

CITY  
of  
YUBA CITY

UTILITIES DEPARTMENT

# City of Yuba City Water System



## Master Plan Update

May 2004

Prepared by **HDR**

# Executive Summary

# **Master Plan Update – Executive Summary**

**City of Yuba City Water System**

**Yuba City**

Final

5/18/04

Prepared under the responsible charge of

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**PURPOSE**

The purpose of this study is to update the Yuba City’s (City’s) July 1997 *Water System Master Plan*. This update evaluates current and future water needs for the City and the City’s Sphere of Influence (SOI) to meet projected growth. In addition, the update addresses changes brought about by the City’s May 2001 acquisition of the Hillcrest Water Company, whose service area was comprised of five regions located in the local unincorporated areas of Sutter County.

**OBJECTIVES**

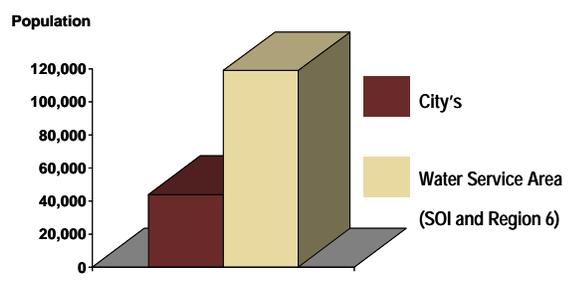
- ◆ Present data and information related to the Hillcrest Water Company water system.
- ◆ Address projected population and land-use information in the City’s Draft General Plan update.
- ◆ Update the City’s hydraulic network computer model to include the Hillcrest water regions.
- ◆ Update the City’s Capital Improvement Program to determine when new facilities will be needed to meet future water demand forecasts for the SOI at build-out conditions.
- ◆ Provide a foundation on which to base future decisions regarding the construction of facilities required for the production, conservation, transmission, and distribution of water to the City’s SOI.

**FINDINGS AND RECOMMENDATIONS**

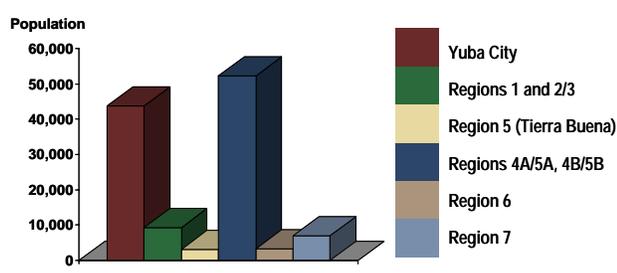
Table ES-1 on the following page summarizes the most significant findings and recommendations in the master plan update.

To be consistent with the City’s General Plan timeline, estimates for future water demands were developed for the service area’s build out conditions using the per capita projection method and the historical peaking demand factors.

**Yuba City Build Out Population**



**Yuba City Build-Out Population by Region**



**Acknowledgements**

We wish to acknowledge the assistance and cooperation of the following City of Yuba City staff who provided significant contributions toward this master plan update: Bill Lewis, Bobby Howard, Jerry Orr, and Diana Langley.

Table ES-1 Summary of Findings and Recommendations

<i>Findings</i>	<i>Recommendations</i>
<b>Groundwater Distribution</b>	
 <p>Groundwater wells in Regions 1, 2, 3, and 5 have lower water quality compared to the City's surface water. The groundwater is relatively hard, has a discernable sulfide smell, and is high in iron, manganese, arsenic, and nitrates.</p>	<p>Connect Regions 1, 2, 3, and 5 to the City's surface water system.</p>
<p>The existing groundwater distribution system in Regions 1, 2, 3, and 5 meet design level pressure and velocity criteria for average day and maximum day demands. However, peak conditions with all pumps activated in each region, the ability to support fire-flow varies throughout each region. Under peak conditions, the majority of Region 5 has adequate pressure with the exception of a few areas.</p>	<p>Recommend looping Region 1 to Regions 2 and 3. With this improvement, the groundwater pumping capacity can meet the peak hour and maximum day plus fire (4,000 gpm fire flow) conditions in these regions.</p>
<b>Surface Water Distribution</b>	
 <p>Under existing Peak Hour demands, there were several areas in the modeled system that experienced low pressures and velocities in excess of 10 fps. The primary area is on the west side of the City limits near Sam's Club. With the existing conditions, the model's pressures were found to be lower than 20 psi. Design standards require a minimum of 30 psi</p>	<p>Due to the high demand, simply increasing the pipe diameter is insufficient to mitigate the problem.</p> <ol style="list-style-type: none"> <li>1) Recommend constructing the new UPRR tank during Phase 1.</li> <li>2) Route piping to this tank south along State Highway 20 (Colusa Avenue) and north to Butte House Road.</li> <li>3) From Hwy 20/Harter, connect piping to Tharp Road/Hwy 20 and to Hwy 20/Walton.</li> </ol>

