

The background of the slide is a grayscale photograph of industrial machinery. On the left, a circular pressure gauge is visible with a scale from 0 to 1.0, with markings at 0.2, 0.4, 0.6, and 0.8. The needle points to approximately 0.4. To the right of the gauge is a complex assembly of pipes, valves, and mechanical components, possibly part of a water filtration or irrigation system. The entire image is overlaid with a semi-transparent white rectangle containing the title and other text.

Conservation of Commercial Irrigation in the City of Woodbury

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Site Supervisor: Jim Westerman



UNIVERSITY OF MINNESOTA

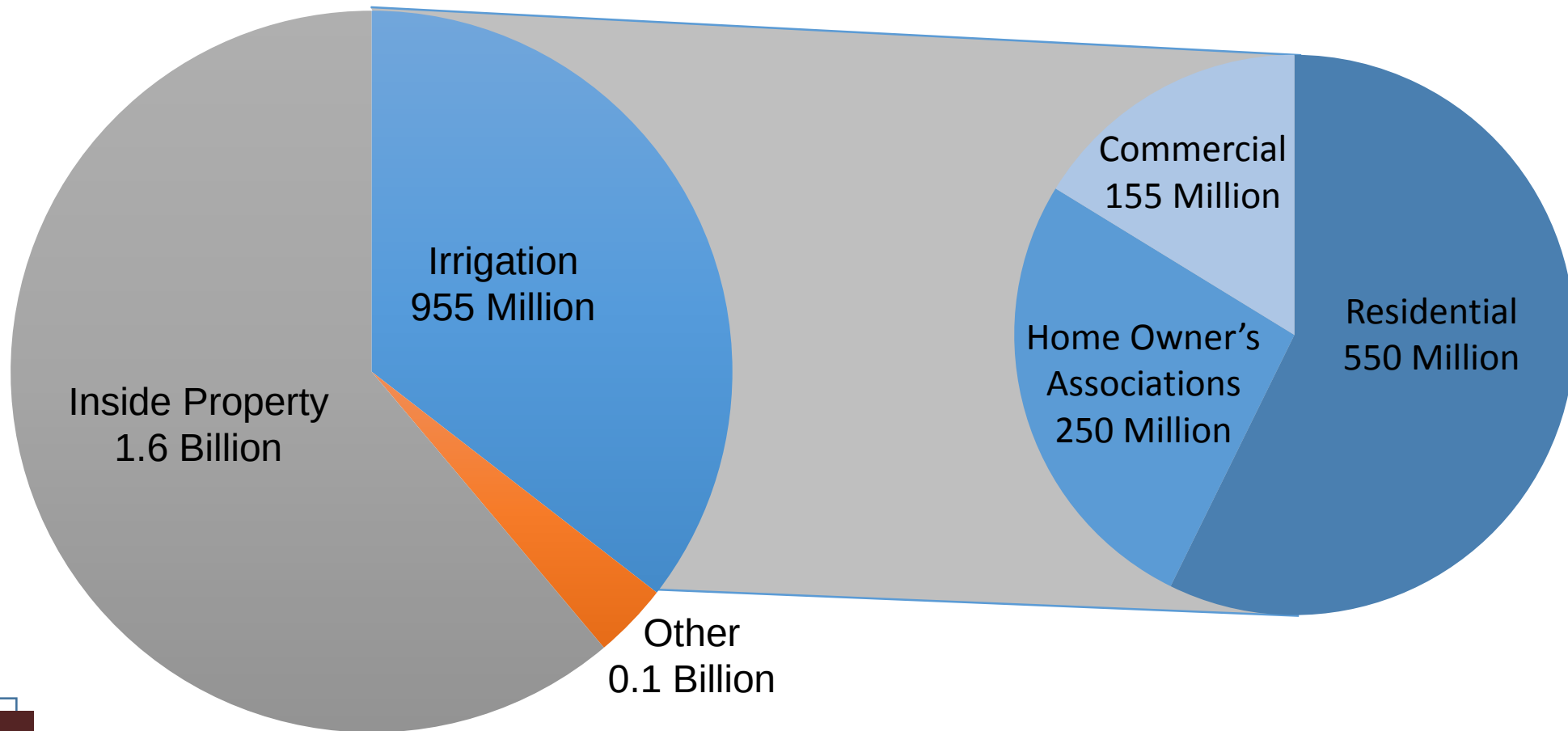
Driven to DiscoverSM

City Overview

- 1844: First settlers
- 1858: Organized township
- 1859: Name change
- 1967: Village incorporation
- Today
 - 66,807 Residents
 - 25,137 Housing Units
 - 420 Commercial Properties
 - 35.56 Square Miles
 - 2.7 Billion Gallons Annually

