

**COMMENTS
ON
FRANKLIN WATER TREATMENT PLANT
CTE ECONOMIC ANALYSIS REVISITED
BY
WILLIAM W. WADE
FOR HRWA**

September 19, 2006

Mr. Wade correctly states that rank ordering of single-point cost estimates is insufficient for such a complicated issue. That is why more than one year of study has been performed to develop a withdrawal strategy protective of the environment and a detailed water treatment plant design report to evaluate the full range of alternatives (a requirement of ARAP withdrawal permit applications). It is unfortunate that Mr. Wade did not spend time talking with CTE staff that performed the studies rather than blindly developing incomplete conclusions based on his limited involvement in the project. In fact, Mr. Wade did not begin review of this project more than two or three weeks before filing his report utilizing incorrect assumptions that lead him to incomplete conclusions.

The following sections cover what seem to be the issues Mr. Wade attempts to call into question.

Suggestion that questions remain

It appears that Mr. Wade is attempting to suggest that our analysis is incomplete and that more questions remain unanswered. Such tactics can be effective in creating a sense of doubt or supposed incompleteness when one desires to impact or slow such a project. No matter the level of study that could have been performed, anyone with even limited understanding could raise questions that are not answered; no matter how insignificant.

Use of wet and dry year and period of record

Mr. Wade suggests that we utilized only one year to represent a wet year and a dry year to draw our conclusions. He also states that “CTE report does not show effect of entire hydrologic record on purchases.” This is not true. We utilized 28 years of data from the USGS gauge located at Highway 96 in downtown Franklin. Mr. Wade attempts to develop a representative wet and dry year for his analysis based on our 28 years of

data. Utilizing the entire period of record is more accurate than developing a statistical dry and wet year. The impact of the varied water availabilities on an annual basis is demonstrated in our Water Availability Technical Memorandum. The TM demonstrates that more water will be available in some years than others. Further it is not as easy as a statistical wet and dry year. These do not take into account the unique nature of the Franklin plant and raw water reservoir. Some years, water withdrawal may not be possible in varied times during the year; this cannot be determined by simply calculating a dry “year”. To accomplish the true impact, it is more appropriate to introduce the proposed withdrawal scheme to the real 28-year period of record; and that is what we have done. The numbers we present are based on the entire period of record, not on one wet or one dry year.

Purchase rate analysis

Mr. Wade suggests that \$1.71/1000gal should be utilized for all analysis. This is inaccurate if the existing rate structure is utilized. It would require a quadrupling of the current level of water purchase for this to be true. That type of demand is nowhere near what is expected in the 2020 projections. It would be inappropriate to assume or suggest that any additional contract negotiations could reduce current rates for this analysis.

Mr. Wade’s suggestion also does not take into account the 12MG expansion planned by HVUD which must be funded by customer rates (including wholesale customers). Nor does it consider the removal of the plant as a supplemental source of water. Just this year there were multiple times that the system could have seen significant impact if Franklin’s WTP were not in operation.

Additional data from Franklin and HVUD also made it possible to develop a more detailed evaluation of rates and volume purchase impacts. However, the data still demonstrate that the treatment plant upgrade is economically feasible. The analysis amounts to an update of the previously developed alternatives tables. The updated tables are included as an attachment.

Planning period

Mr. Wade suggests a 30-year planning period would be more appropriate for such an analysis. We agree. However, the City's active planning document projects future growth only to 2020. Therefore, we determined the most appropriate planning year to evaluate would be utilizing numbers from City planning documentation.

However, because we do feel a longer term planning effort is appropriate, CTE has further project growth expectations for the City's service area through the year 2036 (30 years). Although additional large projects are planned in the City of Franklin, evidently Mr. Wade did not research the actual service area of the City's water distribution system. Although the city expects continued growth, much of the growth will take place within other utility service areas.

An additional chart was developed based on this further evaluation. The attached figure demonstrates the cost comparison for the various alternatives over a 30-year period. This analysis demonstrates what was understood but was unsaid in our original analysis. Although there is real savings in the first 20-year period with plant expansion, a much greater savings per year is realized once the plant expansion is fully funded after the first 20 years.

