DRINKING WATER SYSTEM MASTER PLAN

SPANISH FORK PUBLIC WORKS

EST. 1855

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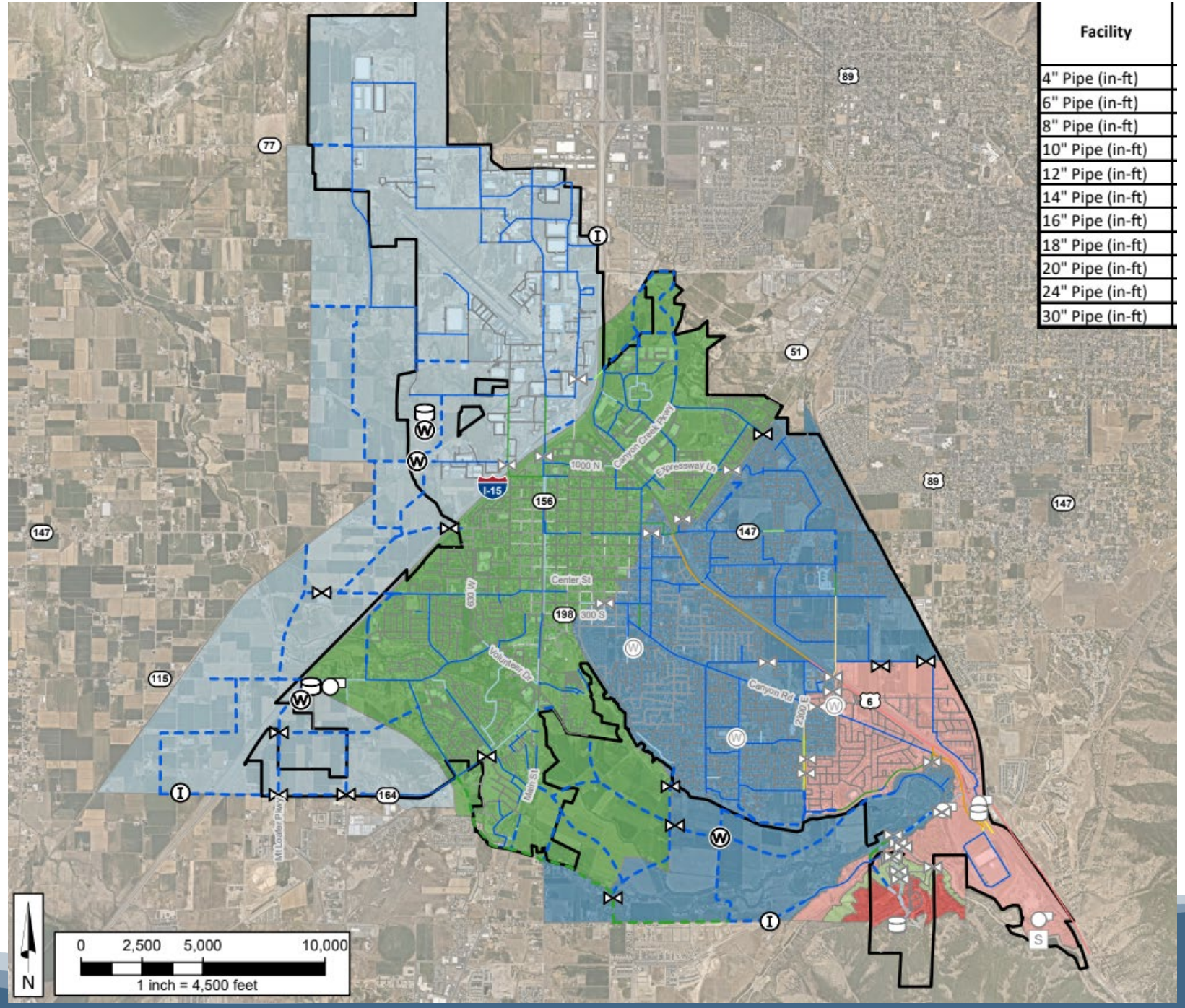

