

2021 Water Master Plan

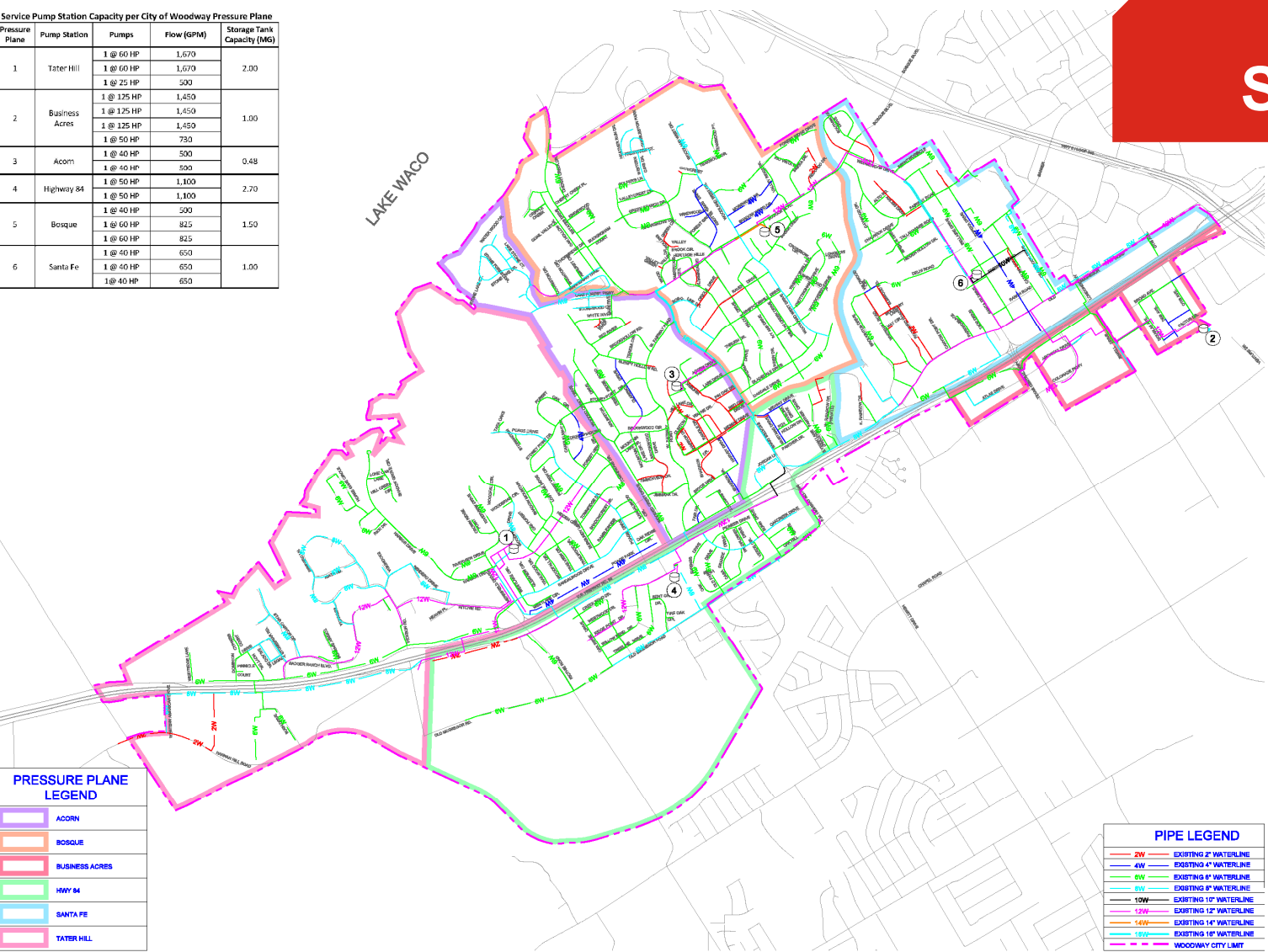
City of Woodway

Pressure Plane	Pump Station	Pumps	Flow (GPM)	Storage Tank Capacity (MG)
1	Tater Hill	1 @ 60 HP	1,670	2.00
		1 @ 60 HP	1,670	
		1 @ 25 HP	500	
2	Business Acres	1 @ 125 HP	1,450	1.00
		1 @ 125 HP	1,450	
		1 @ 125 HP	1,450	
		1 @ 50 HP	750	
3	Acorn	1 @ 40 HP	500	0.48
		1 @ 40 HP	500	
		1 @ 50 HP	1,100	
4	Highway 84	1 @ 50 HP	1,100	2.70
		1 @ 40 HP	500	
5	Bosque	1 @ 60 HP	825	1.50
		1 @ 60 HP	825	
		1 @ 40 HP	650	
6	Santa Fe	1 @ 40 HP	650	1.00
		1 @ 40 HP	650	

Existing System Map

6 Pressure Planes

- Tater Hill
- Business Acres
- Acorn
- Highway 84
- Bosque
- Santa Fe



Population Projections

Year	Population Projections	Population Growth	Residential Connection Growth
2020	9,045	-	-
2030	10,524	1,479	338
2040	11,810	1,286	276

- ▶ Adjusted population projections took into account identified developments and TWDB projections

Water Demands - Historic

- ▶ Average usage, gallons per capita per day (GPCD)
 - Texas cities – 130 GPCD
 - Region G – 126 GPCD
 - Woodway – 266 GPCD (2019 to 2020)

Year	Woodway Well Water	Water from Waco	Total Consumption	Average Day (MGD)
2019	393,737,000	443,594,786	837,331,786	Average 2.3
2020	468,520,000	442,077,901	910,597,901	Average 2.5

Commercial Category	Water Demand per Connection (GPM/Connection)
Industrial	2.5
Office Park	4.0