Risk of reliance on HVUD

Mr. Wade states that "The alternative of HVUD supplies makes explicit consideration of risks of reliance on HVUD compared to withdrawals from Harpeth River a necessary part of the decision process – risks as perceived by all stakeholders." We agree. The proposed plant is not only economically feasible, it provides valuable redundancy. Something that is quite important in today's strained water availability environment.

General comments and response to Wade report

We believed from the beginning that this would be a successful process no matter the outcome. We truly entered this project not knowing the outcome of the river data study and analysis nor the economic analysis. If the model (selected based on TWRA recommendation and deep discussions with HRWA and with the model's creator at The Nature Conservancy) had shown results that pointed to no withdrawal was the right alternative, then that would have been the conclusion. However, it is interesting that

now HRWA avoids evaluation of the data and only makes a blanket statement that they do not support our conclusions. We would like to see the scientific result supporting their position just as we have provided. A statement that “we like the higher cutoff” is not sufficient.

The City and CTE built a technical team that provided a complete analysis of all required elements of the ARAP permit application process. It has included input from EPA, TDEC, TWRA, USGS, FWS, community and other stakeholders such as HRWA over more than a twelve month period. The City of Franklin has spent extensive time, staff and monetary resources to achieve the type of study that TDEC has desired and required for this permit application.

We ask that TDEC consider the scientific study and the findings in evaluating this permit application. A low flow cutoff more than six times the 7Q10 coupled with a protective 20% maximum withdrawal rate above the low flow cutoff (5cfs) is protective of the designated uses of the Harpeth River in Franklin.

Franklin, TN WTP
Summary, Capital and 20-Yr. Annual Costs
(Based on 28 Years of River Data, 1976-2003)

