

APPENDIX H
STRATEGY COST ESTIMATES

Appendix H - Development of Cost Estimates

A cost estimate was prepared for each potential strategy. In most cases the designs used in the strategies are conceptual and require detailed engineering studies prior to implementation of the strategy. The cost estimates include construction costs, other project development costs, and annual costs. Other project costs include engineering and contingencies, environmental and archeological studies, and interest during construction. Annual costs include debt service, operation and maintenance, electricity, and purchase of water. Capital costs presented in this Appendix are set at September 2003 price levels with no adjustment for future inflation. Standardized costs were used in order to make an equitable comparison of the cost of various alternatives. Actual construction and capital costs may be higher or lower depending upon site conditions, financing options, permitting, water purchase price, costs of electricity, time of construction and other factors.

The cost estimates use standard costs for installed pipe, ground storage tanks, pump stations and standard treatment facilities developed from experience with similar projects throughout the State of Texas. Generally, unit costs include the contractors' mobilization, overhead and profit. Installed pipe costs also include appurtenances and an allowance for resolving conflicts. Major conflicts such as highway crossings are noted separately. Other assumptions include costs for purchase of treated or raw water, permitting, mitigation, engineering and environmental studies. These costs may vary substantially from actual costs. Costs for reservoirs and water wells were developed using site-specific criteria.

ASSUMPTIONS:

Standard pipeline costs used for these cost estimates are shown in Table 1. Pump station costs are based on required Horsepower capacity and are listed in Table 2. The power capacity was determined from the hydraulic analyses conducted as part of this study or from a planning level hydraulic grade line evaluation. Pump efficiency was assumed to be 75 percent. Pipelines and pump stations were sized for peak pumping capacity. Generally, a peaking factor of 2 times the average demand was used for strategies where the water was pumped directly to a water treatment plant. If there were additional water sources and/or the water was transported to a terminal storage facility, a peaking factor of 1.2 to 1.5 was used. Terminal ground storage was

provided at each booster pump stations along the transmission line. The sizing of the ground storage tanks varied depending on the strategy, but generally provided sufficient storage for 4 to 8 hours of pumping at peak capacity. Costs for ground storage are shown in Table 3. Covered storage tanks are used for all strategies transporting treated water.

Water treatment plants were sized for peak day capacity. Costs were estimated for new conventional treatment facilities and expansions of existing facilities, and are listed in Table 4. If reverse osmosis was required for surface water sources, the construction costs were increased by 60 percent of the same size conventional treatment plant. This was based on actual cost estimates of similar facilities. For reverse osmosis treatment, it was assumed that 30 percent of the raw water would be discharged as reject water. Minimal losses were assumed for conventional treatment facilities. For treatment of nitrates in groundwater, ion exchange facilities were used for cost estimating purposes and are shown on Table 5. Other treatment options may be applicable. For these facilities it was assumed that 20 percent of the raw water would be discharged as reject water. All treatment plants were sized for finished water capacity.

Engineering, contingency, construction management, financial and legal costs were estimated at 30 percent of construction cost for transmission facilities and 35 percent of construction costs for treatment facilities and reservoir projects. Permitting and mitigation for transmission and treatment projects were estimated at 1 percent of the total construction costs. For reservoirs, mitigation and permitting costs were assumed equal to the land purchase cost. Right-of-way costs for transmission lines were estimated at \$1 per foot. If the pipeline followed existing right-of-ways (such as highways), no additional right-of-way cost was assumed. The costs for property acquisition for reservoirs were based on previous cost estimates, if available. A minimum of \$500 per acre was assumed if no site specific data was available.

Interest during construction is the total of interest accrued at the end of the construction period using a 6 percent annual interest rate on total borrowed funds, less a 4 percent rate of return on investment of unspent funds. This was calculated assuming that the total estimated project cost (excluding interest during construction) would be drawn down at a constant rate per month during the construction period. Factors were determined for different lengths of time for project construction. These factors were used in cost estimating and are presented in Table 6.

