

# Large -Scale Pressurized Irrigation Systems

CASE STUDY: **NAMPA**  
IDAHO



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2016

PNWS AWWA

PRESENTED BY: **James Bledsoe, PE**  
Keller Associates, Inc. | 208.288.1992

# Background

## Nampa's Existing Pressure Irrigation System

Population Served 85,400

### Source Water

Groundwater Pump Stations 53

Surface Water Pump Stations 39

Irrigation Districts 3

Irrigated Acres 4,230

### Irrigation Demands

Max Month 43,900 gpm

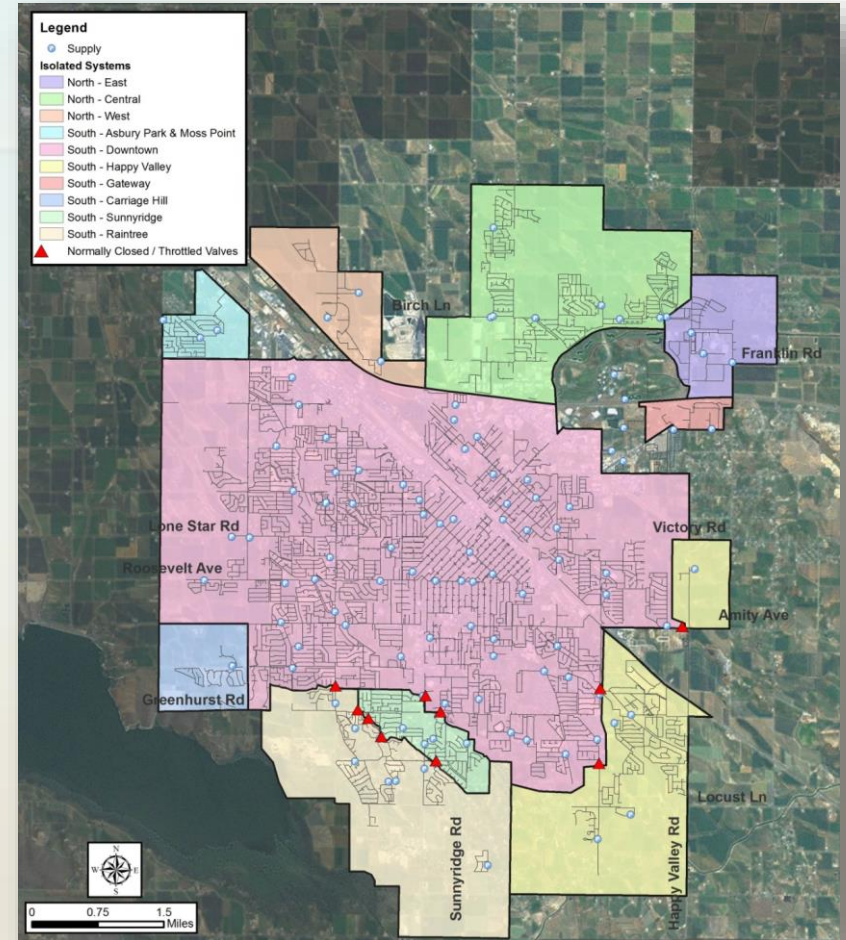
Max Day 51,900 gpm

Peak Hour 69,500 gpm

Potable Max Day Demand 8,240 gpm

Pipelines 429 miles

Pressure Zones 10

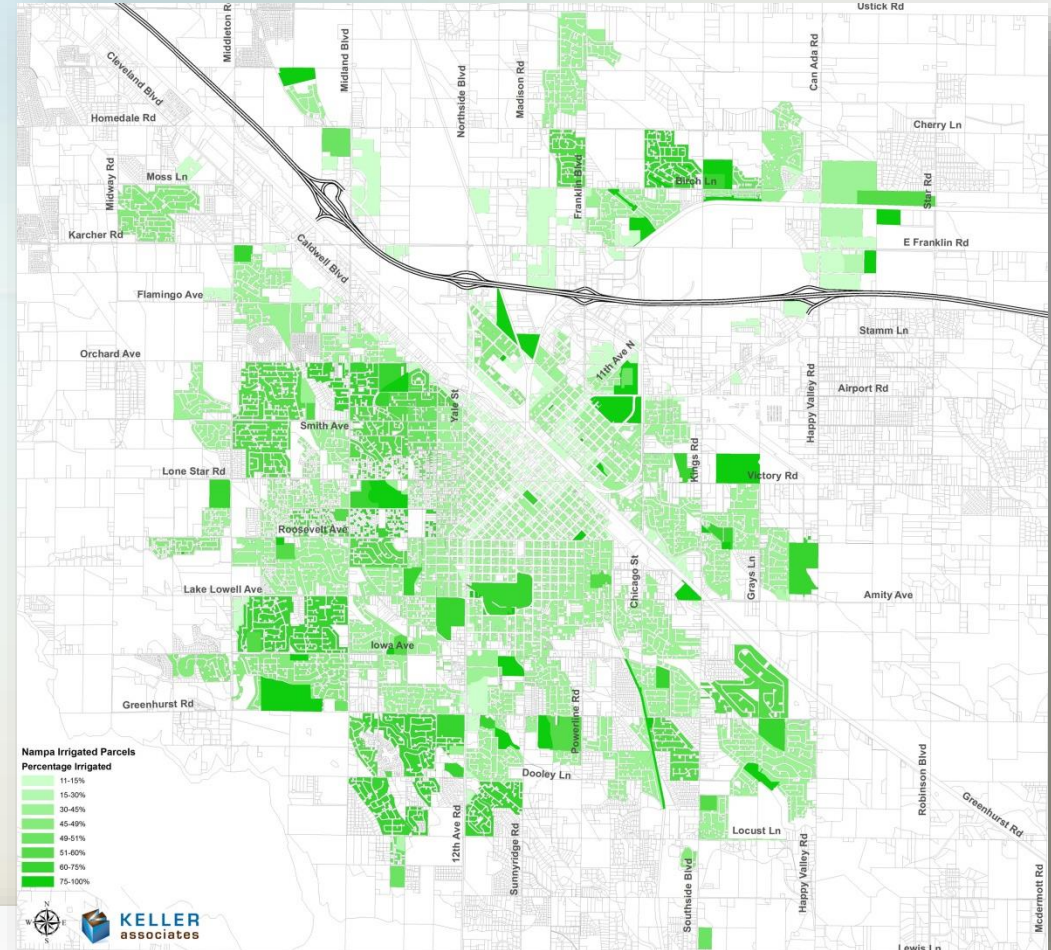




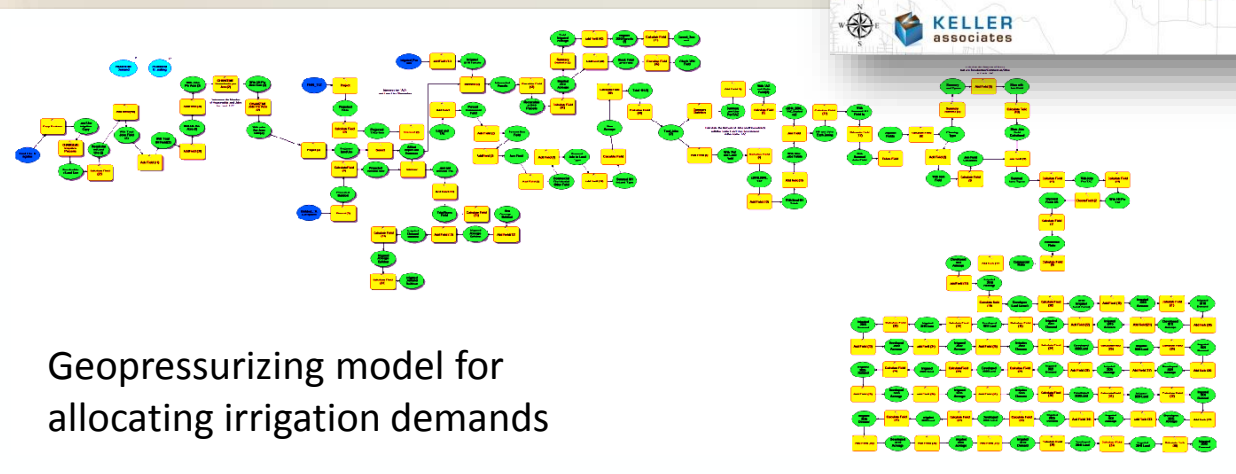


# Estimating and Allocating Demands

- Demand Data
  - Pump records
  - Continuous monitoring of largest 19 facilities
  - Working toward SCADA integration
- Allocation of Demands