Retail	2.5

Water Demands - Projected

Pressure Plane	Projected Population Increase	Avg Day Demand MGD	Maximum Day Demand MGD	Peak Hour Demand MGD	Ratio of MDD to ADD	Ratio of PHD to ADD
2020						
Tater Hill	-	0.731	1.989	3.680	2.7	5.0
Business Acres	-	0.226	0.619	1.145	2.7	5.1
Acorn	-	0.210	0.814	1.506	3.9	7.2
Highway 84	-	0.580	1.656	3.064	2.9	5.3
Bosque	-	0.319	0.936	1.732	2.9	5.4
Santa Fe	-	0.298	1.075	1.989	3.6	6.7
2030						
Tater Hill	703	0.915	2.489	4.605	2.7	5.0
Business Acres	-	0.226	0.619	1.145	2.7	5.1
Acorn	-	0.210	0.814	1.506	3.9	7.2
Highway 84	600	0.737	2.104	3.892	2.9	5.3
Bosque	36	0.328	0.964	1.783	2.9	5.4
Santa Fe	140	0.335	1.207	2.233	3.6	6.7
2040						
Tater Hill	190	0.964	2.624	4.855	2.7	5.0
Business Acres	-	0.226	0.619	1.145	2.7	5.1
Acorn	-	0.210	0.814	1.506	3.9	7.2
Highway 84	1032	1.007	2.874	5.317	2.9	5.3
Bosque	64	0.345	1.013	1.874	2.9	5.4
Santa Fe	-	0.335	1.207	2.233	3.6	6.7

MGD: Million Gallons Per Day | GPCD: Gallons Per Person Per Day | MDD: Maximum Day Demand | ADD: Average Day Demand | PHD: Peak Hour Demand

Water Demands – Projected Commercial

Pressure Zone	Gained Commercial Connections 2020-2030	Water Demand Increase 2020-2030 (gpm)	Gained Commercial Connections 2030-2040	Water Demand Increase 2030-2040 (gpm)
Tater Hill	5	12	5	12
Business Acres – Santa Fe	13	32	11	27
Acorn – Bosque	10	32	0	0
Highway 84	13	34	5	12