Annual costs were estimated using the following assumptions:

1. Debt service for transmission and treatment costs were annualized over 30 years at an annual interest rate of 6 percent. Debt service for reservoir projects was annualized over 40 years.
2. Water purchase costs were based on wholesale rates reported by the selling entity in the water use survey. For BRA, raw water costs are based on the average rate from their system (\$39.75)¹. Use of the WCBWDS was not given a direct cost at this time. Improvements to the WCBWDS necessitated by the strategy were included in the capital costs of the project.
3. Operation and Maintenance costs were estimated at:
 - a. 1 percent of the construction costs for pipelines, storage tanks, and dams
 - b. 2.5 percent of the construction costs for pump stations, meters and SCADA systems
4. Surface water treatment costs were estimated at \$0.35 per 1,000 gallons for conventional plants and \$0.75 per 1,000 gallons of finished water for plants with reverse osmosis. Treatment for nitrates was estimated at \$0.25 per 1,000 gallons. These costs include chemicals, labor and electricity.
5. Reject water disposal for treatment of brackish water was estimated at \$0.25 per 1,000 gallons of reject water. This amount is quite variable depending on the selected disposal method. If the water were returned to a brackish surface water source, the costs would be negligible. If evaporation beds or deep well injection were used, the costs could be much higher. This value represents a moderate cost estimate.
6. Pumping costs were estimated using an electricity rate of \$0.06 per Kilowatt Hour, with pumping at peak capacity generally less than 20 percent of the time. This assumption varied depending on the strategy. Actual pumping costs will vary with the rate structure of the electric utility.

¹ BRA system costs are to increase 15% annually for the immediate future.

**Table 1
Pipeline Costs**

Diameter	Base Installed Cost	Cost with Appurtenances	Assumed ROW Width	Assumed Temporary Easement Width
(Inches)	(\$/Foot)	(\$/Foot)	(Feet)	(Feet)
6	13	15	15	50
8	18	20	15	50
10	21	23	20	60
12	25	28	20	60
14	29	32	20	60
16	33	37	20	60
18	38	42	20	60
20	46	51	20	60
24	59	65	20	60
30	72	80	20	60
36	88	98	20	60
42	100	110	30	70
48	115	127	30	70
54	132	145	30	70
60	167	184	30	70
66	192	211	30	70
72	217	239	30	70
78	243	267	40	80
84	273	300	40	80
90	301	331	40	80
96	347	382	40	80
102	394	433	40	80
108	435	479	40	80
114	483	531	40	80
120	524	576	40	80

- Notes:
- a Costs are based on PVC class 150 pipe for the smaller long, rural pipelines.
 - b Appurtenances assumed to be 10% of installed pipe costs.
 - c For urban pipelines, add 20% to base costs and 35% to cost with appurtenances for pipes 40" or larger. Add more for smaller pipelines.
 - d Adjust costs for obstacles (rock, forested areas) and easy conditions (soft soil in flat country).

**Table 2
Pump Station Costs**

Horsepower	Costs
25	\$ 250,000
50	\$ 400,000
100	\$ 620,000
200	\$ 930,000
300	\$ 1,200,000
400	\$ 1,500,000
500	\$ 1,700,000
600	\$ 1,800,000
700	\$ 1,900,000
800	\$ 2,100,000
900	\$ 2,200,000
1,000	\$ 2,400,000
2,000	\$ 3,500,000
3,000	\$ 4,200,000
4,000	\$ 5,100,000
5,000	\$ 5,800,000
6,000	\$ 6,600,000
7,000	\$ 7,200,000
8,000	\$ 7,800,000
9,000	\$ 8,500,000
10,000	\$ 9,000,000
20,000	\$14,000,000
30,000	\$17,000,000

**Table 3
Ground Storage Tanks**

Size	With Roof	Without Roof
0.10	\$ 75,000	
0.25	\$ 100,000	
0.50	\$ 156,000	
1.00	\$ 275,000	\$ 220,000
1.50	\$ 354,000	\$ 278,000
2.00	\$ 432,000	\$ 335,000
2.50	\$ 510,000	\$ 385,000
3.00	\$ 589,000	\$ 435,000
3.50	\$ 668,000	\$ 485,000
4.00	\$ 746,000	\$ 535,000
5.00	\$ 895,000	\$ 630,000
6.00	\$ 1,043,000	\$ 724,000