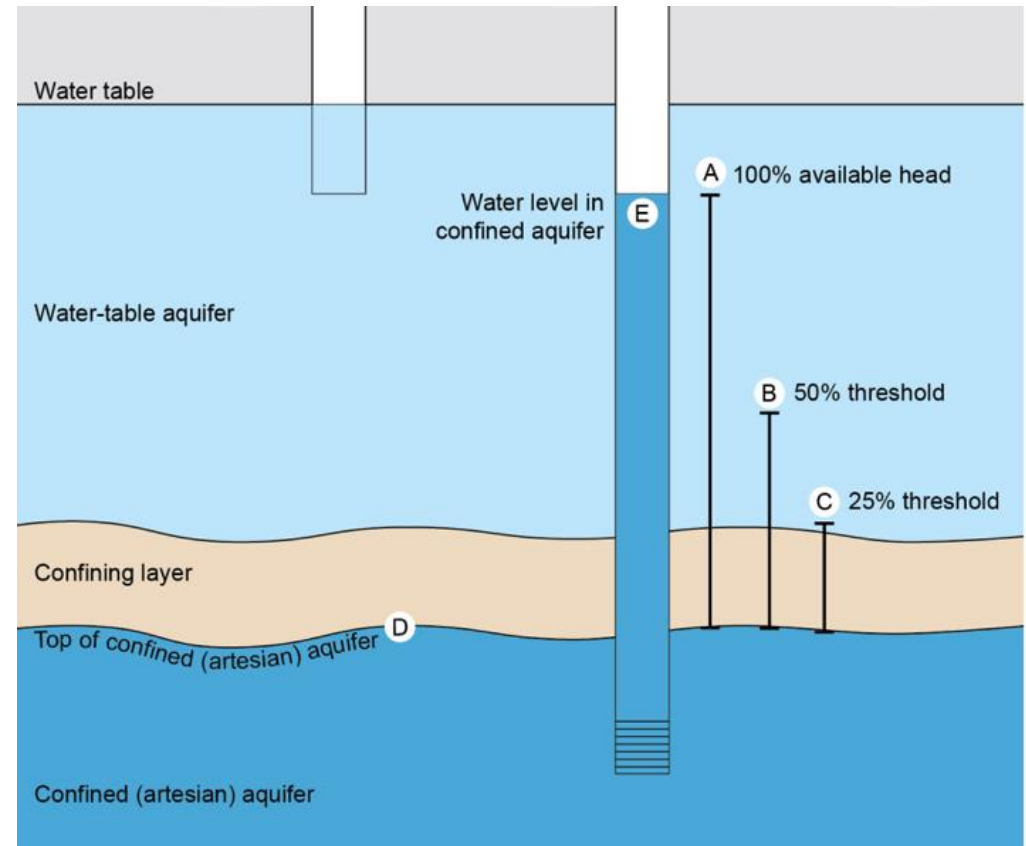


Woodbury's Water Use (Gallons)



Motivations to Change

- Aquifer sustainability
 - Aquifer test
 - Ground water management
- Groundwater
 - Precious resource
 - One alternative



North & East Metro Groundwater Management Area Plan

Reasons for MnTAP Assistance

- Focused on water conservation of commercial properties
- Outdated irrigation equipment
- Pilot irrigation technologies
- Generate conservation data
- Identify interested commercial properties

Approach

- Researched irrigation technologies
- Monitored two test sites
- Analyzed commercial utility reports
- Outreached to properties
- Presented recommendations

Determining Opportunities for Improvement

- Supervisor recommendations
- Inspection of irrigation systems
- Collaboration with irrigation experts
- Financial benefits



Irrigation Schedule

- Opportunity: Irrigation controllers
 - Arbitrary schedule
 - Watering because it's Tuesday
 - Often unmanaged
 - Every zone every cycle
 - What's rain?

