WATER SUPPLY PLANNING

The City is creating a new Water Resources Plan to ensure a stable water supply through 2060. This is in response to public input ranking water as the top community priority, as well as Governor Brownback's call to create water sustainability statewide over the next 50 years. The effort follows a Drought Response Plan, which triggers emergency conservation measures in a drought, that was approved by the City Council in October 2013.

Recommendations for conservation and new water sources are linked to each other and to drought planning. Adding new supply and reducing water usage should be done in concert to provide enough water during drought years without impacting revenue in years with normal water usage. Doing so maximizes the operational benefit (extending the water supply) and the financial benefit of protecting utility revenue streams.

Highest Citizen Priority

Wichitans have ranked a reliable water supply as their most important priority. Last year's community survey showed that 85% of the public is willing to pay for water reliability—that is substantially more than the second highest priority (streets at 66%).

The community survey was conducted in April 2013 and was then followed by the ACT-ICT engagement process. The ACT-ICT efforts involved more than 2,000 people through 102 different community meetings. Those meetings yielded the same results as the community survey—that Wichitans value a reliable water source above other priorities.

Design Drought

Protecting water sources during periods of drought is an important part of long-term water supply planning. The concept of a design drought is used in planning efforts. These design droughts contain varying conditions of hot, dry weather and are factored into water planning models to plan for drought resistance. Design droughts are measured by chance of occurrence in a given year. Thus, a 2% drought has a 2% chance of beginning this year, while a 1% drought is half as likely.

Guidelines from the State of Kansas require communities to plan for a minimum of a 2% drought, which occurs roughly every 50 years. The five-year drought in the 1950s is an example of such conditions. However, 1% droughts—similar to the 1930s Dust Bowl period—do occur and have a more substantial impact on the water supply.

Another way to compare 1% and 2% droughts is to consider the public impact of instituting the City's Drought Response Plan. More stages of the drought plan would be implemented, and the length of time in the more severe drought stages would be longer, in a 1% drought. For instance, a 1% drought would require 71 months of outdoor watering bans, while a 2% drought would require only 11 months. Also, indoor usage would be reduced by 15% for 20 months during a 1% drought; this stage is not included in the 2% drought plan.

Planning for a more severe design drought will reduce the time customers experience challenging water restrictions. The severity of these conditions in the drought plans increases the importance of appropriate water supply planning. The combination of new water supply and conservation efforts can decrease the likelihood of implementing drought plans.

Amount of Time in Each Drought Stage		
	2% Drought	**1% Drought**
Stage 1 Voluntary Conservation	20 months	17 months
Stage 2 Outdoor Watering Once a Week	29 months	21 months
Stage 3 Outdoor Watering Ban	11 months	51 months
Stage 4 Outdoor Watering Ban and 15% Reduction in Indoor Usage	—	20 months

Water Conservation

Determining the economic viability of conservation and new supply is important to making sound decisions. Staff created an economic model based on three factors: the cost savings from delaying need for a new supply; revenue lost from reducing demand beyond current levels; and the expenses from instituting conservation strategies. This model marks down costs to 2014 levels to provide a clear economic gain or cost. The model was verified by water conservation economists who concluded that, "in our opinion, the City of Wichita is using appropriate methodology to evaluate the economic impact of water conservation."

The following table shows three items recommended for inclusion in the 2014 conservation program. They would be funded with the remaining funds from the 2013 rebate program, which reduced usage by 0.44%. The rebate program for 2014 would be modified from last year's conservation program to include more items and it would be offered to more customers. Ranges for costs and water savings are provided due to the uncertainty of how many customers will participate. This will serve as a pilot program and provide data to better estimate the benefits of future conservation options.

Finally, two studies would commence to determine the viability of future conservation efforts aimed at outdoor and industrial usage, which could both be high-yield conservation strategies. These studies will analyze incentives for different types of turf and drought-resistant plantings, capacity for private wells, and technology for recycling water in industrial processes.

2014 Water Conservation Program			
		Full Implementation—Annual Totals	
Action	**2014 Costs**	**Cost**	**Water Savings**
Offer a Modified Rebate Program	$450,000	$1.2m—$3.0m	0.39 - 0.95 MGD (0.68% - 1.67%)
Study Landscape Incentives	$75,000	*Unknown—will be determined during the studies*	
Study Industrial Re-Use	$75,000		

New Water Supplies

Nine options regarding long-term water supply were presented during the City Council workshop on April 8th. These options included an indirect potable re-use system, where bank storage wells would pull river water downstream from the wastewater plant and treat it to drinking water standards. Raw or treated water from El Dorado Lake also were included as options. A purple pipe system that would capture treated effluent for non-potable uses was considered, along with improvements to the Aquifer Storage and Recovery (ASR) project.