Table 4
Conventional Water Treatment Plant Costs

Plant Capacity (mgd)	New Conventional Plants	Conventional Plant Expansions
1	\$ 4,000,000	\$ 2,000,000
3	\$ 7,300,000	\$ 5,100,000
7	\$ 11,500,000	\$ 8,500,000
10	\$ 14,000,000	\$ 10,000,000
15	\$ 17,500,000	\$ 12,500,000
20	\$ 21,000,000	\$ 15,500,000
30	\$ 28,000,000	\$ 21,000,000
40	\$ 35,000,000	\$ 26,500,000
50	\$ 42,000,000	\$ 31,500,000
60	\$ 48,750,000	\$ 36,500,000
70	\$ 55,500,000	\$ 41,500,000
80	\$ 62,000,000	\$ 46,750,000
90	\$ 68,000,000	\$ 52,000,000
100	\$ 74,750,000	\$ 57,500,000

Table 5
Groundwater Nitrate Treatment

Treatment Capacity (MGD)	Ion Exchange Plant Cost
0.25	\$ 600,000
1.0	\$ 1,300,000
3.0	\$ 3,000,000

Table 6
Factors for Interest During Construction

Construction Period	Factor
6 months	0.021667
12 months	0.041667
18 months	0.057593
24 months	0.078194
36 month construction	0.118796