Projected Water Usage

Year	Population	Annual Consumption MG	Avg Day Demand		Maximum Day Demand MGD	Peak Hour Demand MGD	MDD to ADD	PHD to ADD
			MG	GPCD				
2020	9,045	901	2.36	261	7.09	13.11	3.0	5.5
2030	10,524	1043	2.75	261	8.20	15.16	3.0	5.5
2040	11,810	1168	3.09	261	9.15	16.93	3.0	5.5

MGD: Million Gallons Per Day | GPCD: Gallons Per Person Per Day | MDD: Maximum Day Demand | ADD: Average Day Demand | PHD: Peak Hour Demand

Groundwater Production 2012 - 2020

Year	Production/Gallons	Acre-Feet	Permitted Gallons	% Permitted
2012	569,718,000	1,748	664,213,000	85.75%
2013	414,419,000	1,272	664,213,000	62.4%
2014	386,687,000	1,187	664,213,000	50.23%
2015	404,459,000	1,241	664,213,000	60.88%
2016	264,366,000	811*	664,213,000	39.79%
2017	516,377,000	1,585	664,213,000	77.76%
2018	403,911,000	1,240	664,213,000	60.83%
2019	406,728,000	1,248	664,213,000	61.22%
2020	487,852,000	1,493**	664,213,000	73.45%
			Average	63.59%

- ▶ At time of study, groundwater production cost was \$1.00 to \$2.00 per thousand gallons
- ▶ Woodway pays Waco \$3.20 per thousand gallons for the first 365,000,000 gallons and \$3.40 for additional water
- ▶ If Woodway must acquire more water from Waco, the cost per thousand gallons will be \$4.00 based on Waco's 2021 rates
- ▶ Using an average demand of 420,845,000 gallons per year (groundwater converted to surface water, the cost would be \$1,683,000

Model Development

- ▶ System analyses – evaluate performance
- ▶ TCEQ regulations
- ▶ Historic water usage patterns
- ▶ Field tests
- ▶ City input
- ▶ Model calibration and verification