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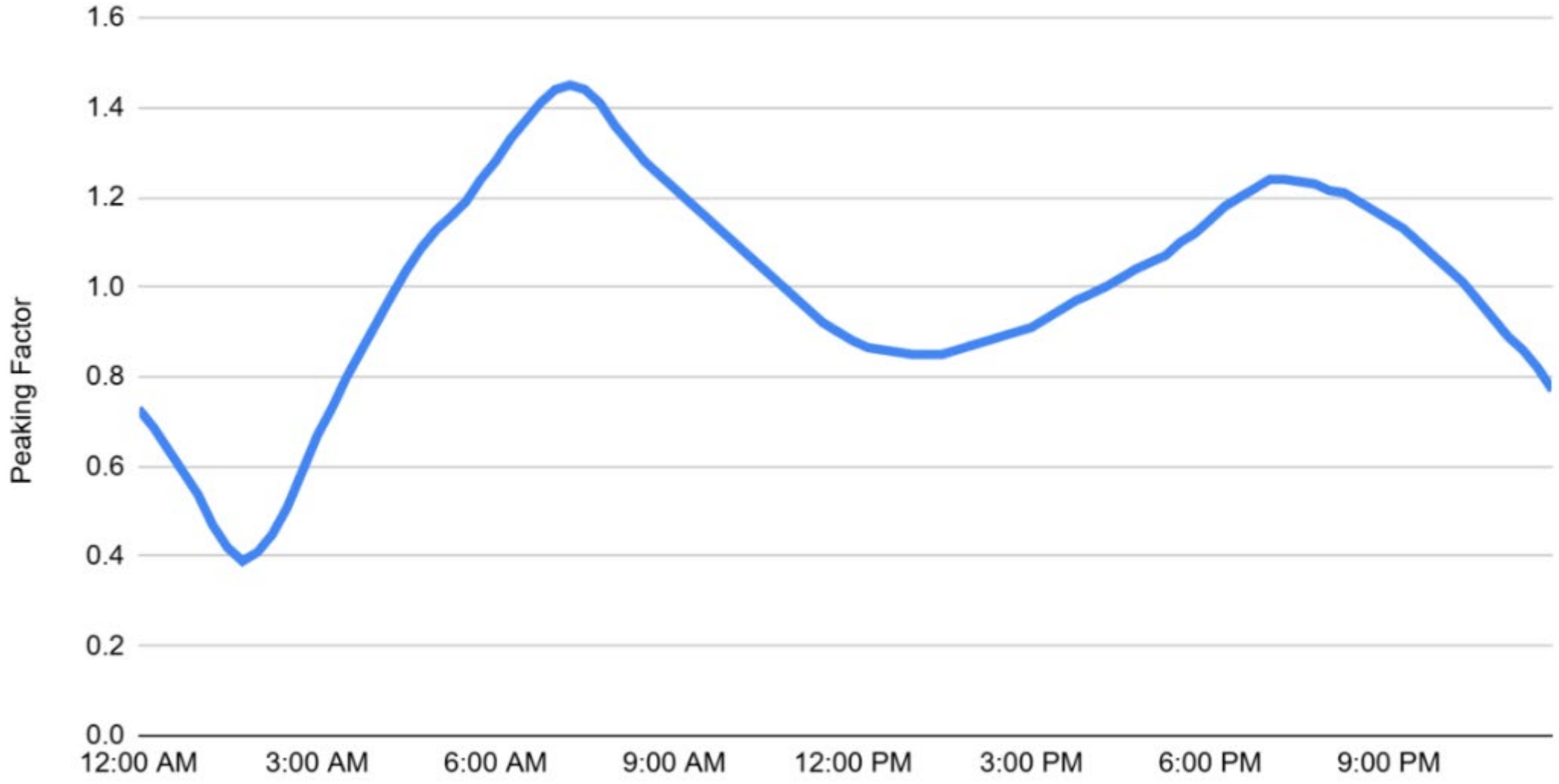

FIGURE 5-1: PEAK DAY DIURNAL CURVE FOR SPANISH FORK CITY

Table 3-3
Existing Drinking Water System Sources

Source	State Rating Flow	Dry Year (DY) Flow	Temp. Max DY Flow	Annual Capacity
WS001 - Cold Springs Upper	2,000 gpm	1,600 gpm	3,600 gpm	7,000 ac-ft
WS017 - Cold Springs Lower	1,033 gpm	1,033 gpm		
WS002 - Malcomb Spring	2,000 gpm	2,000 gpm	2,000 gpm	
WS012 - Crab Creek Upper	370 gpm	370 gpm	370 gpm	
WS013 - Crab Creek Lower	370 gpm	370 gpm	370 gpm	
WS014 - Canyon Road Well	1,250 gpm	1,250 gpm	1,250 gpm	2,016 ac-ft
WS015 - Canyon Elementary Well	1,700 gpm	1,700 gpm	1,700 gpm	2,742 ac-ft
Total	**8,723 gpm**	**8,323 gpm**	**9,290 gpm**	**11,758 ac-ft**
Total (N-1)	**6,723 gpm**	**6,323 gpm**	**7,290 gpm**	**9,016 ac-ft**
Current Established LOS Flow	5,511 gpm	5,511 gpm	5,511 gpm	5,511 ac-ft
Total Excess Source Capacity	**1,212 gpm**	**812 gpm**	**1,979 gpm**	**3,505 ac-ft**

Table 3-4
Existing Wells and Booster Pump Stations

Pump Station	Physical Capacity	Electric Pumping Cost (cost per gpm per month)
Malcomb Springs Pump Station	2,000 gpm	$1.51
Cold Springs Pump Station	3,600 gpm	$2.26
Malcomb Booster Pump Station	2,700 gpm	$2.26
Oaks Booster Pump Station	1,100 gpm	$2.26
1700 East Well	1,700 gpm	$3.26
2550 East Well	1,000 gpm	$3.96