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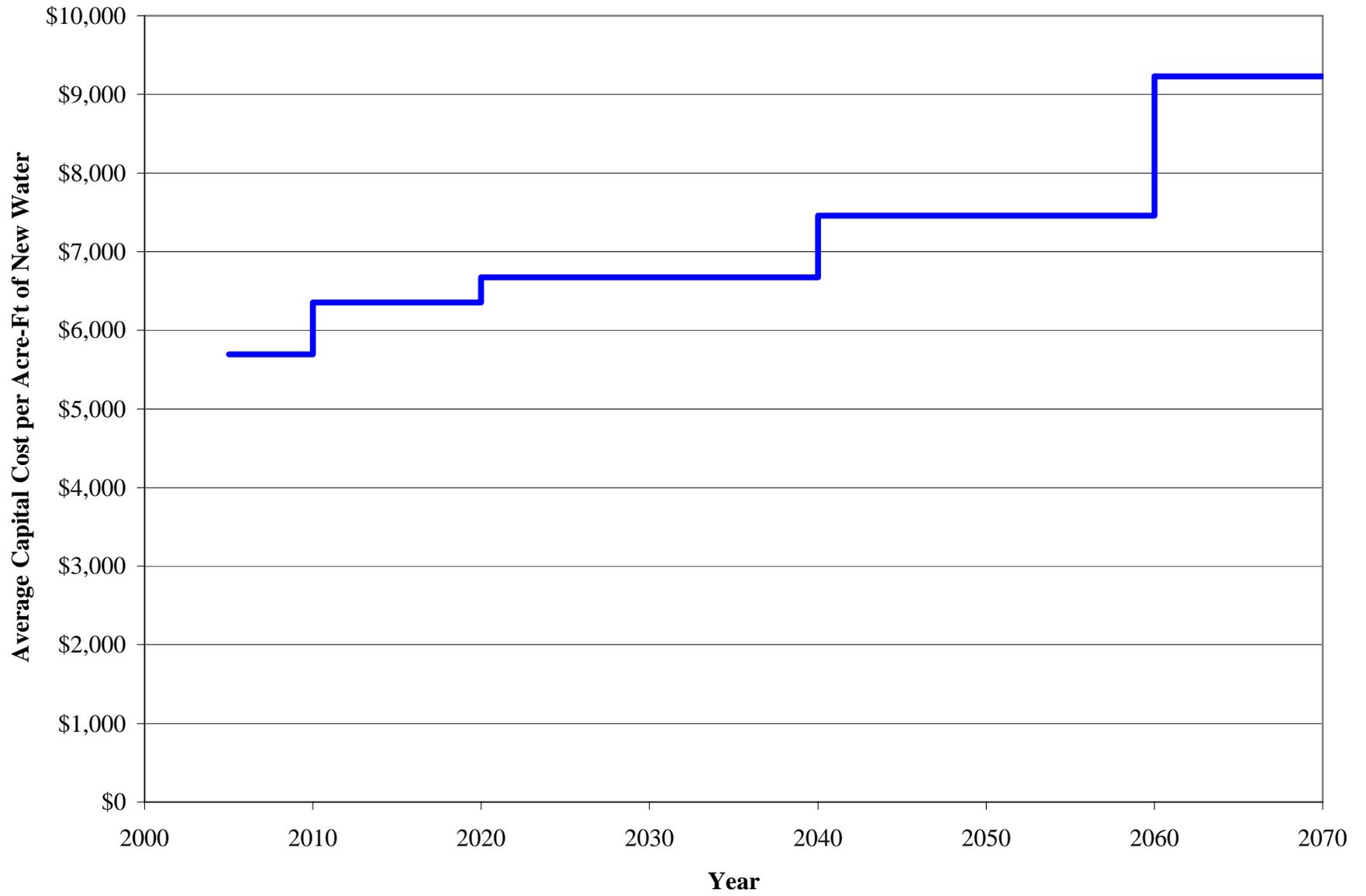
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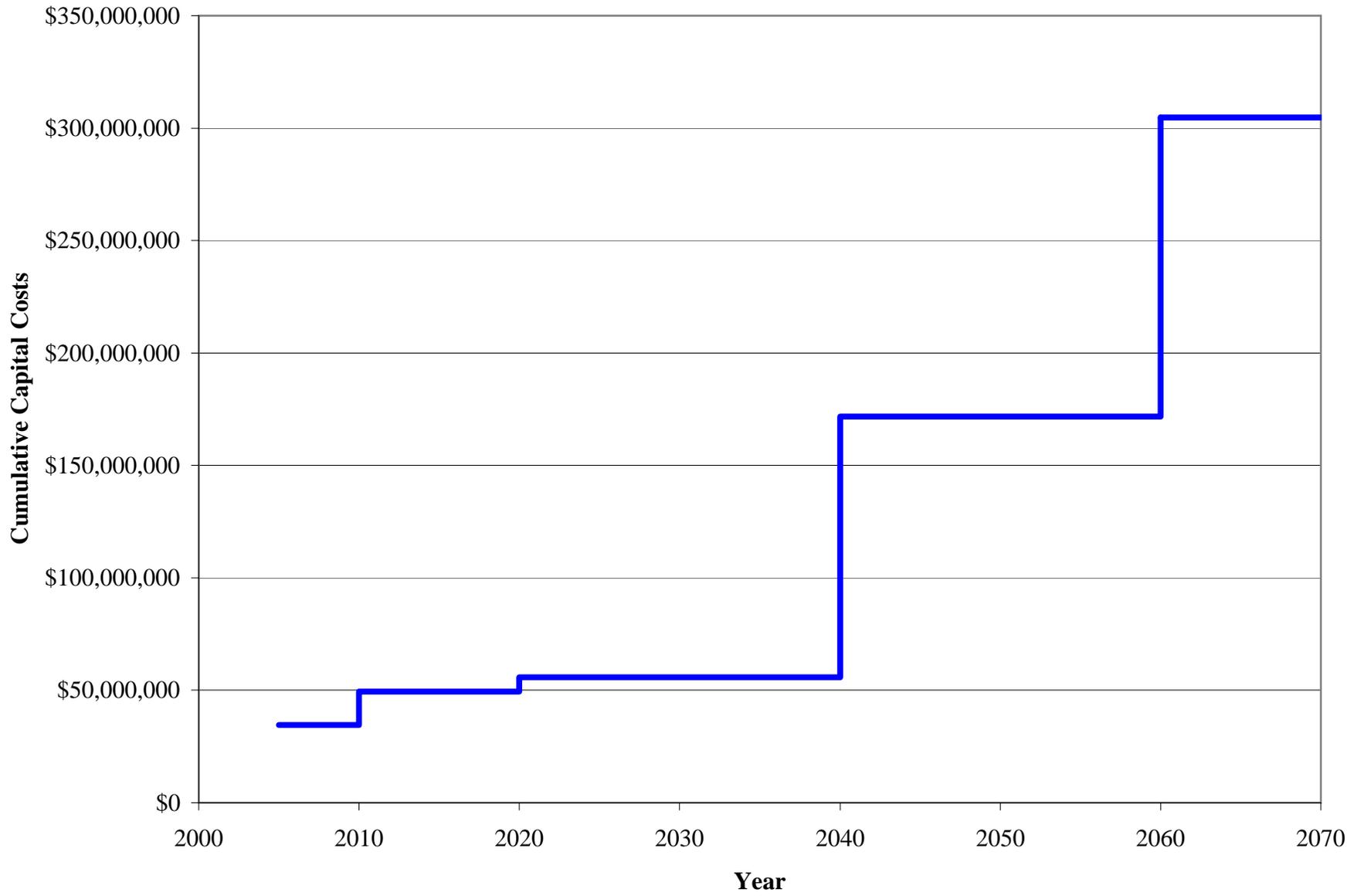
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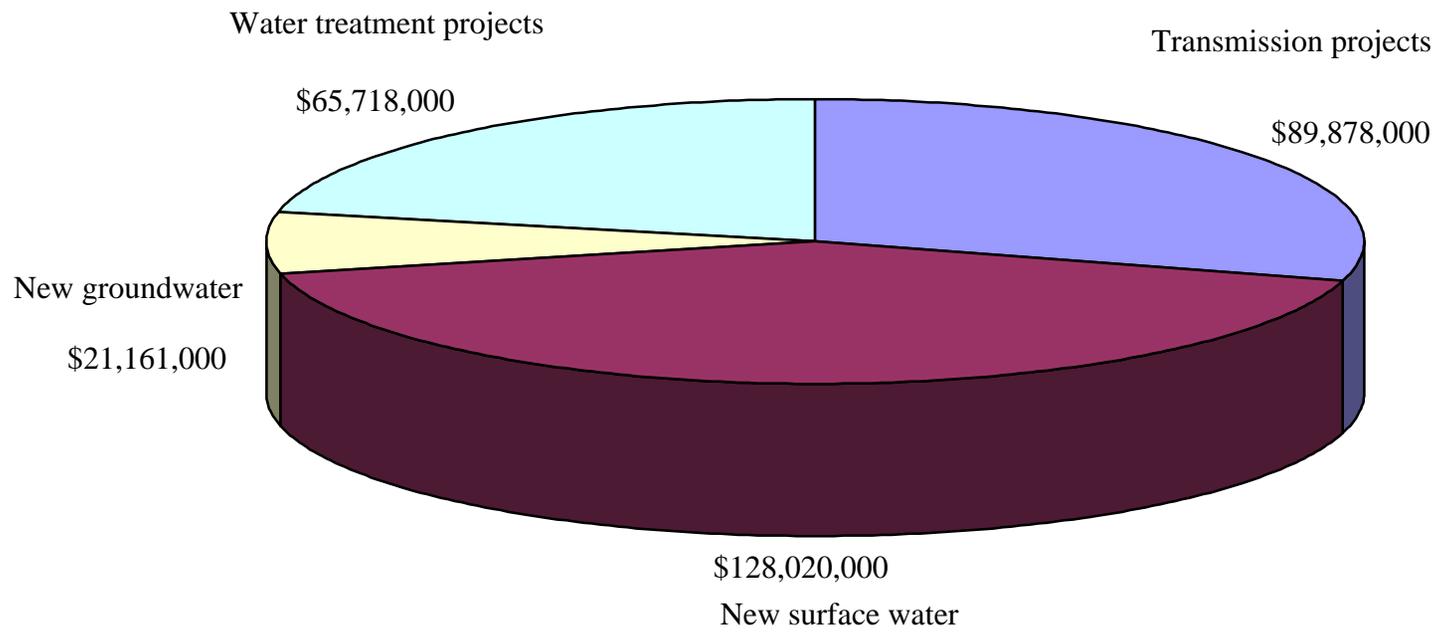
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Year to be Implemented	Strategy	Quantity (AF/Y) raw	Quantity (AF/Y) treated	Total Capital Costs
2005	Abilene supply to Lawn through Steamboat Mtn WSC		150	\$1,873,737
2005	Expansion of Zephyr WSC into northeast Brown County		170	\$2,814,220
