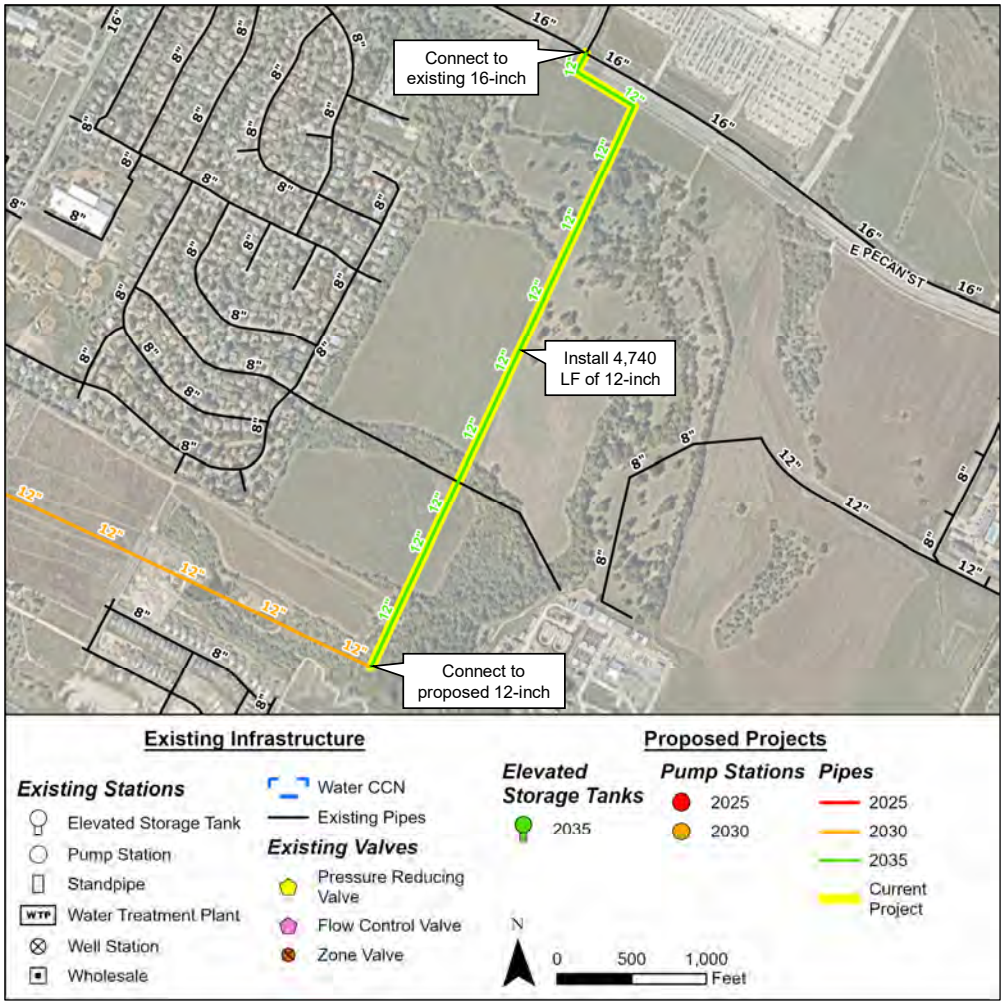
Project Implementation

Engineering & Design	9 months
Construction	15 months
Total Project Duration	24 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	16 inch	6,750 LF	$ 320	$ 2,160,000
2	Connection	16 inch	1 EA	$ 3,000	$ 3,000
3	Connection	30 inch	1 EA	$ 15,000	$ 15,000
4	Connection	42 inch	1 EA	$ 20,000	$ 20,000
5	Misc. Restoration (Pavement, Seeding)		6,750 LF	$ 120	$ 810,000
6	Trench Safety Plan and Implementation		6,750 LF	$ 6	$ 40,500
7	Traffic Control		1 LS	$ 1,500	$ 1,500
8	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 3,062,500
				Contingency (30%)	$ 918,800
				Design (18%)	$ 551,300
				Easement Acquisition (10%)	$ 306,300
				Mobilization (5%)	$ 153,200
				Opinion of Probable Construction Cost	$ 4,992,100

All costs are in 2025 dollars.