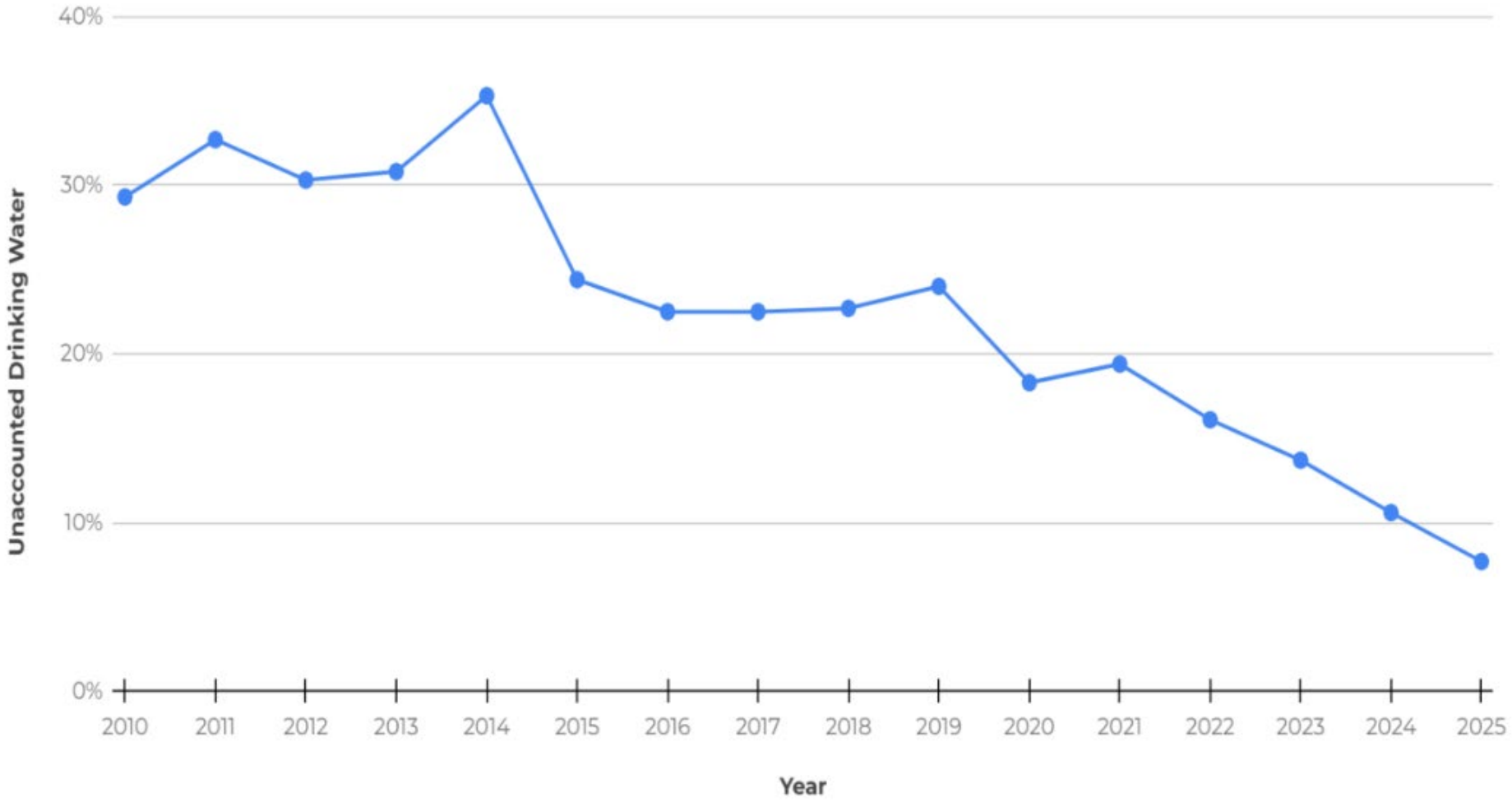

Figure 3-1: Unaccounted Drinking Water

Table 4-2
Existing Storage Requirements

Zone	Recommended Storage Requirements				Existing Storage (MG)	Remaining (MG)
	ERCs	Equalization (MG)	Fire Suppression (MG)	Total (MG)		
Industrial	2,262	0.81	2.9	9.51	13.25	3.74
Malcomb Springs	6,334	2.28				
Lower Crab Creek	6,928	2.49				
Upper Crab Creek	2,160	0.78				
Lower Oaks	575	0.21				
Upper Oaks	111	0.04				
Total	**18,370**	**6.61**	**2.9**	**9.51**	**13.25**	**3.74**

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Table 4-4