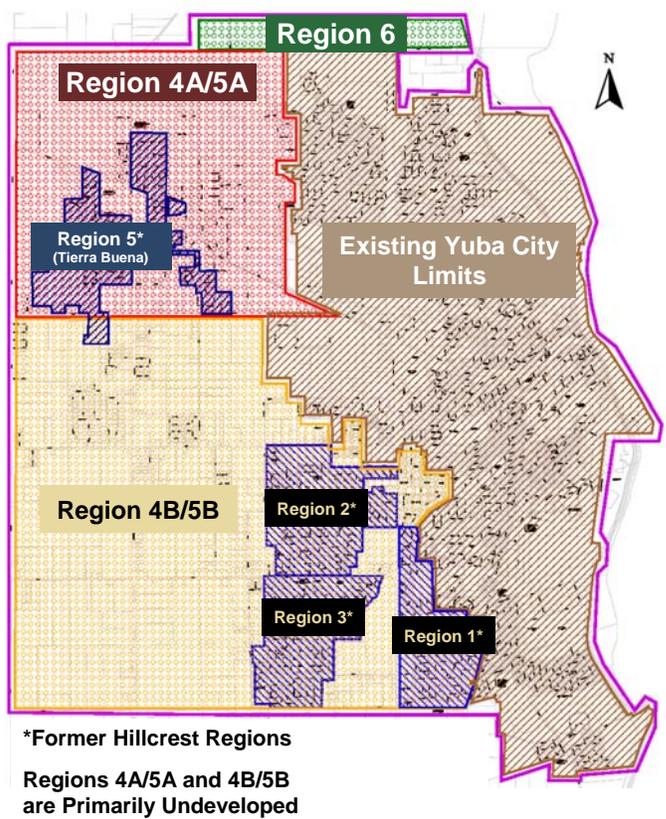
<i>Findings</i>	<i>Recommendations</i>
<p>The majority of the City has adequate fire-flow with a minimum 20 psi system pressure. There are a few exceptions where pipe sizes are either too small and/or pipes are not sufficiently looped.</p>	<p>Loop dead-end line at Sherwood Drive and Windsor Drive with an 8-inch pipeline to the existing pipeline on East Hillcrest Drive and Windsor Drive.</p>
	<p>Increase pipe size to twelve inch on the terminal west end of Bridge Street.</p>
<p>The simulation to reflect refilling the Burns tank over 6-hours showed a flow rate of 5,556 gpm is required. This flow is 1,233 gpm greater than the City's existing maximum day demand.</p>	<p>To accommodate the tank's high refill rate, flow capacity to the southern part of the City must be increased. Future pipeline improvements have been identified throughout the existing system to aid in distributing flow more directly from the WTP to the southern portion of the distribution grid where the Burns tank is located.</p>
<p>The distribution system modeled for future buildout of the City's SOI identified main transmission lines for either upsizing or new additions along main roads.</p>	<p>Install a transmission main (T-main) to circulate water through the SOI, functioning as the backbone of the distribution system and to service the proposed storage tanks.</p>
<p>At buildout, the system meets the Peak Hour demand except for one area south of the Burns tank. In this area, system pressure falls below 30 psi and even below 20 psi in the area immediately south of the Burns tank (east of Garden Highway).</p>	<p>Install additional pumping capacity and supplemental storage capacity at the existing Burns tank site.</p>
<p>The buildout fire-flow scenarios show no deficiencies with the system proposed.</p>	<p>Construct recommended system improvements to meet buildout conditions.</p>
<p>The City's existing storage facilities have a total storage volume of 9 million gallons. At buildout conditions, a total storage volume of 39.3 million gallons is needed for the entire water service area (SOI and Region 6).</p>	<p>Install additional storage tanks in the distribution system as identified in Chapter 6. Since the water service area is continuous, flat in topography, within the same pressure zone, and the distribution system will be well looped, there will be plenty of storage redundancy.</p>