Accounts for land use, lot size



Geopressurizing model for allocating irrigation demands



# Establishing Performance Standards

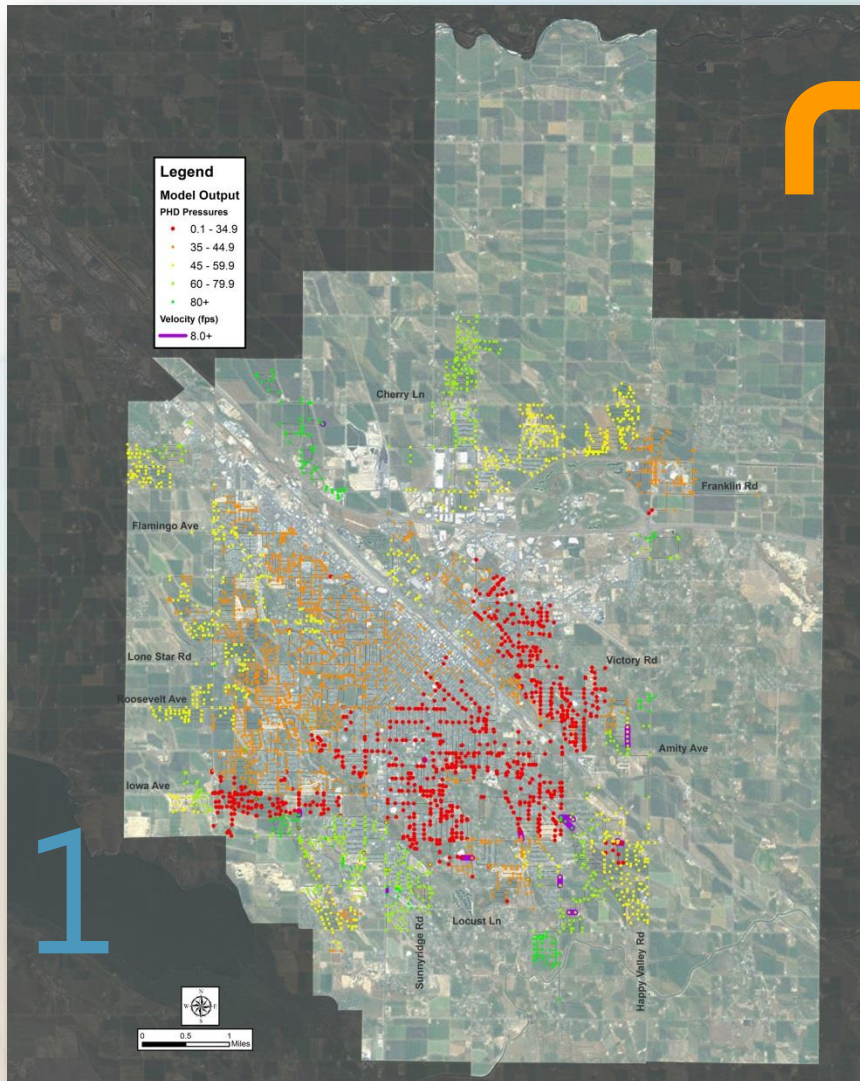
Planning Criteria	Recommended Keller Assoc. (2014)
<b>Pressures</b>	
Min pressure at max hour demand, psi	30
Peak demand per gross acre <sup>a</sup>	7.56 gpm - Residential
<b>Pipelines</b>	
Peak hour maximum velocity, fps	8
<b>Backup Source</b>	
Minimum pressure with largest pump out of service, psi (max week demand)	25 each Zone
Number of connections without secondary source	500
<b>Storage</b>	
Drought conditions -- provide irrigation water?	Yes 35 psi at seasonal average demand



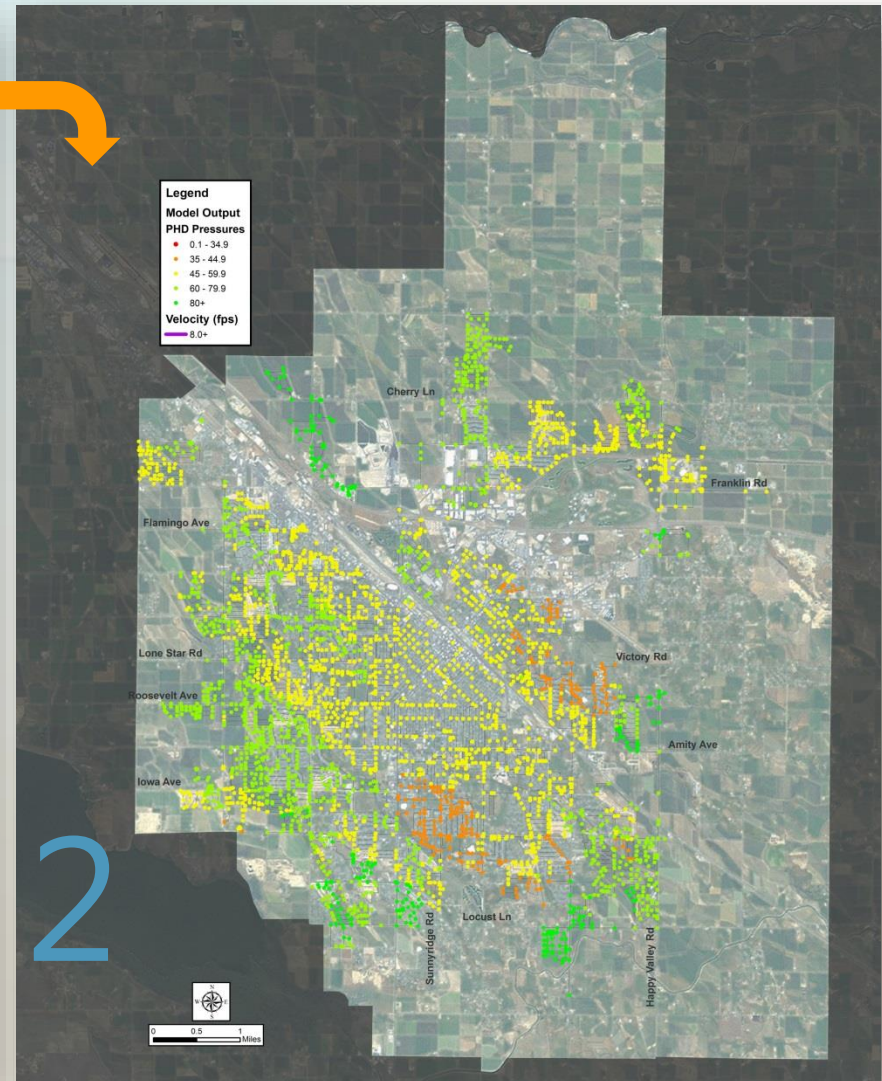
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# Hydraulic Analysis