Project 19: Pfennig Ln (Phase 3)



Project Description

Install approximately 4,740 LF of 12-inch water line from E Pecan St to the Lisso Subdivision.

Project Drivers & Triggers

This project is required to serve future development.

Other Considerations

This project follows the route of the proposed Pfennig Ln as presented in the 2020 Transportation Master Plan and will be jointly bid with the roadway construction.

Central 888 Zone

Capital Improvement	2035 Horizon

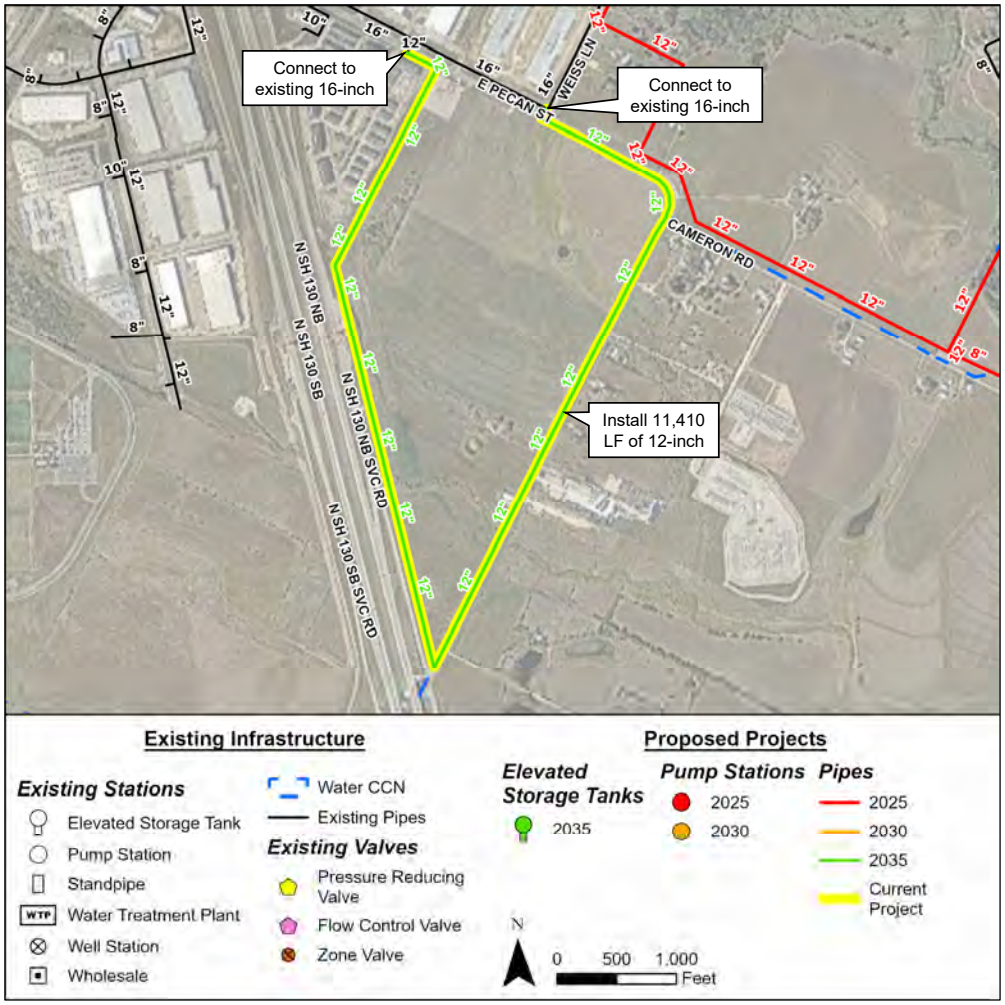
Project Implementation

Engineering & Design	9 months
Construction	12 months
Total Project Duration	21 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	12 inch	4,740 LF	$ 240	$ 1,137,600
2	Connection	12 inch	1 EA	$ 2,000	$ 2,000
3	Connection	16 inch	1 EA	$ 3,000	$ 3,000
4	Misc. Restoration (Pavement, Seeding)		4,740 LF	$ 120	$ 568,800
5	Trench Safety Plan and Implementation		4,740 LF	$ 6	$ 28,500
6	Traffic Control		1 LS	$ 4,000	$ 4,000
7	SWPPP		1 LS	$ 10,000	$ 10,000
				Subtotal	$ 1,753,900
				Contingency (30%)	$ 526,200
				Design (18%)	$ 315,800
				Easement Acquisition (10%)	$ 175,400
				Mobilization (5%)	$ 87,700
				Opinion of Probable Construction Cost	$ 2,859,000

All costs are in 2025 dollars.

Project 20: Cameron Rd



Project Description

Install approximately 11,410 LF of 12-inch water line along E Pecan St, Cameron Rd, and the east side of SH 130.

Project Drivers & Triggers

This project is required to serve future development.

Other Considerations

None.