9/18/2006

	Existing -2005 6.2 mgd / 9.5 mgd	Design Year 2007 (Existing, Post Construction): 6.2-7.2 mgd Avg. Day / 10.0 mgd Pk. Day Demand				
		Alternate 1A**	Alternate 1B**	Alternate 2A**	Alternate 2B**	Alternate 3**
HVUD Purchase						
Annual Vol.	1,570 M.G. / Yr.	1,560 M.G. / Yr.	1,530 M.G. / Yr.	910 M.G. / Yr.	865 M.G. / Yr.	2,260 M.G. / Yr.
Unit Cost	\$ 1.800 / 1000 gal.	\$ 1.800 / 1000 gal.	\$ 1.802 / 1000 gal.	\$ 1.865 / 1000 gal.	\$ 1.873 / 1000 gal.	\$ 1.772 / 1000 gal.
Annual Cost	\$ 2,826,000 / Yr.	\$ 2,808,000 / Yr.	\$ 2,757,060 / Yr.	\$ 1,697,150 / Yr.	\$ 1,620,145 / Yr.	\$ 4,004,720 / Yr.
WTP						
Conv. w/ Filt. Capital Cost		\$ 4,841,500	\$ 5,991,500	\$ 6,739,000	\$ 7,889,000	
DAF w/ Filt. Capital Cost				\$ 7,463,500	\$ 8,613,500	
Membranes Capital Cost				\$ 10,473,050	\$ 11,623,050	
Avg. Annual Vol. (1976-2003)	710 M.G. / Yr.	700 M.G. / Yr.	730 M.G. / Yr.	1,350 M.G. / Yr.	1,395 M.G. / Yr.	0 M.G. / Yr.
Conv. w/ Filt. Unit Cost	\$ 1.854 / 1000 gal.	\$ 2.639 / 1000 gal.	\$ 2.663 / 1000 gal.	\$ 1.613 / 1000 gal.	\$ 1.633 / 1000 gal.	
DAF w/ Filt. Unit Cost				\$ 1.653 / 1000 gal.	\$ 1.671 / 1000 gal.	
Membranes Unit Cost				\$ 1.893 / 1000 gal.	\$ 1.904 / 1000 gal.	
Conv. w/ Filt. Annual Cost	\$ 1,316,530 / Yr.	\$ 1,847,559 / Yr.	\$ 1,943,997 / Yr.	\$ 2,177,637 / Yr.	\$ 2,277,624 / Yr.	
DAF w/ Filt. Annual Cost				\$ 2,231,421 / Yr.	\$ 2,330,985 / Yr.	
Membranes Annual Cost				\$ 2,555,452 / Yr.	\$ 2,655,662 / Yr.	
Distribution Sys. Upgrades						
Capital Cost						\$ 1,293,350 ***
20-Yr. Amortized Cost						\$ 103,727 / Yr.
Totals						
Capital Costs w/ Conv. & Filt.		\$ 4,841,500	\$ 5,991,500	\$ 6,739,000	\$ 7,889,000	
Capital Costs w/ DAF & Filt.				\$ 7,463,500	\$ 8,613,500	
Capital Costs w/ Membranes				\$ 10,473,050	\$ 11,623,050	
Cap. Costs to Shutdown WTP						\$ 1,293,350
Annual Costs w/ Conv. & Filt.	\$ 4,142,530 / Yr.	\$ 4,655,559 / Yr.	\$ 4,701,057 / Yr.	\$ 3,874,787 / Yr.	\$ 3,897,769 / Yr.	
Annual Costs w/ DAF & Filt.				\$ 3,928,571 / Yr.	\$ 3,951,130 / Yr.	
Annual Costs w/ Membranes				\$ 4,252,602 / Yr.	\$ 4,275,807 / Yr.	
Ann. Costs w/ WTP Shutdown						\$ 4,108,447 / Yr.