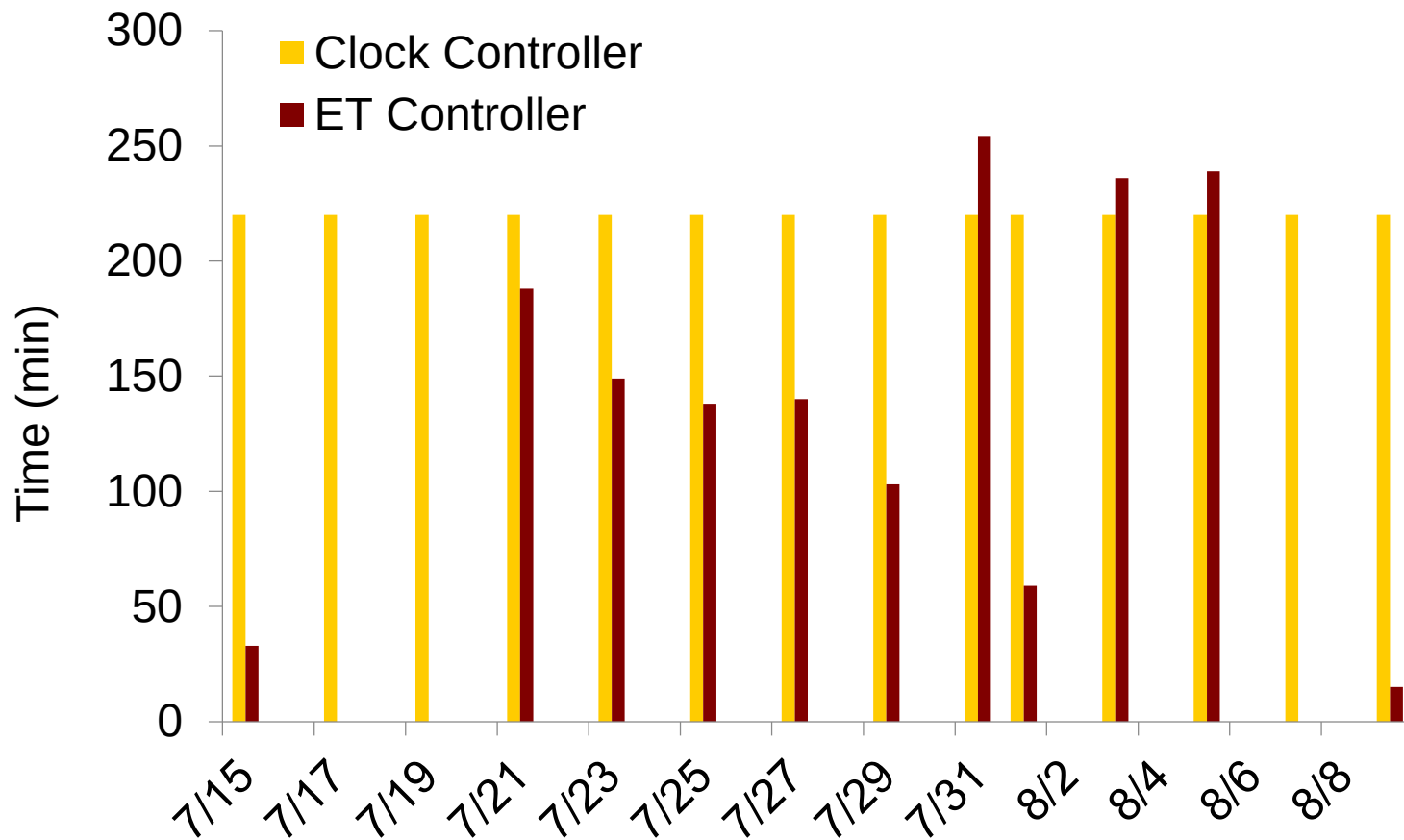


Irrigation Schedule

- Solution
 - Evapotranspiration (ET) controller upgrade
- Benefits
 - Based on ET
 - Weather data
 - Landscape data
 - Plant data
 - Compute soil moisture
 - Zones that need it



Controller Test Site



- Clock-schedule
- ET watering basis
 - Data gaps
- Savings
 - Percent
 - Gallons
 - Time
 - Payback

Water Pressure

- Opportunity: Master valve/sprinkler heads
 - City water pressure
 - Optimal water pressure
 - Difference in pressure
 - Mist
 - Distribution
 - Harmful to plants



http://www.allianceforwaterefficiency.org/Irrigation_System_Maintenance_Introduction.aspx