Buildout Storage Requirements

Zone	Recommended Storage Requirements				Existing Storage (MG)	Remaining (MG)
	ERCs	Equalization (MG)	Fire Suppression (MG)	Total (MG)		
Industrial	16,987	6.12	2.9	17.31	13.25	-4.06
Malcomb Springs	11,629	4.19				
Lower Crab Creek	8,114	2.92				
Upper Crab Creek	2,721	0.98				
Lower Oaks	566	0.22				
Upper Oaks	3	0.00				
Total	**40,019**	**14.41**	**2.9**	**17.31**	**13.25**	**-4.06**

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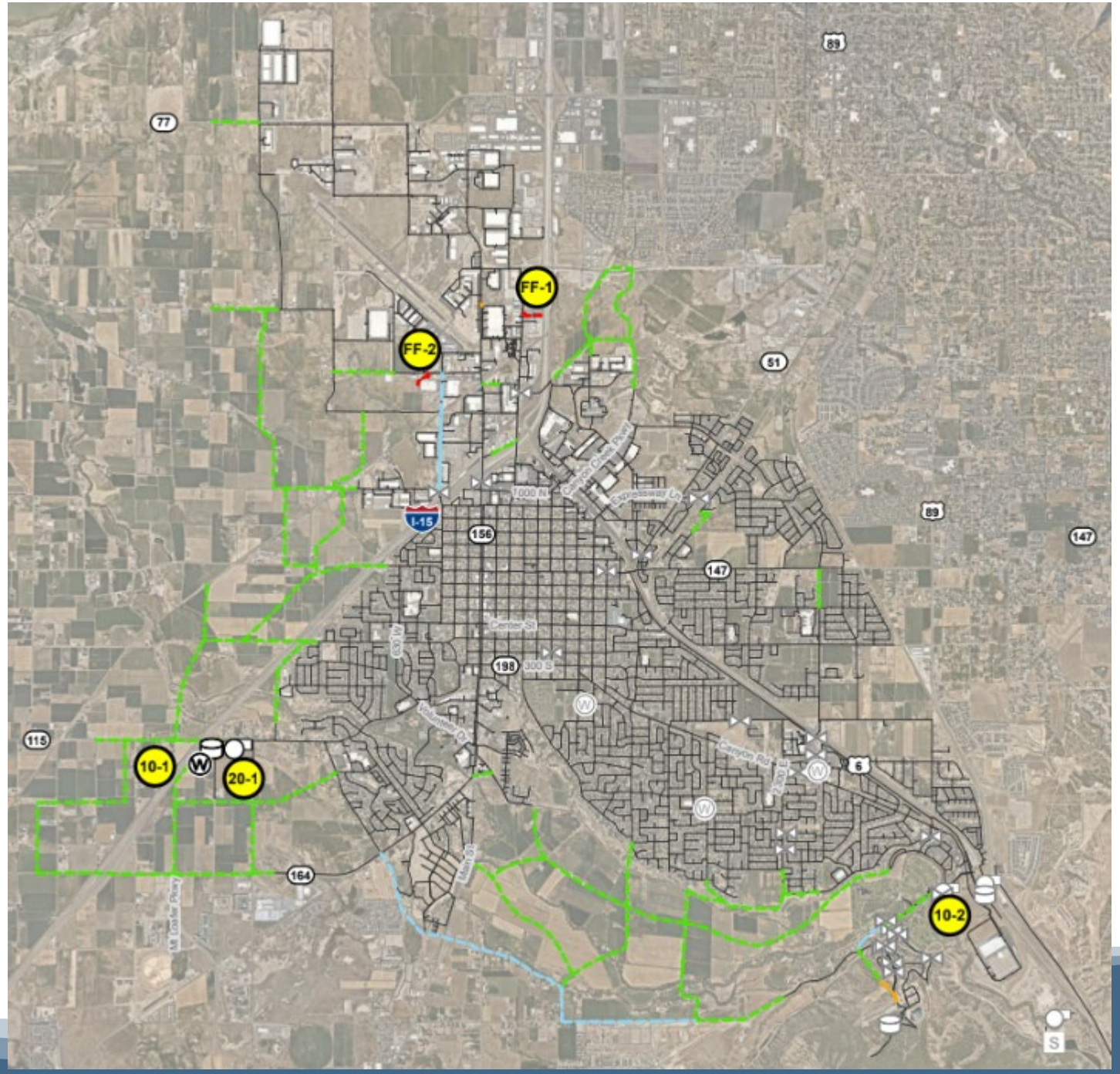