Central 888 Zone

Developer Improvement	2035 Horizon

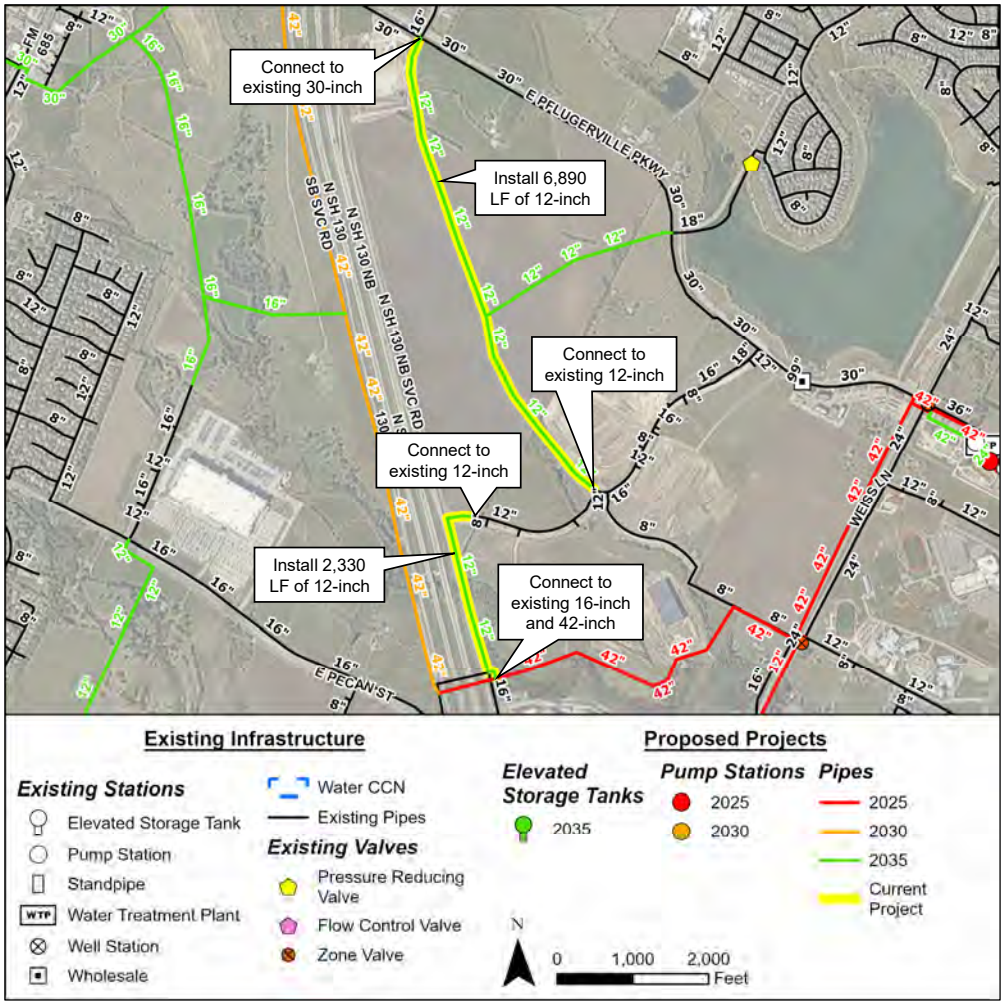
Project Implementation

Engineering & Design	6 months
Construction	12 months
Total Project Duration	18 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	12 inch	11,410 LF	$ 240	$ 2,738,400
2	Connection	16 inch	2 EA	$ 3,000	$ 6,000
3	Misc. Restoration (Pavement, Seeding)		11,410 LF	$ 120	$ 1,369,200
4	Trench Safety Plan and Implementation		11,410 LF	$ 6	$ 68,500
5	Traffic Control		1 LS	$ 6,000	$ 6,000
6	SWPPP		1 LS	$ 12,500	$ 12,500
				Subtotal	$ 4,200,600
				Contingency (30%)	$ 1,260,200
				Design (18%)	$ 756,200
				Easement Acquisition (10%)	$ 420,100
				Mobilization (5%)	$ 210,100
				Opinion of Probable Construction Cost	$ 6,847,200

All costs are in 2025 dollars.

Project 21: East Central Zone Loop (Phase 1)



Project Description

Install approximately 2,330 LF of 12-inch water line along the east side of SH 130 from the proposed 42-inch water line north of E Pecan St to Balatan Blvd and approximately 6,890 LF of 12-inch water line along the future Colorado Sand Dr from Balatan Blvd to E Pflugerville Pkwy.

Project Drivers & Triggers

This project is required to serve future development along the east side of SH 130.

Other Considerations

This project follows the route of the future Colorado Sand Dr. Alternate alignments through future development can be considered. The current project alignment is a conceptual route meant to connect the existing 30-inch water line on Pflugerville Pkwy to the future 42-inch water line.