<i>Findings</i>	<i>Recommendations</i>
<p>One pipeline was found to have pipe flow velocities exceeding the design standard of 7 feet per second.</p>	<p>Replace 8 inch piping with 14 inch piping from Forbes Avenue and Cooper Avenue east to Plumas Street and then north 250 feet and east on Teegarden Avenue to Shasta Street.</p>
<p><b>Surface Water Treatment Plan</b></p>	
<div style="display: flex; align-items: flex-start;">  <div style="margin-left: 10px;"> <p>Continued growth within the existing City limits will be limited and requires a buildout capacity of approximately 24 mgd. However, projected ultimate demand for the total service area (including Region 6) is 65 mgd.</p> </div> </div>	<p>Expand the existing SWTP to meet the future maximum day demands.</p> <p><b>Phase 2:</b> Construct a 24 mgd expansion to increase WTP capacity to 48 mgd.</p> <p><b>Phase 3:</b> Construct a 17 mgd expansion to increase WTP capacity to 65 mgd.</p>
<p>The existing low-lift pumping station (LLPS) has a total capacity of 26.2 mgd and firm capacity of 19.5 mgd.</p>	<p><b>Phase 1:</b> Install one 6.7 mgd pump at the existing LLPS to increase the firm capacity to 26.2 mgd.</p> <p><b>Phase 2:</b> Construct a second LLPS with 24 mgd firm capacity. Install five 7 mgd pumps. Construct a new 60-inch diameter pipeline from LLPS to the WTP.</p> <p><b>Phase 3:</b> Install one 6.7 mgd pump at the existing LLPS. Expand capacity of second LLPS to 35 mgd firm capacity. Install one 7 mgd pump.</p>
<p>The piping intake at the Feather River does not currently have fish screens. Modifications to the intake would likely require installation of fish screens.</p>	<p><b>Phase 1:</b> Construct a common fish screen facility to serve both the existing and new LLPSs. Add a new 36-inch diameter raw water pipeline from the existing LLPS. Construct a 48-inch diameter raw water pipeline from the fish screen to the new LLPS.</p> <p><b>Phase 2:</b> Install additional screens; increase capacity of screening facility to 65 mgd.</p>
<p>Heavy loads of grit (silt and sand) are deposited into the flocculation basins and require basins to be shut down and cleaned twice a year.</p>	<p>Construct an induced vortex-type grit removal system.</p>

<i>Findings</i>	<i>Recommendations</i>
<p>The existing flash mix, flocculation, and sedimentation basins have a total capacity of 24 mgd. Expansion is required for future demand.</p>	<p><b>Phase 2:</b> To the east of the existing basins construct a second flash mixer and three new sedimentation basins (8.5 mgd capacity each).</p> <p><b>Phase 3:</b> To the west of the existing basins, construct a third flash mixer and three new flocculation and sedimentation basins (8.5 mgd capacity each).</p> <p>An alternative to a flash mix and conventional sedimentation system would be an Actiflo system, which would require one-third the area of a conventional flocculation and sedimentation basin with a 20 percent cost savings.</p>
<p>The existing four filters have an operating hydraulic capacity of 24 mgd. Expansion is required for future demand.</p>	<p><b>Phase 2:</b> Construct four new filters to increase the plant hydraulic capacity to 48 mgd. Construct two new 42-inch diameter treated water pipelines from the filter gallery to the new clearwells.</p> <p><b>Phase 3:</b> Construct four new additional filters to increase plant hydraulic capacity to greater than 65 mgd.</p>
<p>The existing clearwells provides a total storage of 4 million gallons. The normal criterion for clearwell capacity is to provide storage equal to at least 15 percent of the treatment plant capacity. For Phase 2 capacity of 48 mgd, total storage required is at least 8 MG. For the Phase 3 capacity of 65 mgd, the total storage required is at least 10 MG.</p>	<p>A 12 MG storage volume at the WTP is recommended to provide enough volume for multiple purposes including disinfectant contact time, WTP operational storage, and operational storage for the distribution system.</p> <p><b>Phase 2:</b> Construct a 4 MG storage tank to increase WTP total storage to 8 MG.</p> <p><b>Phase 3:</b> Construct a 4 MG storage tank to increase WTP total storage to 12 MG.</p>