Capacity Analysis Per Pressure Plane

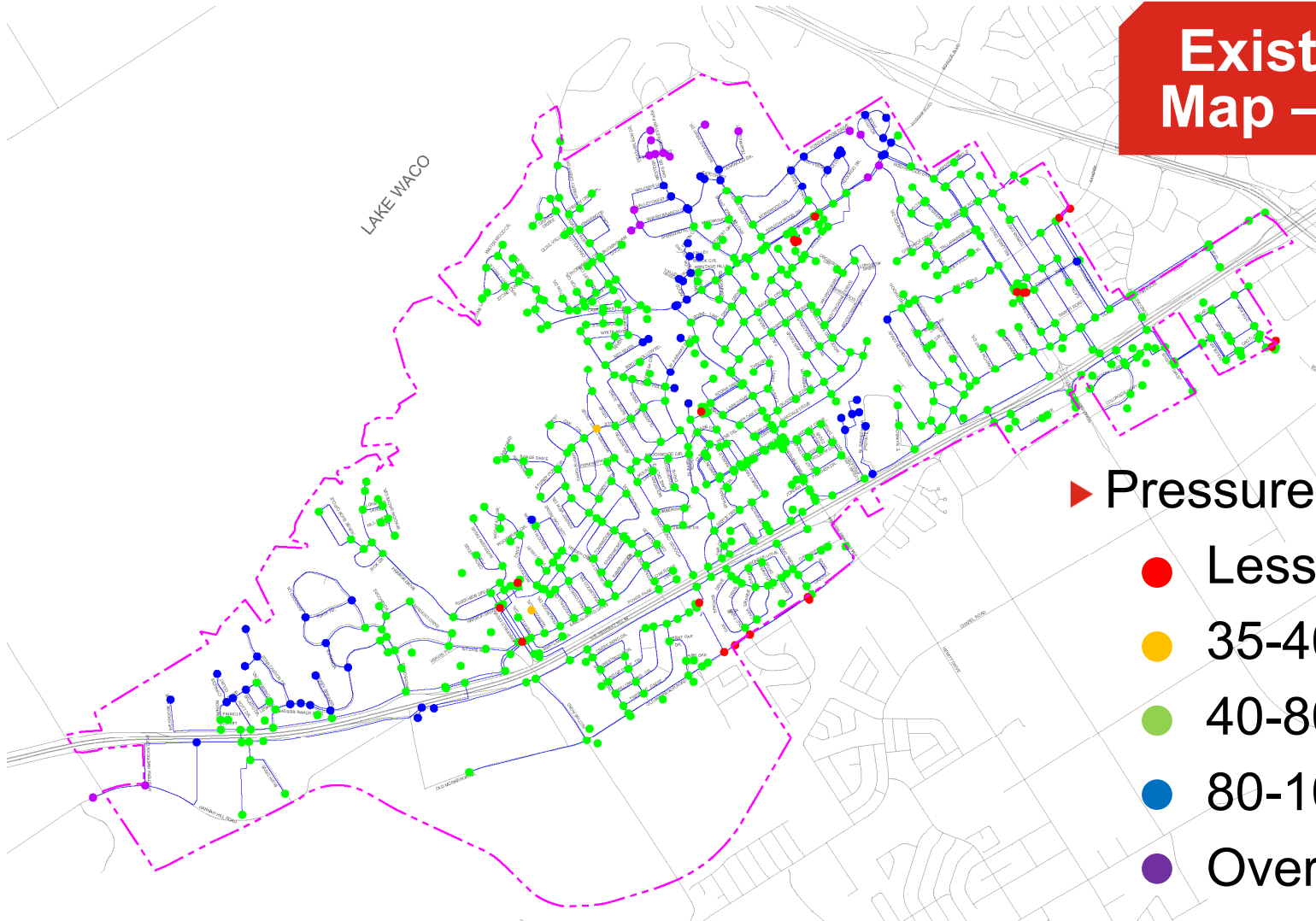
Pressure Plane	Connections	Well Production (gpm) ^a		Service Pumping (gpm) ^b		Storage (MG) ^c		Hydropneumatic Pressure Tank Volume (gal) ^d	
		Required	Provided	Required	Provided	Required	Provided	Required	Provided
Tater Hill	1,116	670	1,300	2,232	3,840	0.22	2.00	22,320	32,000
Bus Acres	119	566	1,610	1,888	6,300	0.19	2.00	18,880	33,000
Santa Fe	825								
Acorn	619	946	1,080	3,152	3,150	0.32	1.98	30,000	27,000
Bosque	957								
Hwy 84	450	270	1,280	900	2,200	0.09	2.70	9,000	16,000

- ▶ ^a Requirement is 0.6 gpm per connection
- ▶ ^b Requirement is 2 gpm per connection
- ▶ ^c Requirement is 200 gallons per connection
- ▶ ^d Requirement is 20 gallons per connection and 30,000 gallons are sufficient up to 2,500 connections

Projected System Capacity Evaluation

2030 Projection									
Pressure Plane	Connections	Well Production (gpm) ^a		Service Pumping (gpm) ^b		Storage (MG) ^c		Hydropneumatic Pressure Tank Volume (gal) ^d	
		Required	Provided	Required	Provided	Required	Provided	Required	Provided
Tater Hill	1,268	761	1,300	2,536	3,840	0.25	2.00	25,360	32,000
Bus Acres	129	589	1,610	1,964	6,300	0.20	2.00	19,636	33,000
Santa Fe	853								
Acorn	629	961	1,080	3,204	3,150	0.32	1.98	30,000	27,000
Bosque	973								
Hwy 84	613	368	1,280	1,226	2,200	0.12	2.70	12,260	16,000
2040 Projection									
Pressure Plane	Connections	Well Production (gpm) ^a		Service Pumping (gpm) ^b		Storage (MG) ^c		Hydropneumatic Pressure Tank Volume (gal) ^d	
		Required	Provided	Required	Provided	Required	Provided	Required	Provided
Tater Hill	1,356	814	1,300	2,712	3,840	0.27	2.00	27,120	32,000
Bus Acres	129	591	1,610	1,970	6,300	0.20	2.00	19,696	33,000
Santa Fe	856								
Acorn	629	978	1,080	3,260	3,150	0.33	1.98	30,000	27,000
Bosque	1,001								
Hwy 84	876	526	1,280	1,752	2,200	0.18	2.70	17,520	16,000