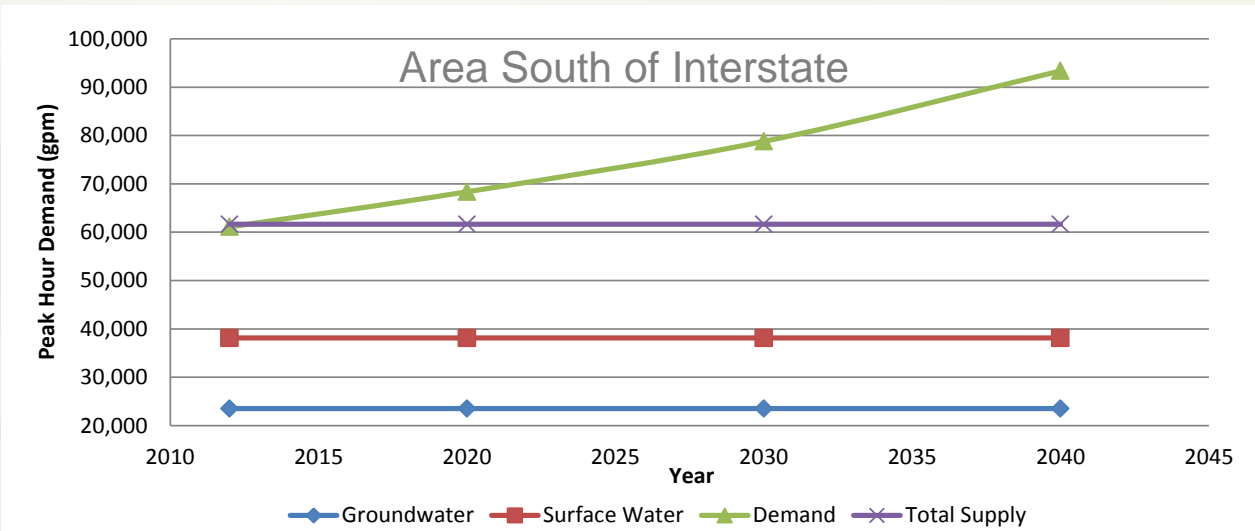
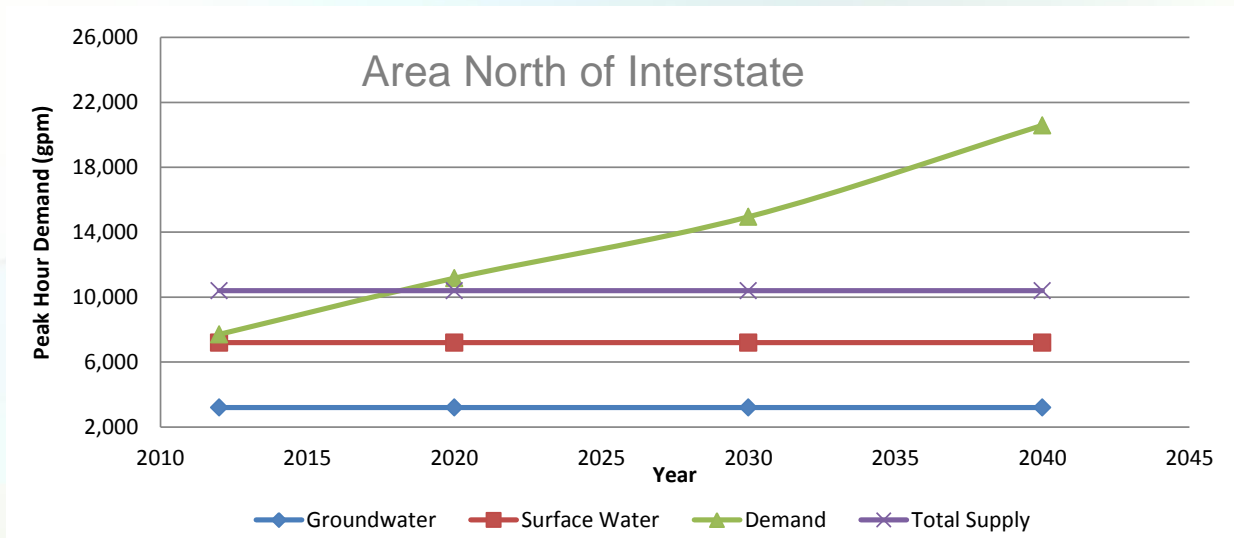
1 Model results for peak hour pressures in the pressure irrigation system