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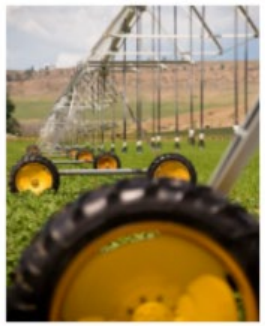
PRESSURIZED IRRIGATION SYSTEM MASTER PLAN



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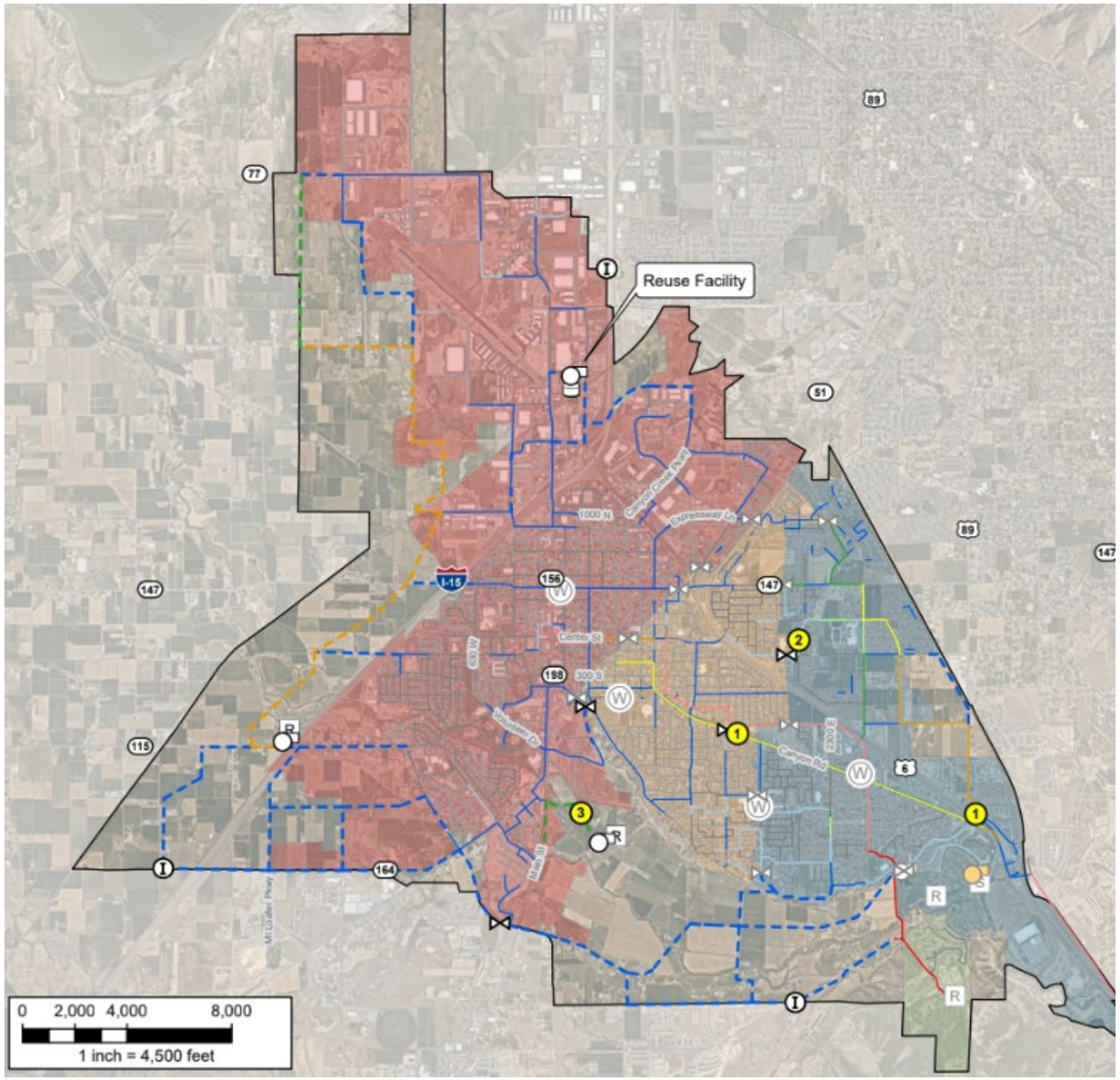