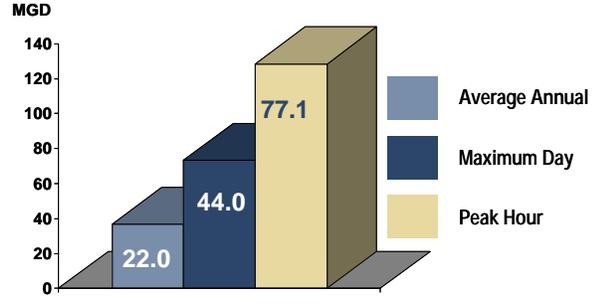
**Service Areas and Water Supply Sources**

Currently, surface water service is provided within the City limit boundary only. All other areas within the service area are served by groundwater wells. Regions 4A/5A and 4B/5B are primarily undeveloped. Because the groundwater is relatively hard, and at times has a discernable sulfide smell, customers consider the groundwater to be poor quality compared to the City’s surface water. In addition, the groundwater is high in iron, manganese, arsenic, nitrates, and other primary and secondary standards. In planning for long-term service area supply, this update assumes all groundwater customers will eventually be converted to surface water supply.

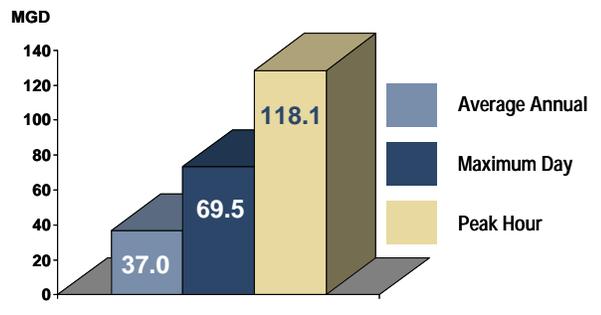


Currently, surface water service is provided within the City limit boundary only. However, due to poor groundwater quality, this update assumes all groundwater customers will eventually be converted to surface water supply.

**Year 2005 Water Demands for Yuba City Water Service Area**



**Projected Yuba City Total Water Service Area Demand at Build-Out**



### CAPITAL IMPROVEMENT PROGRAM

Recommended improvements to the service area have been divided into three planning phases in order to facilitate implementation and to assist the City with planning and funding water system improvements.

#### Phase 1 - (24 mgd capacity)

Improvements to the existing water distribution system within the City and Regions 5 to meet City’s operating criteria (including fire-flow conditions). Includes improvements to the surface water distribution system to service Region 5 and new residential developments in the western portion of the City.

#### Phase 2 - (48 mgd capacity)

Improvements to the surface water distribution system and to serve Regions 1, 2, 3, and portions of Regions 4A/5A and 4B/5B. Includes expansion of the City’s WTP to 48 mgd. Does not include fireflow piping improvements in Regions 1, 2 and 3.

#### Phase 3 - (65 mgd Capacity)

Improvements to the surface water distribution system to serve the entire SOI under buildout conditions. Includes expansion of the City’s WTP to at least 65 mgd.