2 Model results for peak hour pressures after the highest priority improvements

# System Evaluation

## Future Conditions – Supply and Demand

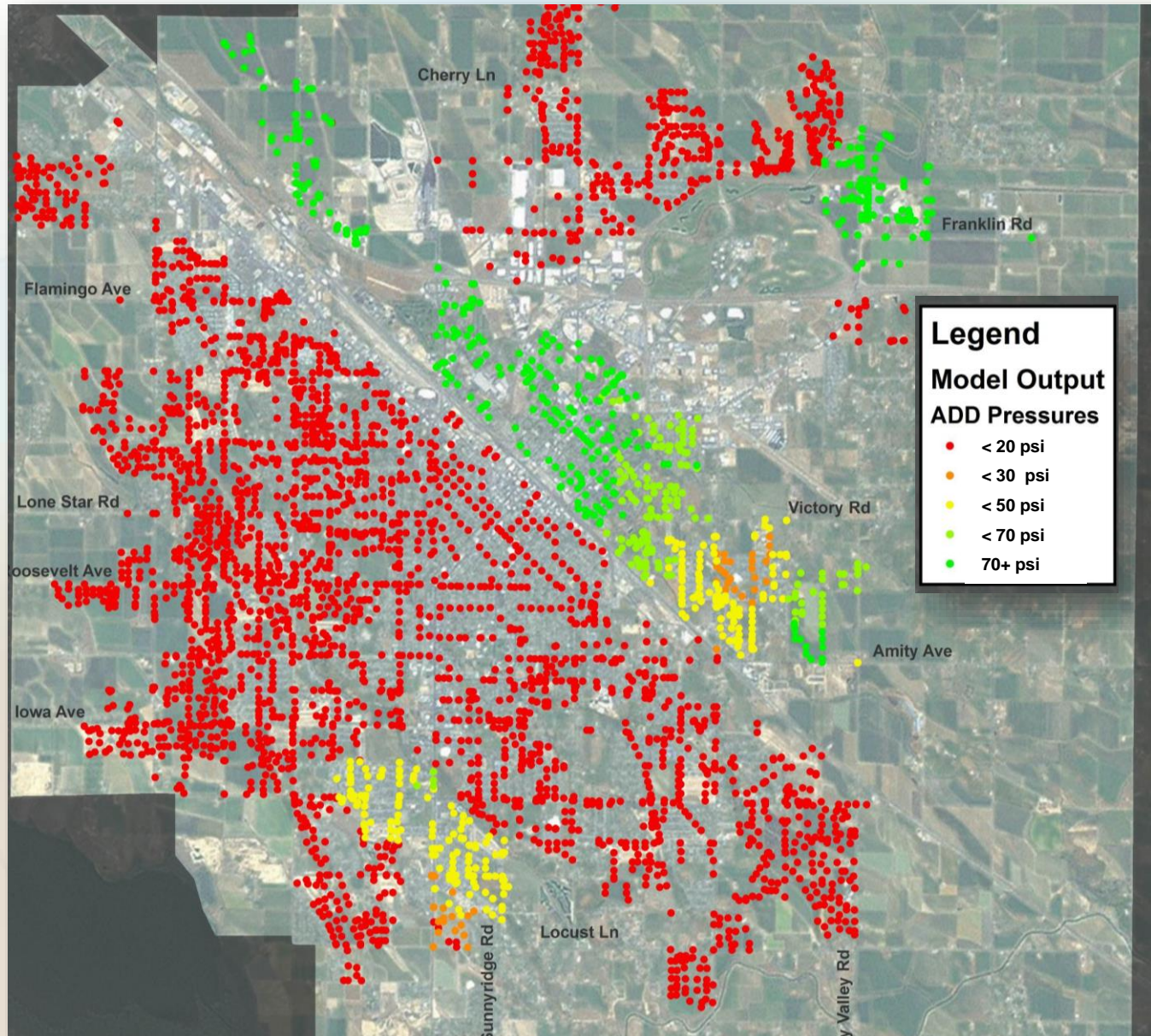


- Existing shortfall in areas south of interstate
- Additional 756 gpm supply needed for every 100 acres of new residential development