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MULTI-SPECTRAL STUDY

Table 2-1
Typical Irrigated Area by Lot Size

Lot Size	Average Landscaped Area
2,000 sq-ft or less	300 sq-ft
2,001 to 3,000 sq-ft	650 sq-ft
3,001 to 4,000 sq-ft	1,375 sq-ft
4,001 to 5,000 sq-ft	2,000 sq-ft
5,001 to 6,000 sq-ft	2,650 sq-ft
6,001 to 7,000 sq-ft	3,250 sq-ft
7,001 to 8,000 sq-ft	3,850 sq-ft
8,001 to 9,000 sq-ft	4,475 sq-ft
9,001 to 10,000 sq-ft	5,150 sq-ft
10,001 to 11,000 sq-ft	5,875 sq-ft
11,001 to 12,000 sq-ft	6,625 sq-ft
12,001 to 16,000 sq-ft	8,675 sq-ft
16,001 to 20,000 sq-ft	11,675 sq-ft
Greater than 20,000 sq-ft	16,875 sq-ft
Average Area per Lot	**0.12 acres**

ERC Irrigated Acreage Percentage

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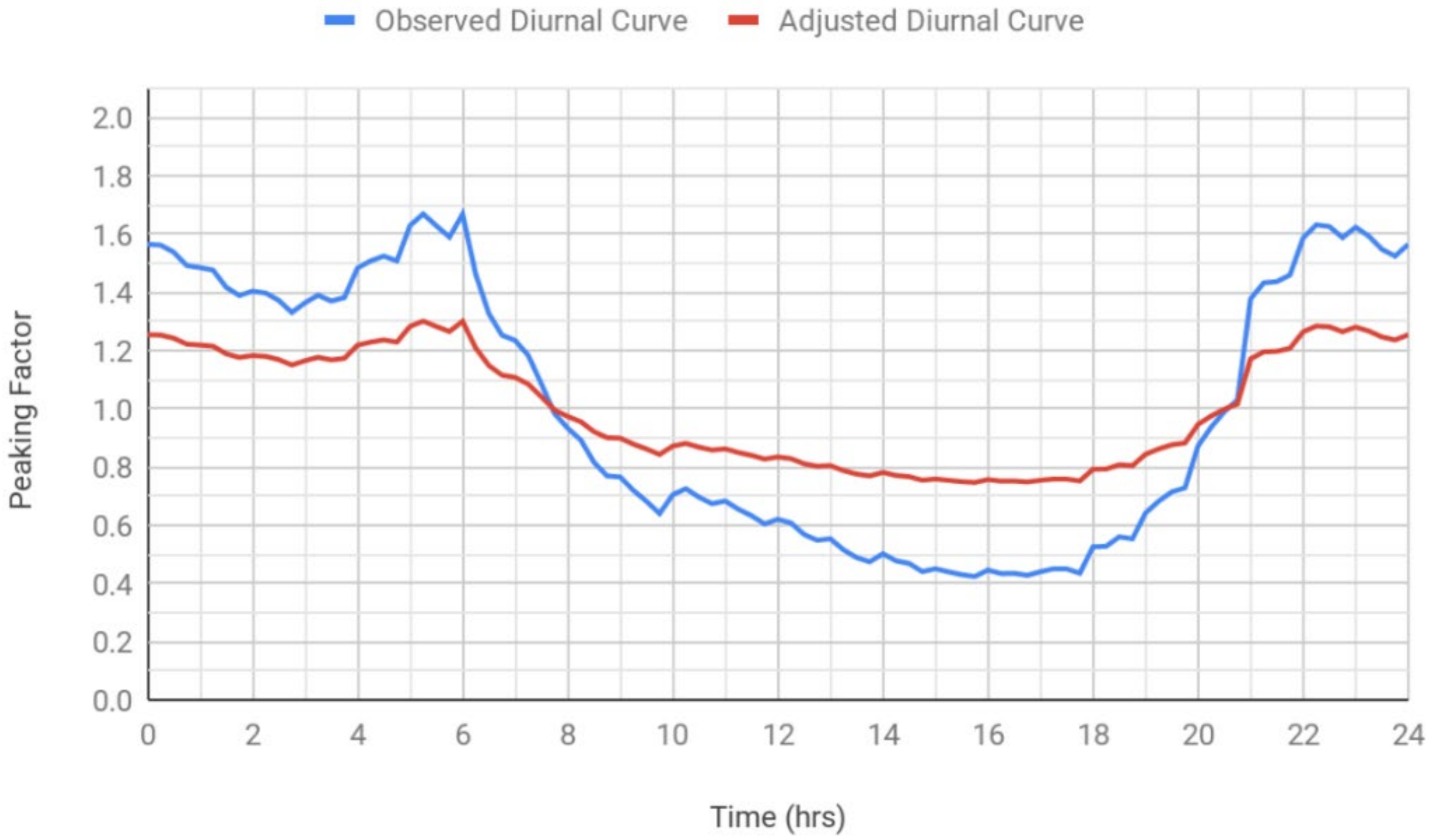
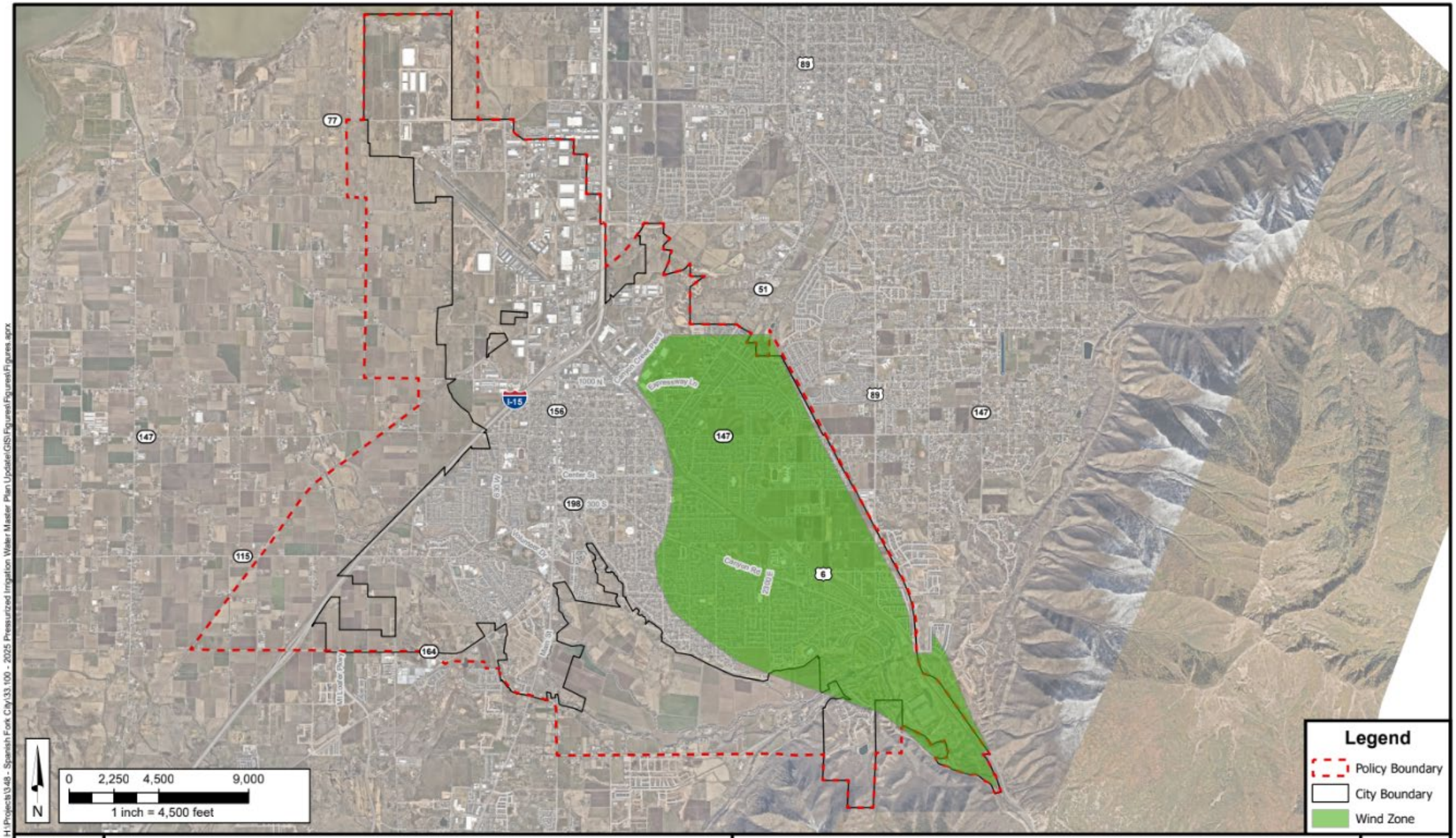