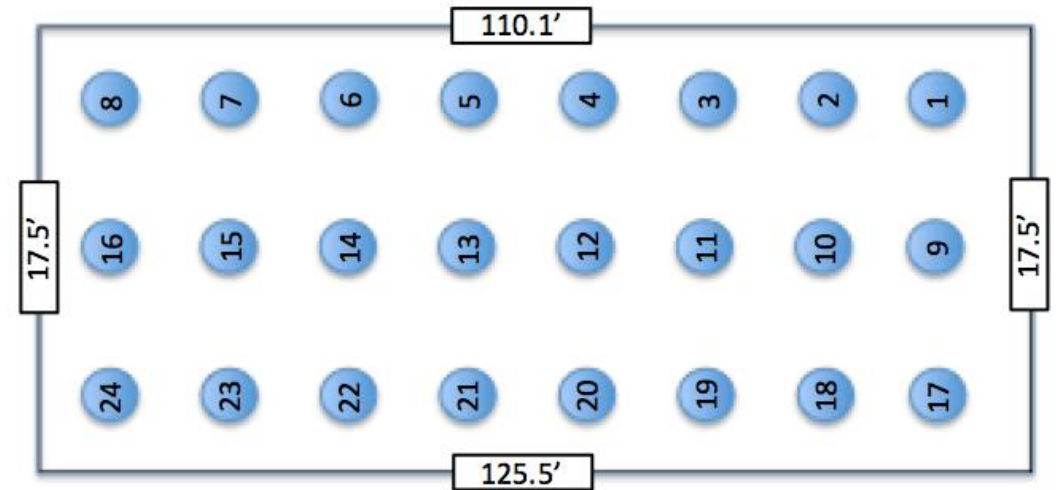
Pressure Regulator Test Site

- Irrigation audit
 - Distribution of catch-cans
 - Run system
- System efficiency