2005	New Groundwater for Sweetwater	5,100	5,100	\$16,972,419
2005	Nitrate treatment of groundwater for Rising Star with backup connection to Westbound WSC	150	150	\$743,585
2005	Regional WTP for Midway Group with sales from Possum Kingdom Lake	2,000	1,400	\$17,240,991
2005	Supply from Eastland Co. WSD to Strawn	200	200	\$1,431,830
2010	Emergency connection to Anson from Abilene to Hamlin line	NA	NA	\$886,652
2010	Interconnection between NCTMWA and Abilene through Hamlin & Stamford		700	\$5,001,808
2010	Sales from Palo Pinto MWD to Gordon	100	100	\$1,102,159
2010	Sales from Eastland County WSD to Cisco		500	\$3,580,798
2010	New Groundwater for ULMWD	1,000		\$4,188,660
2040	Clear Fork Diversions to Hubbard Creek Reservoir with supply to Abilene	16,000	12,500	\$99,115,505
2040	Lake Stamford to Midway Group	800	800	\$10,161,780
2040	Sales from Possum Kingdom Lake to Palo Pinto MWD	1,000	1,000	\$2,833,608
2040	Supply from Possum Kingdom Lake to Graham with blending at WTP	360	360	\$3,801,729
2060	Sales from Possum Kingdom Lake to Abilene with expansion of Hubbard Creek transmission system	8,000	6,000	\$73,328,718
2060	Turkey Peak Reservoir	7,600	4,000	\$59,698,596
		43,330		\$304,776,795