Central 888 Zone

Developer Improvement	2035 Horizon

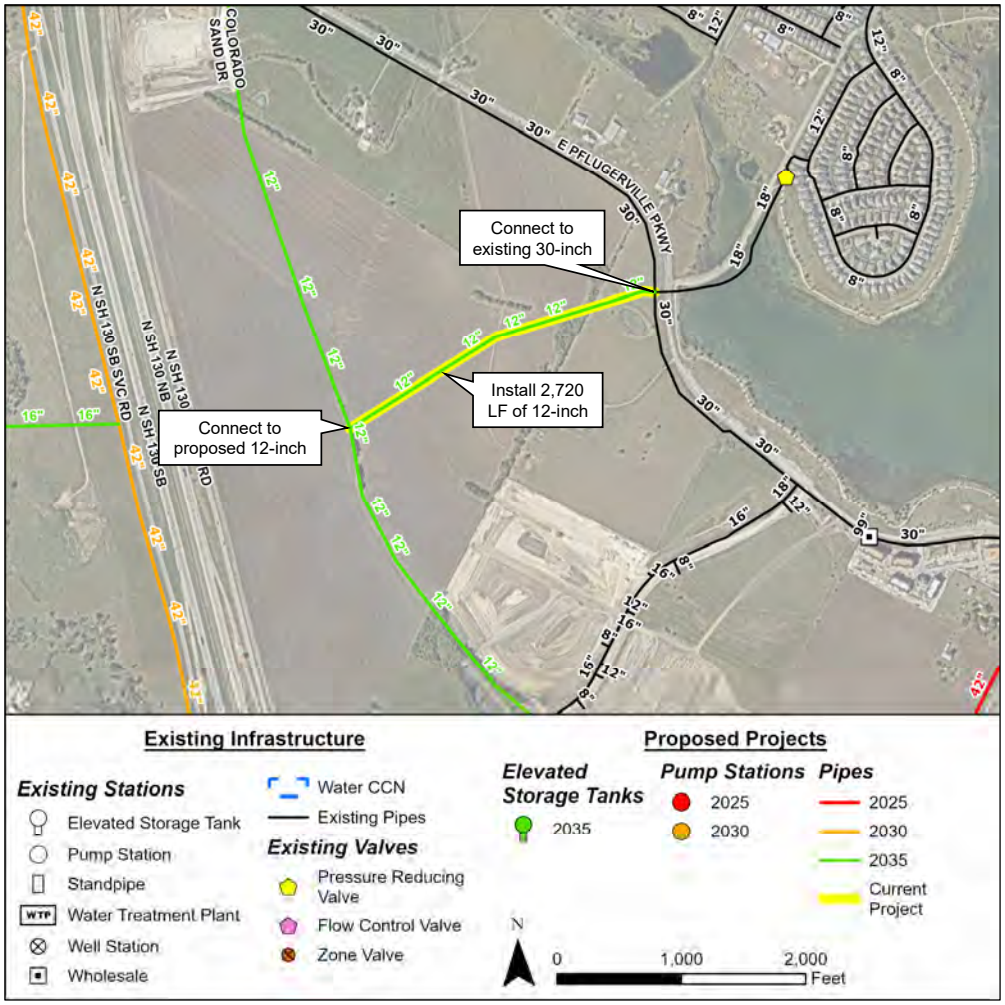
Project Implementation

Engineering & Design	6 months
Construction	12 months
Total Project Duration	18 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	12 inch	9,220 LF	$ 240	$ 2,212,800
2	Connection	12 inch	2 EA	$ 2,000	$ 4,000
3	Connection	30 inch	1 EA	$ 15,000	$ 15,000
4	Connection	42 inch	1 EA	$ 20,000	$ 20,000
5	Misc. Restoration (Pavement, Seeding)		9,220 LF	$ 120	$ 1,106,400
6	Trench Safety Plan and Implementation		9,220 LF	$ 6	$ 55,400
7	Traffic Control		1 LS	$ 8,000	$ 8,000
8	SWPPP		1 LS	$ 10,000	$ 10,000
				Subtotal	$ 3,431,600
				Contingency (30%)	$ 1,029,500
				Design (18%)	$ 617,700
				Easement Acquisition (10%)	$ 343,200
				Mobilization (5%)	$ 171,600
				Opinion of Probable Construction Cost	$ 5,593,600

All costs are in 2025 dollars.

Project 22: East Central Zone Loop (Phase 2)



Project Description

Install approximately 2,720 LF of 12-inch water line from the future Colorado Sand Dr to E Pflugerville Pkwy.