**Flow Alternate 1A: Upgrade Exist. 2 mgd WTP w/o Quarry

**Flow Alternate 1B: Upgrade Exist. 2 mgd WTP w/ 1 mgd Quarry Supplemental Raw Water

**Flow Alternate 2A: Expand WTP to 4 mgd w/o Quarry (5 CFS Cutout)

**Flow Alternate 2B: Expand WTP to 4 mgd w/ 1 mgd Quarry Supp. Raw Water (5 CFS Cutout)

**Flow Alternate 3: Shutdown Existing WTP

*** Distribution System Upgrades (8,500 LF of 24" WM in Downs Blvd. + Piping Config. Changes at Ex. H.S. Pumps)

Franklin, TN WTP
Summary, Capital and 20-Yr. Annual Costs
(Based on 28 Years of River Data, 1976-2003)

9/18/2006

	Existing -2005 6.2 mgd / 9.5 mgd	Design Year 2020: 9.0-10.5 mgd Avg.Day / 14.5 mgd Pk. Day Demand				
		Alternate 1A**	Alternate 1B**	Alternate 2A**	Alternate 2B**	Alternate 3**
HVUD Purchase						
Annual Vol.	1,570 M.G. / Yr.	2,542 M.G. / Yr.	2,512 M.G. / Yr.	1,892 M.G. / Yr.	1,847 M.G. / Yr.	3,242 M.G. / Yr.
Unit Cost	\$ 1.800 / 1000 gal.	\$ 1.765 / 1000 gal.	\$ 1.766 / 1000 gal.	\$ 1.784 / 1000 gal.	\$ 1.786 / 1000 gal.	\$ 1.753 / 1000 gal.
Annual Cost	\$ 2,826,000 / Yr.	\$ 4,486,630 / Yr.	\$ 4,436,192 / Yr.	\$ 3,375,328 / Yr.	\$ 3,298,742 / Yr.	\$ 5,683,226 / Yr.
WTP						
Conv. w/ Filt. Capital Cost		\$ 4,841,500	\$ 5,991,500	\$ 6,739,000	\$ 7,889,000	
DAF w/ Filt. Capital Cost				\$ 7,463,500	\$ 8,613,500	
Membranes Capital Cost				\$ 10,473,050	\$ 11,623,050	
Avg. Annual Vol. (1976-2003)	710 M.G. / Yr.	700 M.G. / Yr.	730 M.G. / Yr.	1,350 M.G. / Yr.	1,395 M.G. / Yr.	0 M.G. / Yr.
Conv. w/ Filt. Unit Cost	\$ 1.854 / 1000 gal.	\$ 2.639 / 1000 gal.	\$ 2.663 / 1000 gal.	\$ 1.613 / 1000 gal.	\$ 1.633 / 1000 gal.	
DAF w/ Filt. Unit Cost				\$ 1.653 / 1000 gal.	\$ 1.671 / 1000 gal.	
Membranes Unit Cost				\$ 1.893 / 1000 gal.	\$ 1.904 / 1000 gal.	
Conv. w/ Filt. Annual Cost	\$ 1,316,530 / Yr.	\$ 1,847,559 / Yr.	\$ 1,943,997 / Yr.	\$ 2,177,637 / Yr.	\$ 2,277,624 / Yr.	
DAF w/ Filt. Annual Cost				\$ 2,231,421 / Yr.	\$ 2,330,985 / Yr.	
Membranes Annual Cost				\$ 2,555,452 / Yr.	\$ 2,655,662 / Yr.	
Distribution Sys. Upgrades						
Capital Cost		\$ 5,122,680 ***	\$ 5,122,680 ***	\$ 5,122,680 ***	\$ 5,122,680 ***	\$ 5,122,680 ***
20-Yr. Amortized Cost		\$ 410,839 / Yr.	\$ 410,839 / Yr.	\$ 410,839 / Yr.	\$ 410,839 / Yr.	\$ 410,839 / Yr.
Totals						
Capital Costs w/ Conv. & Filt.		\$ 9,964,180	\$ 11,114,180	\$ 11,861,680	\$ 13,011,680	
Capital Costs w/ DAF & Filt.				\$ 12,586,180	\$ 13,736,180	
Capital Costs w/ Membranes				\$ 15,595,730	\$ 16,745,730	
Cap. Costs to Shutdown WTP						\$ 5,122,680
Annual Costs w/ Conv. & Filt.	\$ 4,142,530 / Yr.	\$ 6,745,028 / Yr.	\$ 6,791,028 / Yr.	\$ 5,963,804 / Yr.	\$ 5,987,204 / Yr.	
Annual Costs w/ DAF & Filt.				\$ 6,017,588 / Yr.	\$ 6,040,566 / Yr.	
Annual Costs w/ Membranes				\$ 6,341,618 / Yr.	\$ 6,365,243 / Yr.	
Ann. Costs w/ WTP Shutdown						\$ 6,094,065 / Yr.

**Flow Alternate 1A: Upgrade Exist. 2 mgd WTP w/o Quarry

**Flow Alternate 1B: Upgrade Exist. 2 mgd WTP w/ 1 mgd Quarry Supplemental Raw Water

**Flow Alternate 2A: Expand WTP to 4 mgd w/o Quarry (5 CFS Cutout)

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*** Estimated Cost of 24" WM in
Downs Blvd. Extending to
Columbia Ave. + 16"/12" WM
to Goose Creek Interchange

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Summary, Capital and 20-Yr. Annual Costs
(Based on 28 Years of River Data, 1976-2003)