\$5,720,000 \$5,020,991

subtracted the c

Summary of Strategy Costs

Water User	Alternative	Capital Costs					Annual Costs									
		Quantity (AF/Y) raw	Quantity (AF/Y) treated	Construction Costs	Other Project Costs	Total Capital Costs	Annualized Capital	Pumping (electrical)	Treatment	Water Purchase	Use of existing pipelines	O&M	Total Annual Costs	Cost per AF/Y	Cost per 1,000 gallons	
Throckmorton	Elm Creek Reservoir (priority analysis)	220	220	\$12,108,000	\$5,988,318	\$18,096,318	\$1,206,923	\$2,600	\$25,102	\$0	\$0	\$95,810	\$1,330,435	\$6,047	\$18.56	
	Elm Creek Reservoir (Transmission and treatment)	1,300	340	\$887,000	\$311,928	\$1,198,928	\$87,100	\$2,600	\$38,794	\$333,137	\$0	\$13,310	\$474,941	\$1,397	\$4.29	
	Midway Group Regional WTP/ Possum Kingdom Lake		193	See Midway Group												
	Lake Stamford	800	800	\$7,488,000	\$2,673,780	\$10,161,780	\$738,240	\$20,800	\$91,240	\$260,680	\$0	\$73,630	\$1,184,590	\$1,481	\$4.54	
	Lake Stamford	340	340	\$3,855,000	\$1,342,250	\$5,197,250	\$377,580	\$10,200	\$38,780	\$110,790	\$0	\$52,575	\$589,925	\$1,735	\$5.32	
Abilene	Possum Kingdom Lake	20,000	14,000	\$89,040,000	\$38,534,554	\$127,574,554	\$9,268,153	\$799,800	\$3,910,220	\$795,000	\$0	\$706,900	\$15,480,073	\$1,106	\$3.39	
	West Double Mountain Fork Treatment and Transmission Systems	20,000	14,000	\$69,122,000	\$30,319,680	\$99,441,680	\$7,224,330	\$435,500	\$3,910,220	\$5,067,335	\$0	\$371,720	\$17,009,105	\$1,215	\$3.73	
	West Double Mountain Fork Treatment and Transmission Systems (priority analysis)	8,000	5,600	\$41,870,000	\$18,319,880	\$60,189,880	\$4,372,730	\$158,400	\$1,564,080	\$7,975,810	\$0	\$269,200	\$14,340,220	\$2,561	\$7.86	
	East Double Mountain Fork Treatment and Transmission Systems	20,000	14,000	\$66,315,400	\$29,162,140	\$95,477,540	\$6,936,340	\$527,900	\$3,910,220	\$5,694,056	\$0	\$340,654	\$17,409,170	\$1,244	\$3.82	
	East Double Mountain Fork Treatment and Transmission Systems (priority analysis)	9,500	6,650	\$45,284,000	\$19,889,663	\$65,173,663	\$4,734,800	\$159,600	\$1,857,350	\$11,263,570	\$0	\$260,840	\$18,276,160	\$2,748	\$8.43	
	Clear Fork Diversion with no transmission improvements	12,500	12,500	\$12,500,000	\$5,694,531	\$18,194,531	\$1,321,810	\$790,500	\$1,425,600	\$5,847,492	\$0		\$9,385,402	\$751	\$2.30	
	Clear Fork Diversion with transmission improvements and water from Possum Kingdom	20,500	18,100	\$66,960,000	\$24,118,718	\$91,078,718	\$6,616,770	\$2,189,200	\$2,989,680	\$6,165,490	\$0	\$514,480	\$18,475,620	\$1,021	\$3.13	
	Cedar Ridge Reservoir w/ compensation to BRA	20,000	14,000	\$69,531,400	\$30,488,530	\$100,019,930	\$7,266,339	\$725,300	\$3,910,216	\$7,470,369	\$0	\$453,064	\$19,825,288	\$1,416	\$4.35	
	Cedar Ridge Reservoir (priority analysis)	14,700	9,400	\$41,785,000	\$18,203,960	\$59,988,960	\$4,358,133	\$596,900	\$2,624,730	\$8,861,093	\$0	\$309,350	\$16,750,205	\$1,782	\$5.47	
Aspermont Development Corporation	West Double Mountain Fork Reservoir	34,000		\$70,500,000	\$42,585,133	\$113,085,133	\$7,515,810	\$0	\$0	\$638,660	\$0	\$460,000	\$8,614,470	\$253	\$0.78	
	West Double Mountain Fork Reservoir (priority analysis)	8,000		\$70,500,000	\$42,585,133	\$113,085,133	\$7,515,810	\$0	\$0	\$0	\$0	\$460,000	\$7,975,810	\$997	\$3.06	
	East Double Mountain Fork Reservoir	43,000		\$98,300,000	\$62,899,527	\$161,199,527	\$10,713,570	\$0	\$0	\$978,650	\$0	\$550,000	\$12,242,220	\$285	\$0.87	
	East Double Mountain Fork Reservoir (priority analysis)	9,500		\$98,300,000	\$62,899,527	\$161,199,527	\$10,713,570	\$0	\$0	\$0	\$0	\$550,000	\$11,263,570	\$1,186	\$3.64	
NCTMWA	Groundwater from Seymour Aquifer	500	500	\$1,789,400	\$605,500	\$2,394,900	\$174,000	\$10,000	\$57,020	\$13,850	\$0	\$44,725	\$299,595	\$599	\$1.84	
	Lake Creek diversions	800	800	\$5,450,600	\$2,229,830	\$7,680,430	\$557,970	\$21,400	\$91,240	\$11,930	\$0	\$127,260	\$809,800	\$1,012	\$3.11	
	Interconnection with Abilene through Hamlin & Stamford		700	\$3,737,200	\$1,264,608	\$5,001,808	\$363,400	\$36,300	\$0	\$319,300	unknown	\$46,700	\$765,700	\$1,094	\$3.36	
Midway Group	Regional WTP/ Possum Kingdom Lake	2,000	1,400	\$11,939,400	\$5,301,591	\$17,240,991	\$1,252,540	\$90,000	\$391,020	\$79,500	unknown	\$66,690	\$1,879,750	\$1,343	\$4.12	