#### Fireflow Improvements

Includes piping improvements needed in Regions 1, 2 and 3 to maintain a minimum system pressure of 20 psi and maximum pipe velocity of 10 feet per second during fireflow conditions. No planning period has been identified for Regions 1, 2 and 3 fireflow piping improvements.

Table ES-2 (following page) summarizes estimated costs for each phase. Proposed improvements in these tables do not include improvements needed to serve Region 7.

Figure ES-1 concludes this Executive Summary (and is provided in large scale format in the Master Plan Update). This figure maps out the CIP to improvements needed to meet the City’s total water service area demands and operational goals through build-out conditions.

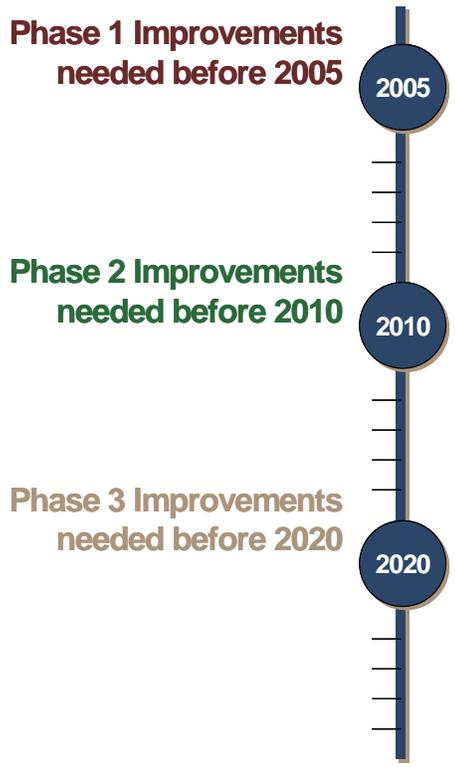


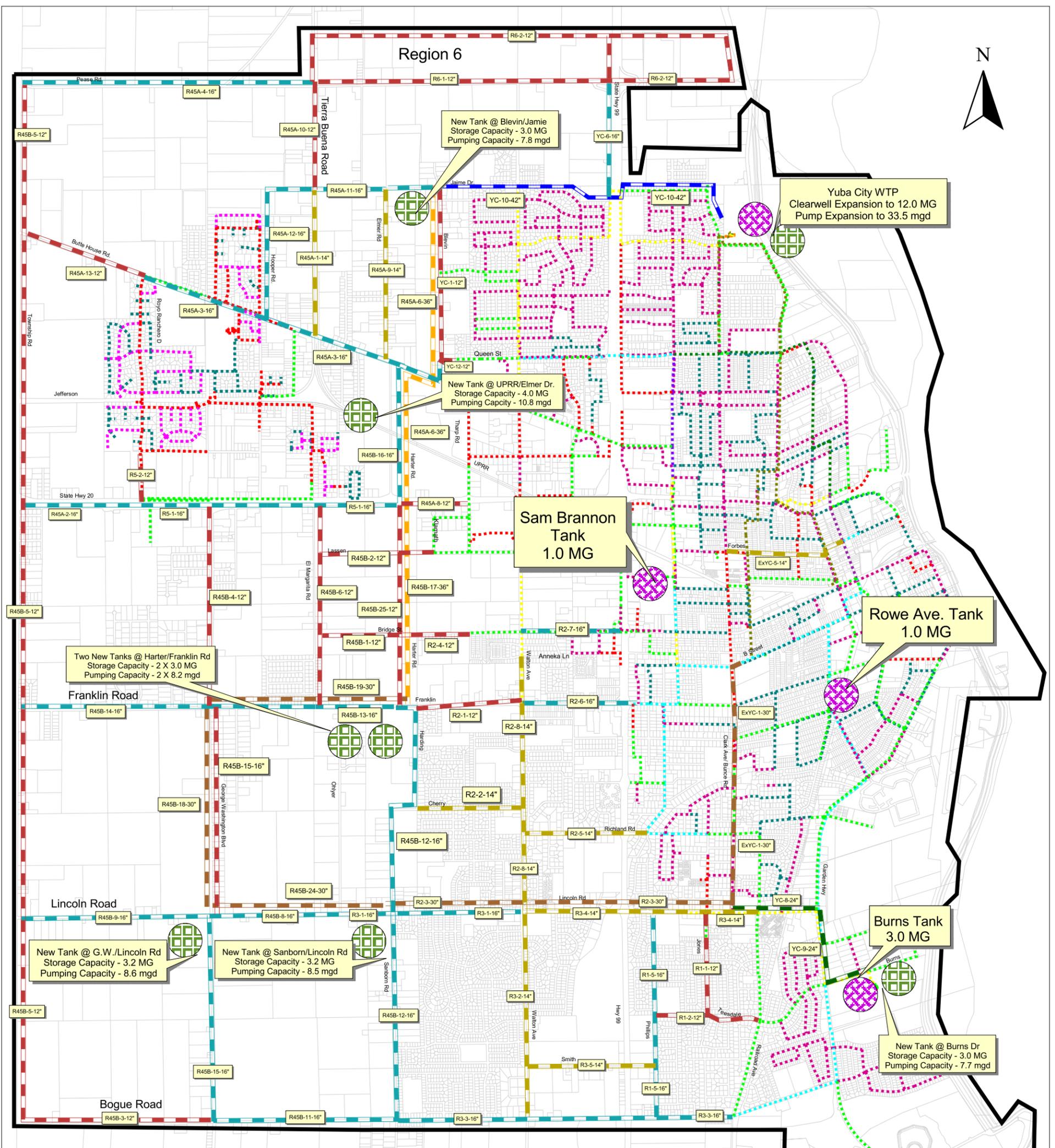
Table ES-2 Summary of Capital Improvement Program Costs