9/18/2006

	Existing -2005 6.2 mgd / 9.5 mgd	Design Year 2027: 10.4 mgd Projected Avg. Day Demand				
		Alternate 1A**	Alternate 1B**	Alternate 2A**	Alternate 2B**	Alternate 3**
HVUD Purchase						
Annual Vol.	1,570 M.G. / Yr.	3,070 M.G. / Yr.	3,040 M.G. / Yr.	2,420 M.G. / Yr.	2,375 M.G. / Yr.	3,770 M.G. / Yr.
Unit Cost	\$ 1.800 / 1000 gal.	\$ 1.756 / 1000 gal.	\$ 1.756 / 1000 gal.	\$ 1.768 / 1000 gal.	\$ 1.769 / 1000 gal.	\$ 1.747 / 1000 gal.
Annual Cost	\$ 2,826,000 / Yr.	\$ 5,390,920 / Yr.	\$ 5,338,240 / Yr.	\$ 4,278,560 / Yr.	\$ 4,201,375 / Yr.	\$ 6,586,190 / Yr.
WTP						
Conv. w/ Filt. Capital Cost		\$ 4,841,500	\$ 5,991,500	\$ 6,739,000	\$ 7,889,000	
DAF w/ Filt. Capital Cost				\$ 7,463,500	\$ 8,613,500	
Membranes Capital Cost				\$ 10,473,050	\$ 11,623,050	
Avg. Annual Vol. (1976-2003)	710 M.G. / Yr.	700 M.G. / Yr.	730 M.G. / Yr.	1,350 M.G. / Yr.	1,395 M.G. / Yr.	0 M.G. / Yr.
Conv. w/ Filt. Unit Cost	\$ 1.854 / 1000 gal.	\$ 2.639 / 1000 gal.	\$ 2.663 / 1000 gal.	\$ 1.613 / 1000 gal.	\$ 1.633 / 1000 gal.	
DAF w/ Filt. Unit Cost				\$ 1.653 / 1000 gal.	\$ 1.671 / 1000 gal.	
Membranes Unit Cost				\$ 1.893 / 1000 gal.	\$ 1.904 / 1000 gal.	
Conv. w/ Filt. Annual Cost	\$ 1,316,530 / Yr.	\$ 1,847,559 / Yr.	\$ 1,943,997 / Yr.	\$ 2,177,637 / Yr.	\$ 2,277,624 / Yr.	
DAF w/ Filt. Annual Cost				\$ 2,231,421 / Yr.	\$ 2,330,985 / Yr.	
Membranes Annual Cost				\$ 2,555,452 / Yr.	\$ 2,655,662 / Yr.	
Distribution Sys. Upgrades						
Capital Cost		\$ 5,122,680 ***	\$ 5,122,680 ***	\$ 5,122,680 ***	\$ 5,122,680 ***	\$ 5,122,680 ***
20-Yr. Amortized Cost		\$ 410,839 / Yr.	\$ 410,839 / Yr.	\$ 410,839 / Yr.	\$ 410,839 / Yr.	\$ 410,839 / Yr.
Totals						
Capital Costs w/ Conv. & Filt.		\$ 9,964,180	\$ 11,114,180	\$ 11,861,680	\$ 13,011,680	
Capital Costs w/ DAF & Filt.				\$ 12,586,180	\$ 13,736,180	
Capital Costs w/ Membranes				\$ 15,595,730	\$ 16,745,730	
Cap. Costs to Shutdown WTP						\$ 5,122,680
Annual Costs w/ Conv. & Filt.	\$ 4,142,530 / Yr.	\$ 7,649,318 / Yr.	\$ 7,693,076 / Yr.	\$ 6,867,036 / Yr.	\$ 6,889,837 / Yr.	
Annual Costs w/ DAF & Filt.				\$ 6,920,820 / Yr.	\$ 6,943,199 / Yr.	
Annual Costs w/ Membranes				\$ 7,244,850 / Yr.	\$ 7,267,876 / Yr.	
Ann. Costs w/ WTP Shutdown						\$ 6,997,029 / Yr.