# System Evaluation

## Existing Conditions – Drought Pressures



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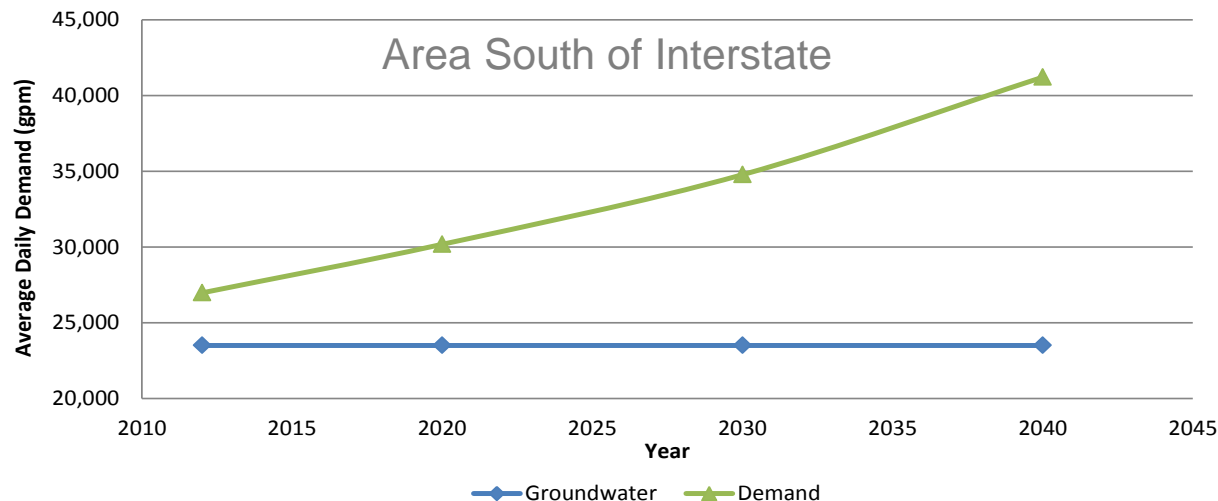
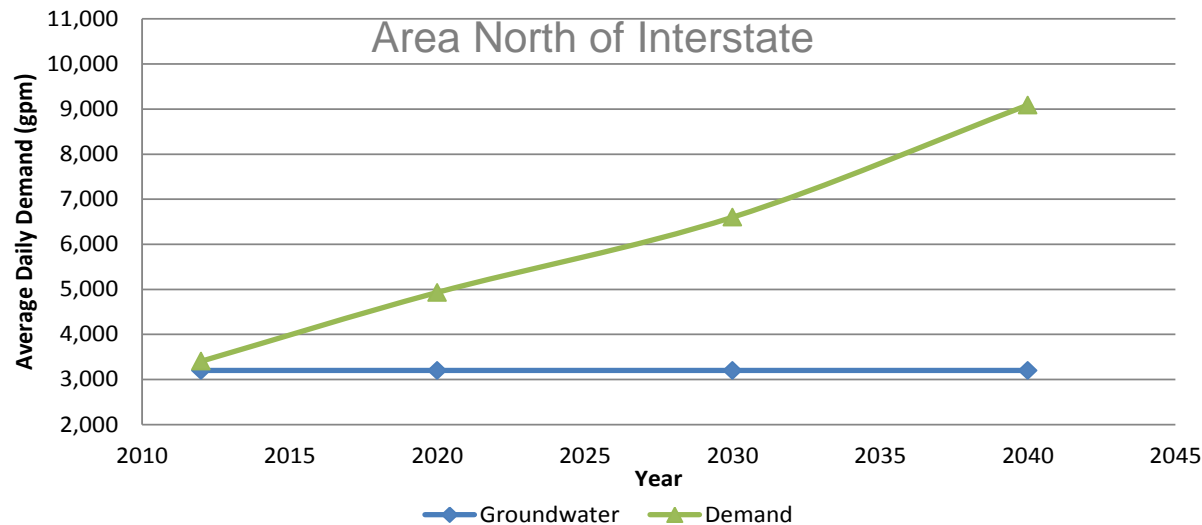
### Major Issues

- Groundwater sources cannot contribute to entire system
- Improved transmission and strategic placement of new groundwater sources is needed



# System Evaluation

## Future Conditions – Drought (No Surface Water)



- Without new groundwater supplies, deficit would overwhelm potable system
- Decrease drought vulnerability by maintaining a blend of surface and ground water supplies

# Potential Reuse Water

- Nampa considering direct infiltration south of city
- Available reuse water 11.7 MGD (8,100 gpm)
- Potential to offset four 2,000 gpm pump station
- Provide drought-proof supply source
- Implementation would require:
  - Potential additional treatment steps
  - Permitting
  - Public education
  - Potential additional transmission piping
  - Needs to be investigated further
  - Further evaluation recommended