Project Drivers & Triggers

This project is required to serve future development between E Pflugerville Pkwy and SH 130.

Other Considerations

Alternate alignments through future development should be considered. The current project alignment is a conceptual route.

Central 888 Zone

Developer Improvement	2035 Horizon

Project Implementation

Engineering & Design	6 months
Construction	12 months
Total Project Duration	18 months

No.	Description	Size	Quantity	Unit Cost	Total Cost
1	Water Main	12 inch	2,720 LF	$ 240	$ 652,800
2	Connection	12 inch	1 EA	$ 2,000	$ 2,000
3	Connection	30 inch	1 EA	$ 15,000	$ 15,000
4	Misc. Restoration (Pavement, Seeding)		2,720 LF	$ 120	$ 326,400
5	Trench Safety Plan and Implementation		2,720 LF	$ 6	$ 16,400
6	Traffic Control		1 LS	$ 1,500	$ 1,500
7	SWPPP		1 LS	$ 8,000	$ 8,000
				Subtotal	$ 1,022,100
				Contingency (30%)	$ 306,700
				Design (18%)	$ 184,000
				Easement Acquisition (10%)	$ 102,300
				Mobilization (5%)	$ 51,200
				Opinion of Probable Construction Cost	$ 1,666,300

All costs are in 2025 dollars.