Existing Pressure Map – Average Day



Existing Pressure Map – Max Day

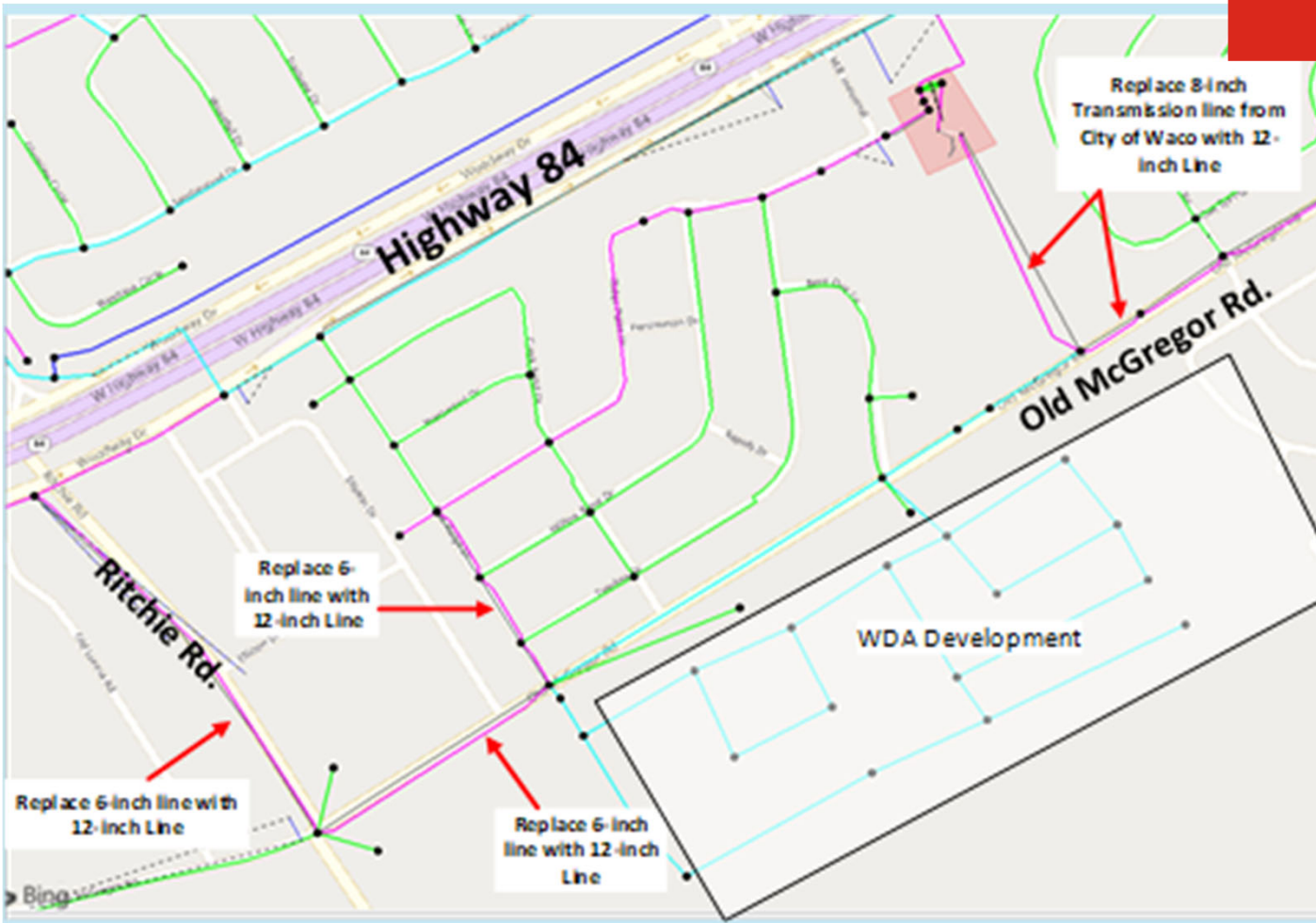
► Pressure Legend (PSI)