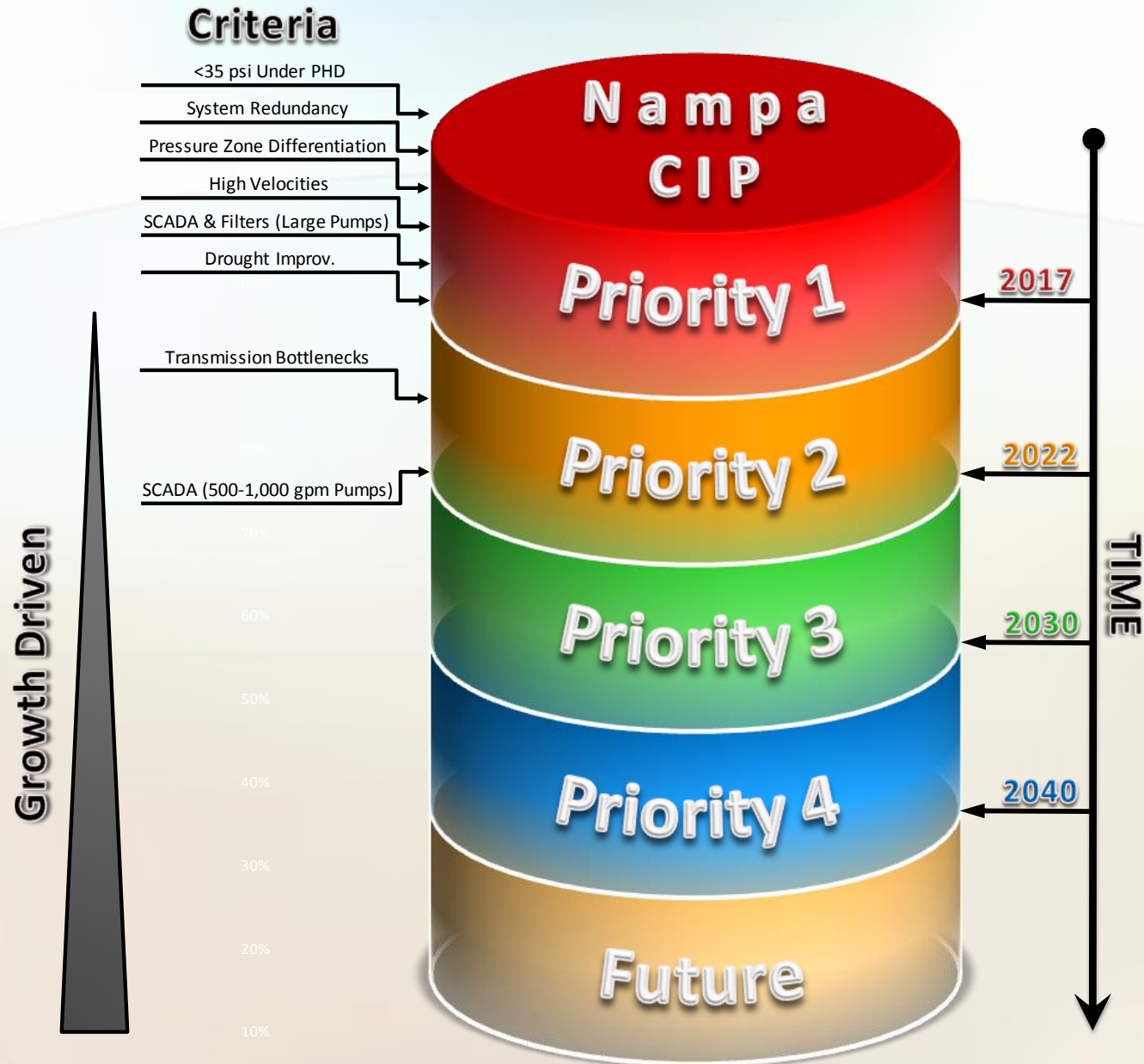


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# Identify – Prioritize Solutions