<i>Phase 1</i>	
Distribution Piping	11,450,000
Storage Tanks and Pumping Station	5,175,000
<b>Sub-total</b>	<b>16,625,000</b>
Contingency (25%)	4,160,000
Engineering, Administration, CM (20%)	4,160,000
<b>Phase 1 Total (rounded)</b>	<b>24,945,000</b>

<i>Phase 2</i>	
Distribution Piping	28,740,000
Storage Tanks and Pumping Station	7,750,000
Surface Water Treatment Plant Expansion to 48 mgd	26,645,000
<b>Sub-total</b>	<b>63,135,000</b>
Contingency (25%)	15,780,000
Engineering, Administration, CM (20%)	15,780,000
<b>Phase 2 Total (rounded)</b>	<b>94,695,000</b>

<i>Phase 3</i>	
Distribution Piping	44,946,000
Storage Tanks and Pumping Station	19,000,000
Surface Water Treatment Plant Expansion to 65 mgd	17,350,000
<b>Sub-total</b>	<b>81,296,000</b>
Contingency (25%)	20,320,000
Engineering, Administration, CM (20%)	20,320,000
<b>Phase 3 Total (rounded)</b>	<b>121,936,000</b>

<i>Fireflow Improvements</i>	
Fireflow piping	14,982,000
<b>Sub-total</b>	<b>14,982,000</b>
Contingency (25%)	3,750,000
Engineering, Administration, CM (20%)	3,750,000
<b>Phase 3 Total (rounded)</b>	<b>22,482,000</b>



**City of Yuba City  
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Existing Pipe	36-inch
6-inch	Proposed 12-inch
8-inch	Proposed 14-inch
10-inch	Proposed 16-inch
12-inch	Proposed 24-inch
14-inch	Proposed 30-inch
16-inch	Proposed 36-inch
18-inch	Proposed 42-inch
20-inch	Existing Tank
24-inch	New Tank
30-inch	

Future development south of Bogue Road would require the designation of a separate pressure zone



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**Figure 4-3. Yuba City Buildout Sphere of Influence  
Proposed Improved Distribution System**

Plot Title		<b>ctadokor 02/5/2004 4-3</b>	
Plot By	Date	Map No	Plot File
800	02/5/2004		Fig4-3YCBO.plt
Scale		0 800 1600 2400 Feet	