Observed Diurnal Curve
Adjusted Diurnal Curve
Peaking Factor
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
0.0
0
2
4
6
8
10
12
14
16
18
20
22
24
Time (hrs)



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SPANISH FORK CITY PRESSURIZED IRRIGATION MASTER PLAN

FIGURE 3-2 WIND ZONES

SPANISH FORK PRIDE & PROGRESS

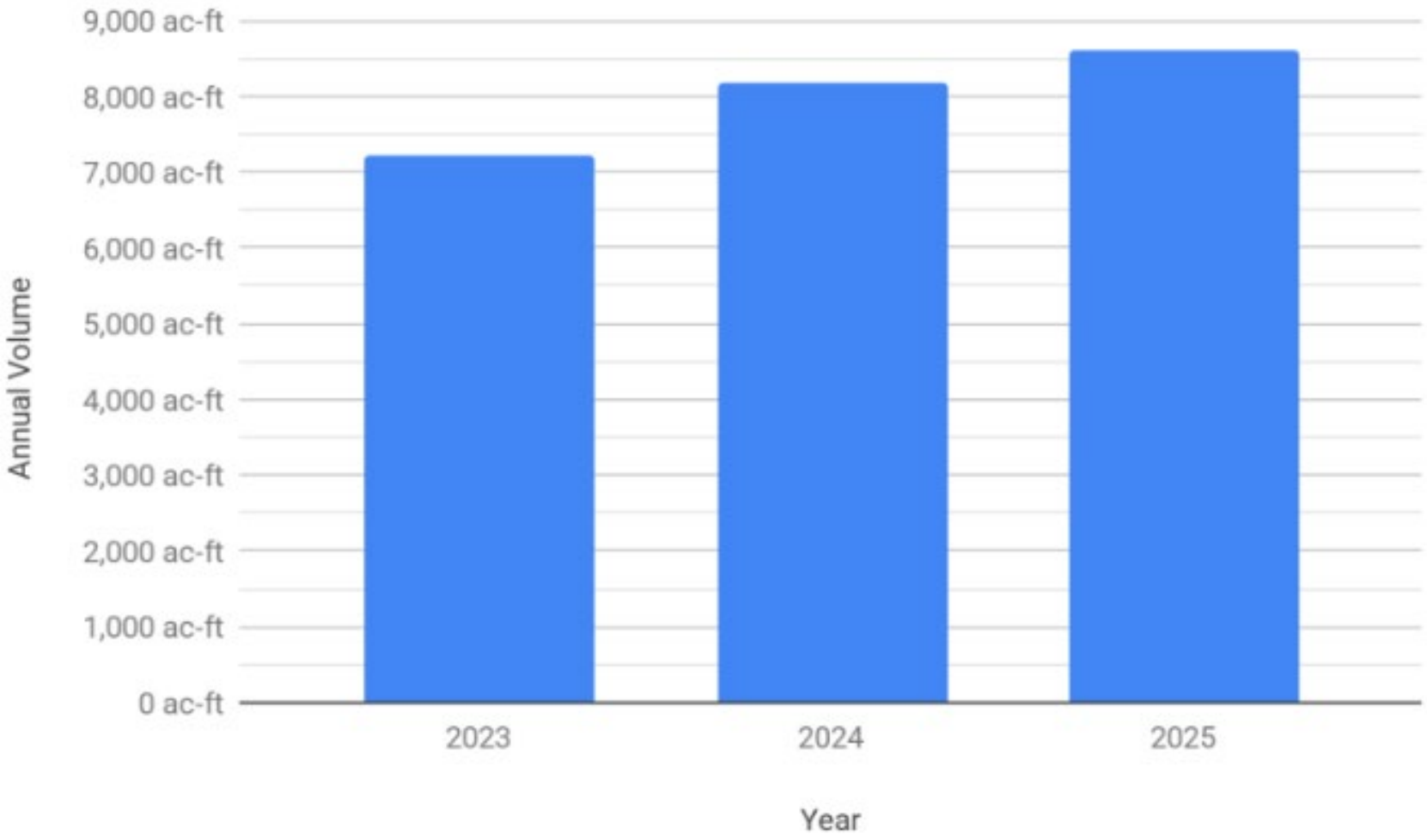


Figure 3-3: Annual Pressurized Irrigation Water Use

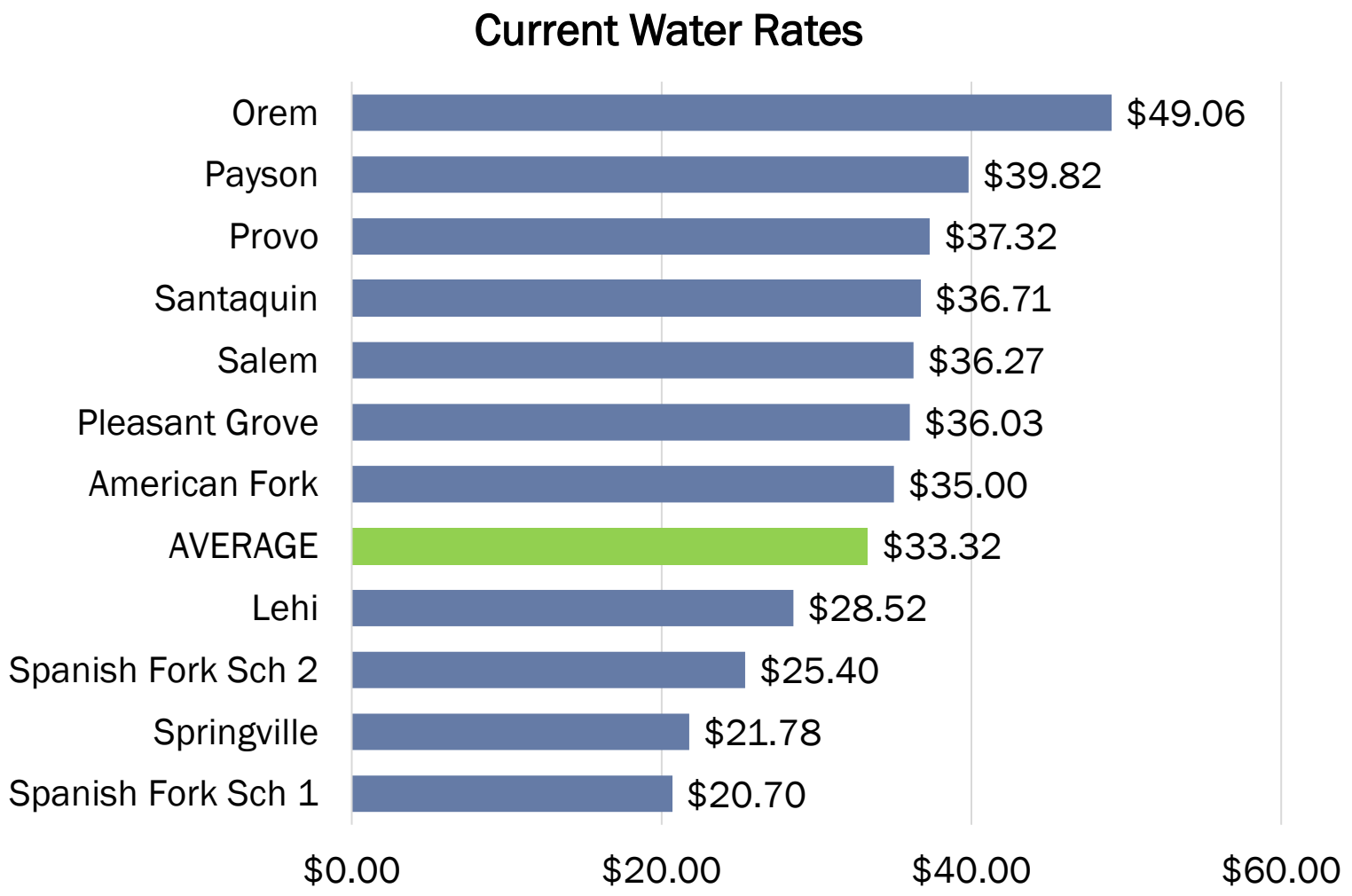
Table 3-5
Excess Source Available

Type	Period	Existing Source Capacity	Source Requirement	Excess Source Available
Peak Day	Existing	26,440 gpm	17,180 gpm	9,260 gpm
	Build-out	26,440 gpm	35,250 gpm	-8,810 gpm
Average Yearly	Existing	12,555 ac-ft	7,810 ac-ft	4,745 ac-ft
	Build-out	12,555 ac-ft	16,020 ac-ft	-3,467 ac-ft

1. It is anticipated that the Canyon Road Well and Canyon Elementary Well will be used in the drinking water system and are not included in the source calculations.