## Prioritization Criteria





# Identify – Prioritize Solutions

## Capital Improvement Plan - South



**Legend**

**Supply Improvements (1,500 gpm)**

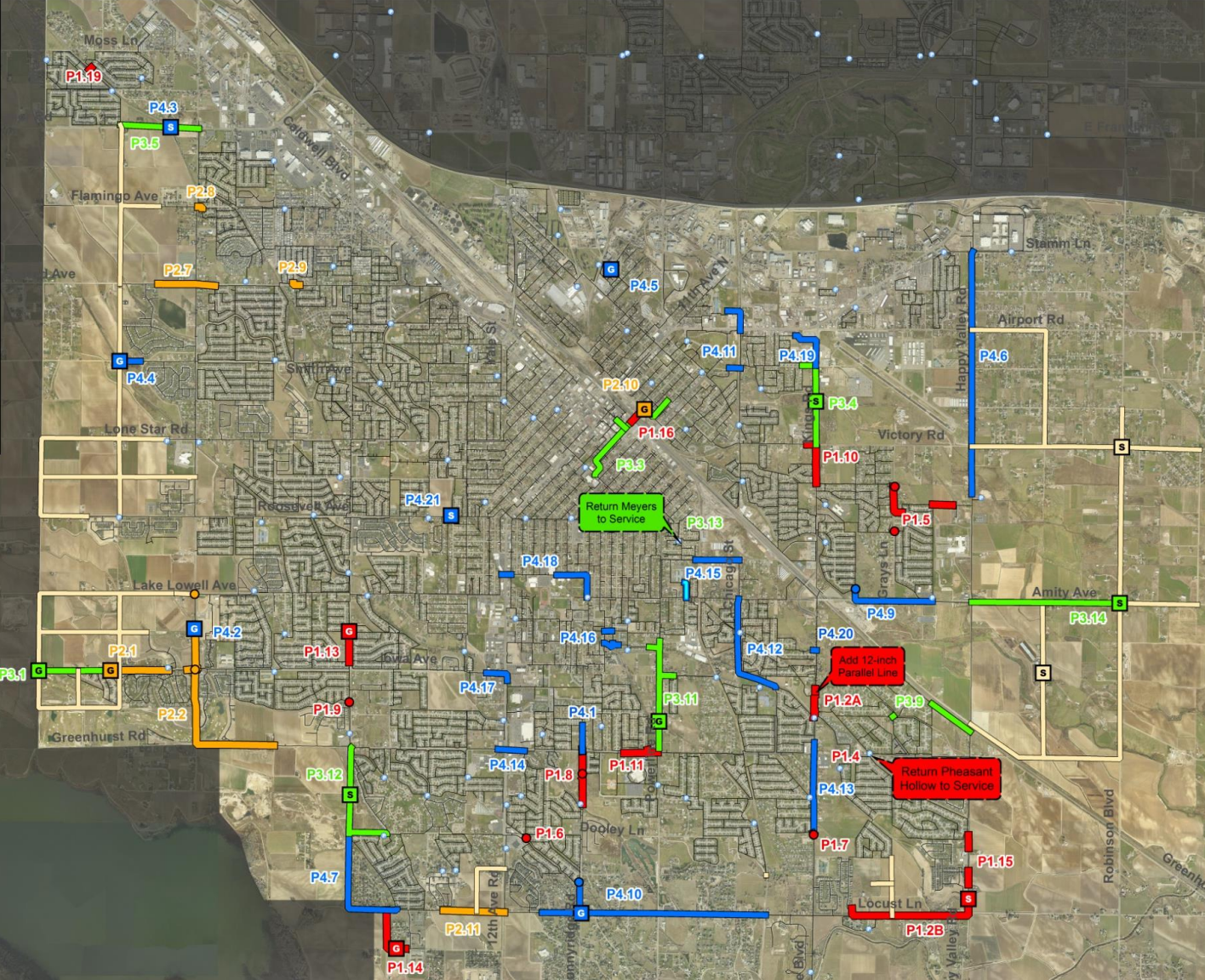
- P1 - Surface Water (2012)
- P1 - Groundwater (2012)
- P2 - Surface Water (2020)
- P2 - Groundwater (2020)
- P3 - Surface Water (2030)
- P3 - Groundwater (2030)
- P4 - Surface Water (2040)
- P4 - Groundwater (2040)
- S Future Pump Station
- Proposed PRV

**Distribution Improvements**

- P1 (2012)
- P2 (2020)
- P3 (2030)
- P4 (2040)
- Future

**PI System**

- Main
- Supply





# Identify – Prioritize Solutions

## Capital Improvement Plan



ID#	Item	Cost*
<b>Priority 1 Improvements (2014 - 2017)</b>		
1.1	Phyllis Canal Crossing on Birch Lane	\$ 85,000
1.2A	Southside PRV and Parallel Line	\$ 111,000
1.2B	Happy Valley Supply and Locust 12-inch Pipeline	\$ 1,550,000
1.3	Cherry Pump Station and Pipeline; Idaho Center Pipeline	\$ 1,147,000
1.4	Return Pheasant Hollow Station to Service	\$ 107,000
1.5	Install Greys Lane PRVs (2) and Associated Pipeline	\$ 309,000
1.6	Dooley Lane PRV	\$ 36,000
1.7	Southside PRV	\$ 63,000
1.8	Sunny Ridge PRV and Pipeline	\$ 422,000
1.9	Midland PRV	\$ 63,000
1.10	South Kings Road Pipeline	\$ 289,000
1.11	Greenhurst Pipeline North of Skyview High School	\$ 176,000
1.12	Franklin Road Pipeline	\$ 261,000
1.13	Midland Supply and Transmission Pipeline	\$ 927,000
1.14	Tio Lane Supply and Pipeline; Burk Lane Pipeline	\$ 1,071,000
1.15	Happy Valley Pipeline	\$ 162,000
1.16	14th Ave Railroad Crossing	<i>Currently Under Construction</i>
1.17	Install Cross Connections	\$ 138,000
1.18	Asbury Park/Crestwood and Moss Point Intertie	\$ 58,000
1.19	12 Pump Station Filter Upgrades (>1,500 gpm pumps)	\$ 784,000
1.20	23 Pump Station SCADA Upgrades (>1,000 gpm pumps)	\$ 376,000
<b>Total Priority 1 Improvements</b>		<b>\$ 8,135,000</b>
<b>Priority 2 Improvements (2017 - 2022)</b>		<b>\$ 8,511,000</b>
<b>Priority 3 Improvements (by 2030)</b>		<b>\$ 13,362,000</b>
<b>Priority 4 Improvements (by 2040)</b>		<b>\$ 12,964,000</b>
<b>Future Pipeline Projects (Costs = 1.5x Upsize Cost)</b>		<b>\$ 3,731,000</b>

- Over \$40 M in improvements identified in 20-yr planning horizon
- Substantial backlog of needed projects
- Majority of future costs are projects that benefit growth (developer funded)