- Less than 35
- 35-40
- 40-80
- 80-100
- Over 100

Comparison of Projected 2040 Maximum Day Demand and City of Waco Water Availability for the Woodway System

Pressure Plane	Projected 2040 Maximum Day Demand (gpm)	City of Waco Water Availability (gpm)
Tater Hill	1,822	800
Business Acres	430	N/A
Acorn	565	N/A
Hwy 84	1,996	800
Bosque	703	N/A
Santa Fe	838	1,000

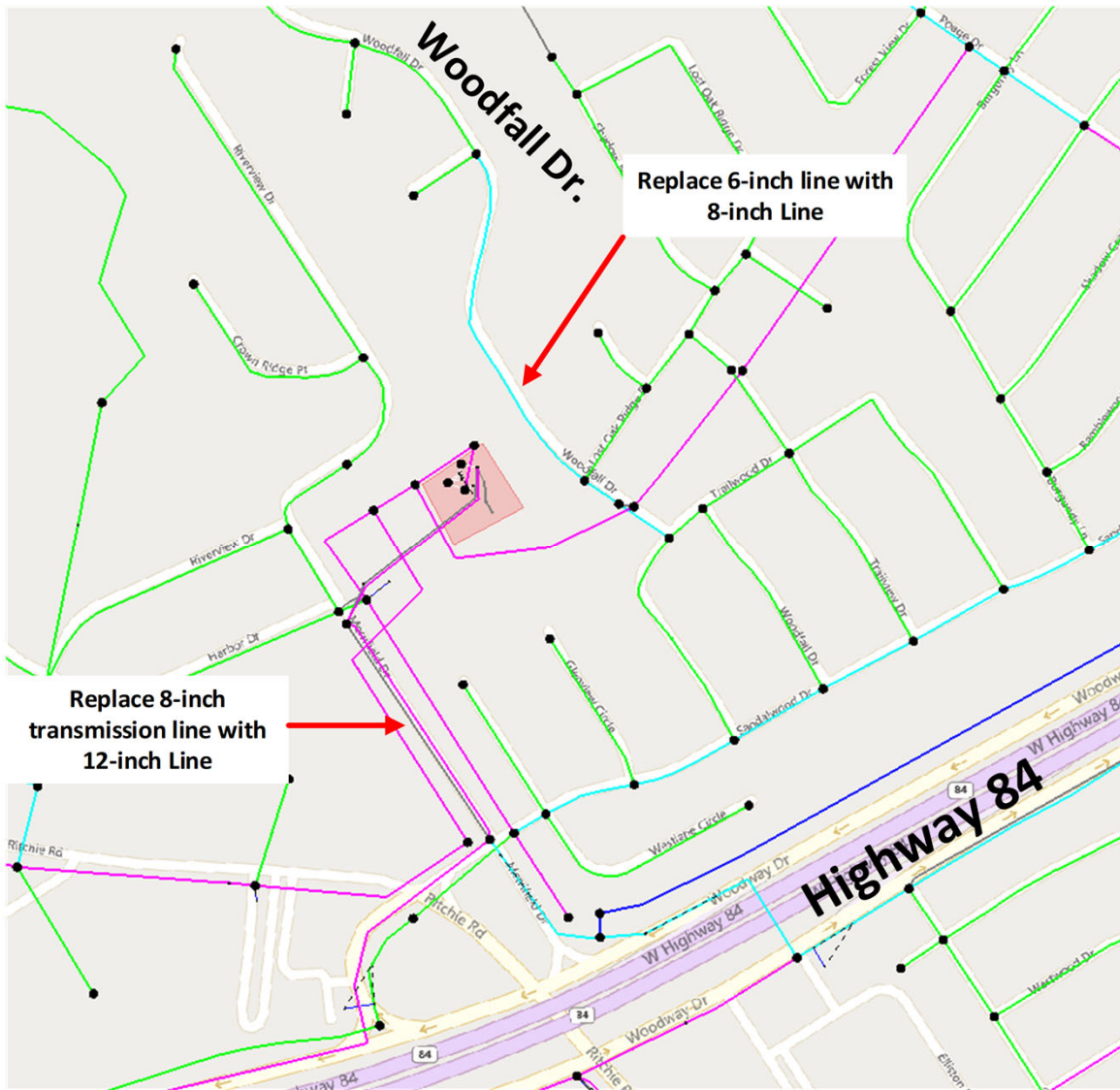
Highway 84 Pressure Plane Recommended Pipe Replacements