Table 4-2
Build-Out Storage Requirements

Zone	Equalization[1]	Emergency[2]	Operational	Total	Existing
Spanish Oaks Reservoir	11.91 MG	15.72 MG	3.26 MG	30.89 MG	25.09 MG
Golf Course Pond	0.00 MG	0.00 MG	3.26 MG	3.26 MG	7.82 MG
Total	**11.91 MG**	**15.72 MG**	**6.52 MG**	**34.15 MG**	**32.91 MG**



Spanish Fork Case Study

- Hired out valve exercising in 2006
- At that time had the highest water rates.
- 2010 Started In-House Exercising Program
- By 2020 had ½ the employees of a smaller city and twice the connections.
- By 2026 had the lowest water rates.
- Pipe replacement plan also contributed.

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PIPES CARRY MORE THAN JUST WATER

Rust from aging or corroding pipes

Biofilms

Minerals from different water sources

Source: WaterCareer (2015).

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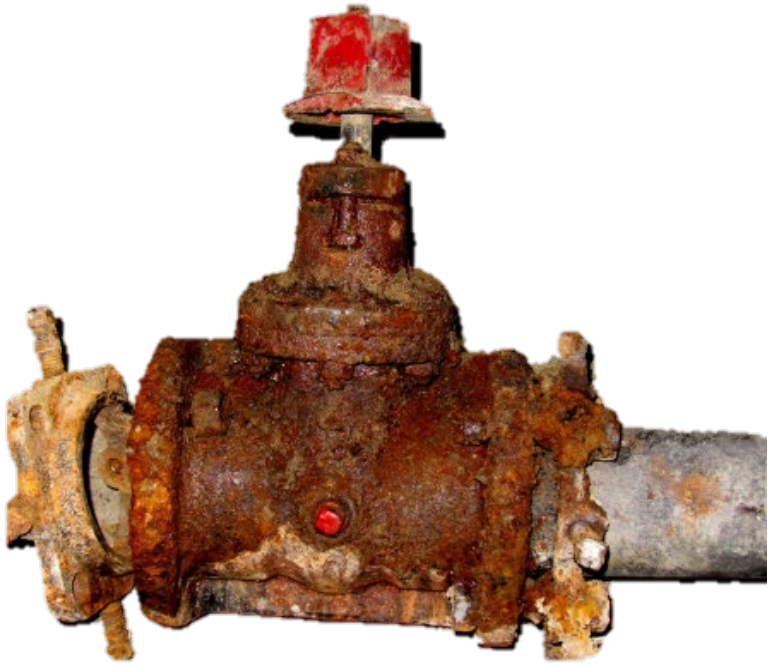
SEDIMENT BUILDUP CAN “FREEZE” OR BREAK VALVES



Sediment accumulation at valve seats and stems + infrequent operation
= **Inoperable valve**

Source: Balkan Plumbing.

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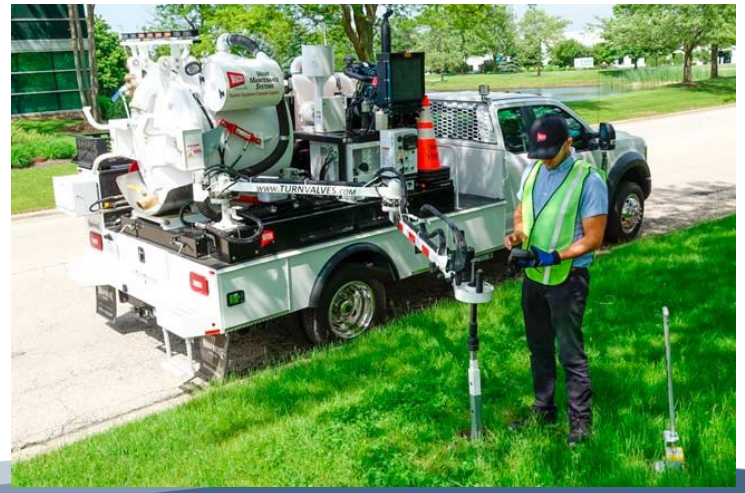
WHAT'S REQUIRED FOR A VALVE EXERCISING PROGRAM?

- 2 Employees
- Training
- Valve keys
- Valve exerciser tool
- Vehicle
- Metal detector
  (for buried valves)
- Method for record keeping



Source: Envirotech Equipment; EH Wachs

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COSTS

	Number of Valves	Average Expected Lifespan *with maintenance*	Average Expected Lifespan *without maintenance*	Average Replacement Cost per valve	Cost Savings per year
DW Valves	7,500	60 yrs (Manu. 35 – 45 yrs)	39 yrs (Manu. 35% Less)	$6,500 $48,750,000	$437,000
Hydrants	2,400	80 yrs (Manu. 40 – 60 yrs)	52 yrs (Manu. 35% Less)	$8,500 $20,400,000	$137,000
PI Valves	1,500 2,200	60 yrs (Manu. 35 – 45 yrs)	39 yrs (Manu. 35% Less)	$6,000 $13,200,000	$118,000

Note: Conservative estimate. Assumes all valves cost the same as an 8” to replace.

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