Determining the Best Options

The viability of the options were evaluated by three criteria. All three criteria were designed to provide a reliable water supply, while minimizing customer impacts. Only two options provide enough water to meet long-term needs without creating unattainable cost burdens or conservation goals. The criteria to evaluate options included:

1) Meets Long-Term Water Needs: The goal of the water planning efforts is to provide enough water through 2060 to provide for community growth and drought protection. Viable options need to yield at least 9 million gallons per day (MGD) of water each year to meet the goal of long-term water reliability.

2) Minimize Costs: New water sources are expensive and containing costs is an important consideration. Only three of the original nine options carried capital costs that were lower than $250 million.

3) Reasonable Conservation Goals: Any viable option must not create such a severe conservation requirement as to impact the quality of life of utility customers. Of the three options with capital costs less than $250 million, one had such a minimal impact on water supply that customers would still have to meet very heavy conservation goals, including the gradual elimination of outdoor watering. Because of this, only two options remain viable.

Final Two Options

Based on the criteria, two options meet the goal of providing water for community growth and drought protection. Both have upfront costs of $250 million or less, and would yield at least 9 MGD annually. This level of acre feet ensures that the necessary conservation goals are low enough to minimize the effects on customers.

- Treated El Dorado Water: Drinking water would be purchased for immediate use in the distribution system. Multiple sub-options exist, based on 10 to 30 million gallons per day (MGD). A hybrid approach would build 30 MGD capacity, and only take that much water in the first years of a drought, which could prolong the life of Cheney Lake. This would cost less in capital expenses; if $250 million were allocated to this project, the remaining funds would be used to pre-pay water purchase costs.

- ASR Improvements: A water storage site and new wells would be constructed to maximize output of the existing facilities. A new pipeline would allow delivery of more water to the main pump station. This option cost would require $250 million to cover infrastructure costs. It also would require an additional $1 million more per year in operating expenses compared to the El Dorado options. However, the City would not incur a cost to access the water.

Capital and Operating Costs				
	Option 1 El Dorado: 30 MGD	**Option 2 El Dorado: 10 MGD**	**Option 3 El Dorado Hybrid**	**Option 4 ASR Imp.**
Project Costs				
Wichita Capital	$16,400,000	$16,400,000	$16,400,000	$250,000,000
El Dorado Capital	$210,000,000	$168,200,000	$210,000,000	—
Pre-Paid Water	$23,600,000	$65,400,000	$23,600,000	—
Total	**$250,000,000**	**$250,000,000**	**$250,000,000**	**$250,000,000**
Annual Costs				
Ops. and Maintenance	$600,000	$600,000	$600,000	$1,600,000
Water Purchase	$1.39/thousand gallons, increased yearly by 2.7% (assumed CPI)			—

Based on discussions with City of El Dorado staff, capital costs for options 1 and 3 ($210 million) are based on $60 million for the treatment plant; $110 million for the distribution line; and $40 million for water rights from the US Army Corps of Engineers. Option 2 scales the treatment plant down by 33% and the distribution system by 20%. The purchase price was estimated at the quoted Operations and Maintenance cost of $0.81 per 1,000 gallons, plus the rate El Dorado charges for raw water ($0.58 per 1,000 gallons). These prices are preliminary and would be subject to negotiation, possibly lowering the cost.

Summary - Funding Gap

Securing a long term water supply and mitigating drought conditions is expensive. The total cost and water rate impacts of each option are shown below. The table also includes two other outcomes: the final year that each new supply could offset the impact of a 1% drought (reducing the need for drought plan implementation); and the annual conservation needed to provide drought protection through 2060. Improvements to the ASR project are the lowest cost option, because the City would have only infrastructure costs. The El Dorado options would involve both capital costs and costs for purchasing water. All options could be funded initially with $250 million, with non-capital funding in the El Dorado options used for initial water purchasing costs.

Comparison of Water Supply Options					
Option	**Total Cost through 2060**	**Impact to Water Rates**	**Final Year of Pre-Payment**	**Year 1% Drought Protection Ends**	**Required Annual Conservation**
1: El Dorado 30 MGD	**$1,357,937,133**	**11.6%**	**2019**	**2034**	**0.29%**
2: El Dorado 10 MGD	**$632,868,950**	**4.0%**	**2029**	**2030**	**0.35%**
3: El Dorado Hybrid	**$755,643,575**	**5.3%**	**2022**	**2033**	**0.30%**
4: ASR Improvements	**$376,417,612**	**1.3%**	**Not Applicable**	**2030**	**0.35%**

Option 3 includes the full 30 MGD treatment plant, but only having a take-or-pay provision based on a 10 MGD minimum.