$$EF = \left(\frac{\bar{V}_{LQ}}{\bar{V}_{Tot}} \right) * 100$$

$\bar{V}_{LQ}$ = Average volume of the lower quartile

$\bar{V}_{Tot}$ = Average total volume



- Irrigation experts provided consultation for process

Water Pressure

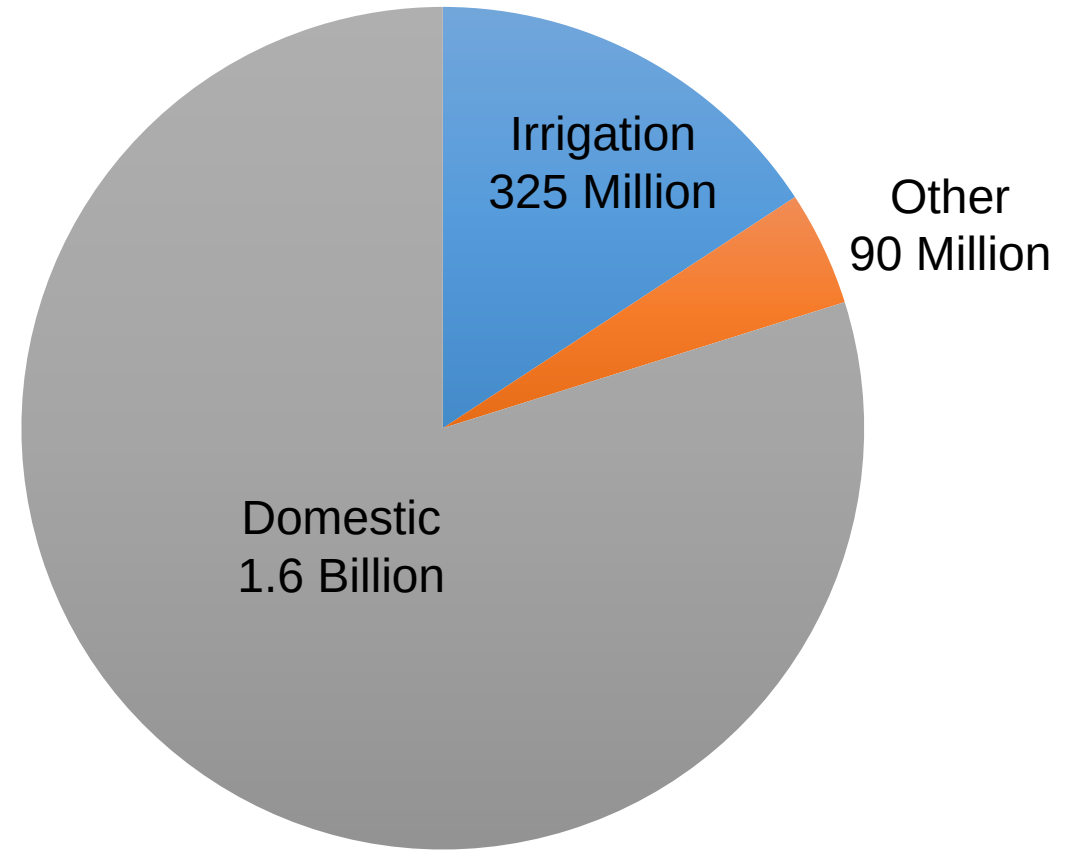
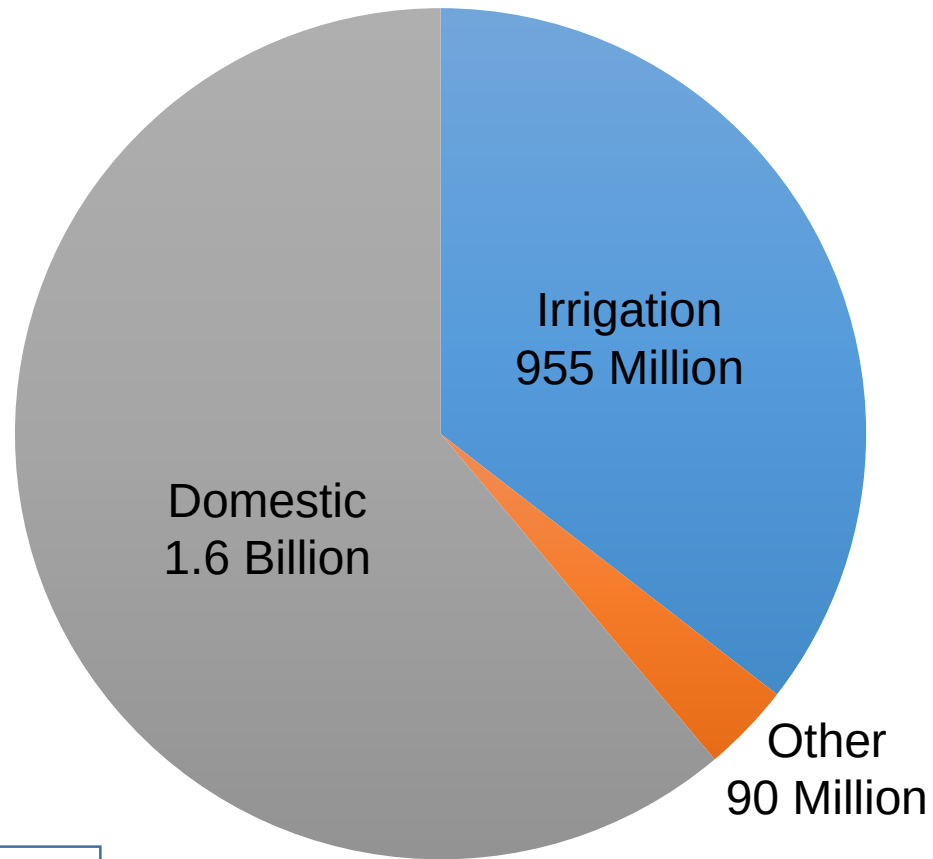
- Solution
 - Master valve regulation
 - 30 psi regulator
 - Solenoid restriction
- Savings
 - Pressure dependent
 - Test site: ~ 35%
 - 1 million gallons example



Outreach

Property	Upgrade	Pay Back Period (Months)	Annual Savings (gallons)	Annual Savings	Status
1	ET	14	360,000	\$1,024	Recommended
	PR	1	265,000		
2	ET	4	679,000	\$1,930	Recommended
	PR	1	499,000		
3	ET	6	529,000	\$1,504	Recommended
	PR	1	389,000		
4	ET	2	1,076,000	\$3,058	Recommended
	PR	1	791,000		
5	ET	2	1,056,000	\$3,001	Recommended
	PR	1	776,000		
6	ET	3	427,000	\$1,214	Recommended
	PR	1	314,000		
	Totals	37	7,160,000	\$11,731	

City-Wide Projections (Gallons)



Additional/Future Ideas

- Standardize irrigation use
 - Mapping irrigable property
 - Compare and contrast
- Outreach to residents
 - Personal investment
 - Outreach simplicity
 - Management levels



Personal Benefits

- Communication skills
- Coordinating
- Developed relationships
- Education
- Governmental processes
- Independence



Thank you

- MnTAP
 - Mick Jost
 - Miriam Yee
 - Linda Maleitzke
- MnTAP Organization
- City of Woodbury
 - Jim Westerman
- Engineering Department

Questions?