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9/18/2006

	Existing -2005 6.2 mgd / 9.5 mgd	Design Year 2027: 10.4 mgd Projected Avg. Day Demand				
		Alternate 1A**	Alternate 1B**	Alternate 2A**	Alternate 2B**	Alternate 3**
HVUD Purchase						
Annual Vol.	1,570 M.G. / Yr.	3,070 M.G. / Yr.	3,040 M.G. / Yr.	2,420 M.G. / Yr.	2,375 M.G. / Yr.	3,770 M.G. / Yr.
Unit Cost	\$ 1.800 / 1000 gal.	\$ 1.756 / 1000 gal.	\$ 1.756 / 1000 gal.	\$ 1.768 / 1000 gal.	\$ 1.769 / 1000 gal.	\$ 1.747 / 1000 gal.
Annual Cost	\$ 2,826,000 / Yr.	\$ 5,390,920 / Yr.	\$ 5,338,240 / Yr.	\$ 4,278,560 / Yr.	\$ 4,201,375 / Yr.	\$ 6,586,190 / Yr.
WTP						
Conv. w/ Filt. Capital Cost		<i>Retired Debt</i>	<i>Retired Debt</i>	<i>Retired Debt</i>	<i>Retired Debt</i>	
DAF w/ Filt. Capital Cost				<i>Retired Debt</i>	<i>Retired Debt</i>	
Membranes Capital Cost				<i>Retired Debt</i>	<i>Retired Debt</i>	
Avg. Annual Vol. (1976-2003)	710 M.G. / Yr.	700 M.G. / Yr.	730 M.G. / Yr.	1,350 M.G. / Yr.	1,395 M.G. / Yr.	0 M.G. / Yr.
Conv. w/ Filt. Unit Cost	\$ 1.854 / 1000 gal.	\$ 2.639 / 1000 gal.	\$ 2.663 / 1000 gal.	\$ 1.213 / 1000 gal.	\$ 1.179 / 1000 gal.	
DAF w/ Filt. Unit Cost				\$ 1.210 / 1000 gal.	\$ 1.176 / 1000 gal.	
Membranes Unit Cost				\$ 1.271 / 1000 gal.	\$ 1.235 / 1000 gal.	
Conv. w/ Filt. Annual Cost	\$ 1,316,530 / Yr.	\$ 1,847,559 / Yr.	\$ 1,943,997 / Yr.	\$ 1,637,169 / Yr.	\$ 1,644,926 / Yr.	
DAF w/ Filt. Annual Cost				\$ 1,632,848 / Yr.	\$ 1,640,182 / Yr.	
Membranes Annual Cost				\$ 1,715,513 / Yr.	\$ 1,723,494 / Yr.	
Distribution Sys. Upgrades						
Capital Cost		<i>Retired Debt ***</i>	<i>Retired Debt ***</i>	<i>Retired Debt ***</i>	<i>Retired Debt ***</i>	<i>Retired Debt ***</i>
20-Yr. Amortized Cost						
Totals						
Capital Costs w/ Conv. & Filt.		<i>Retired Debt</i>	<i>Retired Debt</i>	<i>Retired Debt</i>	<i>Retired Debt</i>	
Capital Costs w/ DAF & Filt.				<i>Retired Debt</i>	<i>Retired Debt</i>	
Capital Costs w/ Membranes				<i>Retired Debt</i>	<i>Retired Debt</i>	
Cap. Costs to Shutdown WTP						<i>Retired Debt</i>
Annual Costs w/ Conv. & Filt.	\$ 4,142,530 / Yr.	\$ 7,238,479 / Yr.	\$ 7,282,237 / Yr.	\$ 5,915,729 / Yr.	\$ 5,846,301 / Yr.	
Annual Costs w/ DAF & Filt.				\$ 5,911,408 / Yr.	\$ 5,841,557 / Yr.	
Annual Costs w/ Membranes				\$ 5,994,073 / Yr.	\$ 5,924,869 / Yr.	
Ann. Costs w/ WTP Shutdown						\$ 6,586,190 / Yr.