► Pipe Diameter (inch)

- ≤ 2.0
- ≤ 4.0
- ≤ 6.0
- ≤ 8.0
- ≤ 10.0
- ≤ 12.0
- ≤ 14.0
- Other

Tater Hill Pressure Plane Recommended Pipe Replacements



► Pipe Diameter (inch)

-  <= 2.0
 <= 4.0
 <= 6.0
 <= 8.0
 <= 10.0
 <= 12.0
 <= 14.0
 Other

2021 – 2025 Capital Improvement Projects

PP ID	PP Name	Project #	Project	Cost
1	Tater Hill	1-1	Increase Operating Pressure at Hydropneumatic Tank	City Staff
1	Tater Hill	1-2	Woodfall Dr. Fire Flow Improvements	\$685,580.00
3	Acorn	3-1	Increase Pumping Capacity	\$536,980.00
4	Hwy 84	4-1	Increase Operating Pressure at Hydropneumatic Tank	City Staff
5	Bosque	5-1	Evaluate Field Conditions in Bosque PP	City Staff
5	Bosque	5-2	Increase Hydropneumatic Capacity	\$429,880.00
6	Santa Fe	6-1	Rockford Road – Whitehall Road Fire Flow Improvements	\$967,560.00
6	Santa Fe	6-2	Santa Fe PS Pump Capacity Improvements	\$497,080.00
TOTAL 2021-2025 CIP PROJECTS				\$3,117,080.00

► 2021 Cost Estimate

2025 – 2030 Capital Improvement Projects

PP ID	PP Name	Project #	Project	Cost
4	Hwy 84	4-2	Increase Hydropneumatic Capacity in PP 4	\$429,880.00
TOTAL 2025-2030 CIP PROJECTS				\$429,880.00

► 2021 Cost Estimate

2030 – 2040 Capital Improvement Projects

PP ID	PP Name	Project #	Project	Cost
1	Tater Hill	1-3	12-Inch Water Line at Wickson Connection (Sandalwood Dr. to Tater Hill Tank)	\$519,970.00
2	Business Acres	2-1	6-Inch Water Line (Waco Connection)	\$509,470.00
3	Acorn	3-2	12-Inch Water Line from Bosque PP (Waco Connection)	\$2,706,740.00
4	Hwy 84	4-3	12-Inch Water Line along Ritchie Road (Hwy 84 to Old McGregor Rd)	\$927,020.00
4	Hwy 84	4-4	12-Inch Water Line along Old McGregor Road (Ritchie Road to Oak Ridge Drive)	\$569,400.00
4	Hwy 84	4-5	12-Inch Water Line along Oak Ridge Drive (Treeline Drive to Old McGregor Drive)	\$151,650.00
4	Hwy 84	4-6	12-Inch Water Line along Oak Ridge Drive (Ridge Point Drive to Old McGregor Road)	\$353,480.00
4	Hwy 84	4-7	New Pump at Hwy 84 Pump Station	\$355,750.00
4	Hwy 84	4-8	12-Inch Water Line (Waco Connection)	\$1,177,425.00
5	Bosque	5-3	New Pumping and Storage Facility and 12-Inch Water Line (Waco Connection)	\$6,669,825.00
TOTAL 2030-2040 CIP PROJECTS				\$13,940,730.00

► 2021 Cost Estimate