**Flow Alternate 1A: Upgrade Exist. 2 mgd WTP w/o Quarry

**Flow Alternate 1B: Upgrade Exist. 2 mgd WTP w/ 1 mgd Quarry Supplemental Raw Water

**Flow Alternate 2A: Expand WTP to 4 mgd w/o Quarry (5 CFS Cutout)

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(Based on 28 Years of River Data, 1976-2003)

9/18/2006

	Existing -2005 6.2 mgd / 9.5 mgd	Design Year 2035: 12.1 mgd Projected Avg. Day Demand				
		Alternate 1A**	Alternate 1B**	Alternate 2A**	Alternate 2B**	Alternate 3**
HVUD Purchase						
Annual Vol.	1,570 M.G. / Yr.	3,674 M.G. / Yr.	3,644 M.G. / Yr.	3,024 M.G. / Yr.	2,979 M.G. / Yr.	4,374 M.G. / Yr.
Unit Cost	\$ 1.800 / 1000 gal.	\$ 1.748 / 1000 gal.	\$ 1.749 / 1000 gal.	\$ 1.756 / 1000 gal.	\$ 1.757 / 1000 gal.	\$ 1.742 / 1000 gal.
Annual Cost	\$ 2,826,000 / Yr.	\$ 6,422,152 / Yr.	\$ 6,373,356 / Yr.	\$ 5,310,144 / Yr.	\$ 5,234,103 / Yr.	\$ 7,619,508 / Yr.
WTP						
Conv. w/ Filt. Capital Cost		<i>Retired Debt</i>	<i>Retired Debt</i>	<i>Retired Debt</i>	<i>Retired Debt</i>	
DAF w/ Filt. Capital Cost				<i>Retired Debt</i>	<i>Retired Debt</i>	
Membranes Capital Cost				<i>Retired Debt</i>	<i>Retired Debt</i>	
Avg. Annual Vol. (1976-2003)	710 M.G. / Yr.	700 M.G. / Yr.	730 M.G. / Yr.	1,350 M.G. / Yr.	1,395 M.G. / Yr.	0 M.G. / Yr.
Conv. w/ Filt. Unit Cost	\$ 1.854 / 1000 gal.	\$ 2.085 / 1000 gal.	\$ 2.005 / 1000 gal.	\$ 1.213 / 1000 gal.	\$ 1.179 / 1000 gal.	
DAF w/ Filt. Unit Cost				\$ 1.210 / 1000 gal.	\$ 1.176 / 1000 gal.	
Membranes Unit Cost				\$ 1.271 / 1000 gal.	\$ 1.235 / 1000 gal.	
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DAF w/ Filt. Annual Cost				\$ 1,632,848 / Yr.	\$ 1,640,182 / Yr.	
Membranes Annual Cost				\$ 1,715,513 / Yr.	\$ 1,723,494 / Yr.	
Distribution Sys. Upgrades						
Capital Cost		<i>Retired Debt</i> ***	<i>Retired Debt</i> ***	<i>Retired Debt</i> ***	<i>Retired Debt</i> ***	<i>Retired Debt</i> ***
20-Yr. Amortized Cost						
Totals						
Capital Costs w/ Conv. & Filt.		<i>Retired Debt</i>	<i>Retired Debt</i>	<i>Retired Debt</i>	<i>Retired Debt</i>	
Capital Costs w/ DAF & Filt.				<i>Retired Debt</i>	<i>Retired Debt</i>	
Capital Costs w/ Membranes				<i>Retired Debt</i>	<i>Retired Debt</i>	
Cap. Costs to Shutdown WTP						<i>Retired Debt</i>
Annual Costs w/ Conv. & Filt.	\$ 4,142,530 / Yr.	\$ 7,881,423 / Yr.	\$ 7,836,835 / Yr.	\$ 6,947,313 / Yr.	\$ 6,879,029 / Yr.	
Annual Costs w/ DAF & Filt.				\$ 6,942,992 / Yr.	\$ 6,874,285 / Yr.	
Annual Costs w/ Membranes				\$ 7,025,657 / Yr.	\$ 6,957,597 / Yr.	
Ann. Costs w/ WTP Shutdown						\$ 7,619,508 / Yr.

**Flow Alternate 1A: Upgrade Exist. 2 mgd WTP w/o Quarry

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*** Estimated Cost of 24" WM in Downs Blvd. Extending to Columbia Ave. + 16"/12" WM to Goose Creek Interchange

Franklin WTP Economic Analysis
Total Annual Costs
5cfs cutoff with 20% withdrawal limitation