Summary of Strategy Costs

Water User	Alternative			Capital Costs			Annual Costs							Cost per 1,000 gallons	
		Quantity (AF/Y) raw	Quantity (AF/Y) treated	Construction Costs	Other Project Costs	Total Capital Costs	Annualized Capital	Pumping (electrical)	Treatment	Water Purchase	Use of existing pipelines	O&M	Total Annual Costs		Cost per AF/Y
Palo Pinto MWD	Release from Possum Kingdom with blending	1,000	1,000	\$2,030,000	\$803,608	\$2,833,608	\$205,860	\$15,300	\$114,050	\$39,750	\$0	\$37,800	\$412,760	\$413	\$1.27
	Release from Possum Kingdom with treatment	2,500	1,750	\$11,070,000	\$4,724,299	\$15,794,299	\$1,147,440	\$30,200	\$488,780	\$99,380	\$0	\$50,200	\$1,816,000	\$1,038	\$3.18
	Turkey Peak Reservoir (raw water)	7,600		\$24,600,000	\$16,023,494	\$40,623,494	\$2,699,900	\$0	\$0	\$0	\$0	\$155,000	\$2,854,900	\$376	\$1.15
	Turkey Peak Reservoir (municipal supply)	4,000	4,000	\$12,671,500	\$6,403,602	\$19,075,102	\$1,385,790	\$106,900	\$456,190	\$1,502,579	\$0	\$63,715	\$3,515,174	\$879	\$2.70
Cisco	Eastland Co. WSD (1.4 MGD)		780	\$3,541,200	\$1,203,189	\$4,744,389	\$344,670	\$27,600	\$0	\$381,250	\$0	\$33,410	\$786,930	NA	NA
	Eastland Co. WSD (1 MGD)		500	\$2,671,800	\$908,998	\$3,580,798	\$260,140	\$12,700	\$0	\$244,390	\$0	\$24,720	\$541,950	NA	NA
	Lake Possum Kingdom with blending	250	250	\$2,246,000	\$912,396	\$3,158,396	\$229,450	\$4,300	\$61,100	\$9,940	unknown	\$24,210	\$329,000	NA	NA
Rising Star	Lake Possum Kingdom with treatment	500	350	\$6,165,400	\$2,523,635	\$8,689,035	\$631,250	\$8,600	\$97,760	\$19,880	unknown	\$30,650	\$788,140	NA	NA
	Westbound WSC	150	150	\$1,098,850	\$371,833	\$1,470,683	\$106,800	\$9,998	\$0	\$73,300	unknown	\$16,400	\$206,498	\$1,377	\$4.22
Strawn	Nitrate treatment with backup connection to Westbound WSC	150	150	\$536,500	\$207,085	\$743,585	\$54,000	\$2,000	\$9,780	\$24,400	\$0	\$600	\$90,780	\$605	\$1.86
	Eastland Co. WSD	200	200	\$1,093,000	\$338,830	\$1,431,830	\$106,270	\$2,300	\$0	\$97,760	unknown	\$10,980	\$217,310	\$1,087	\$3.33
WCTMWD	Lake Possum Kingdom with blending	1,475		\$3,333,800	\$1,215,448	\$4,549,248	\$330,500	\$126,200	\$0	\$99,380	unknown	\$19,300	\$575,380	\$390	\$1.20
	Clear Fork Diversions to Hubbard Creek Reservoir w/ compensation to BRA	16,000		\$58,287,800	\$22,633,174	\$80,920,974	\$5,878,820	\$286,400	\$0	\$327,940	\$0	\$991,630	\$7,484,790	\$468	\$1.44
	Clear Fork Diversions to Hubbard Creek Reservoir (priority analysis)	6,000		\$58,287,800	\$22,633,174	\$80,920,974	\$5,878,820	\$260,400	\$0	\$0	\$0	\$991,630	\$7,130,850	\$1,188	\$3.65
	Cedar Ridge Reservoir (priority analysis)	14,700		\$76,738,100	\$46,669,401	\$123,407,501	\$8,201,852	\$0	\$0	\$0	\$0	\$659,241	\$8,861,093	\$603	\$1.85
	Cedar Ridge Reservoir w/ compensation to BRA	0		\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	#DIV/0!	#DIV/0!
Graham	Possum Kingdom Lake w/ treatment	1,000	700	\$8,374,000	\$3,465,686	\$11,839,686	\$860,140	\$29,200	\$195,510	\$39,750	\$0	\$51,240	\$1,175,840	\$1,680	\$5.16
	Possum Kingdom Lake with blending at WTP	360	360	\$2,786,000	\$1,015,729	\$3,801,729	\$276,190	\$10,600	\$41,060	\$14,310	\$0	\$36,360	\$378,520	\$1,051	\$3.23
	Possum Kingdom Lake w/ blending at Lake Graham	1,000	700	\$4,268,800	\$1,556,333	\$5,825,133	\$423,190	\$29,200	\$79,830	\$39,750	\$0	\$58,040	\$630,010	\$900	\$2.76
ULMWD	Groundwater	1,000		\$3,129,640	\$1,059,020	\$4,188,660	\$304,300	\$21,400	\$0	\$27,700	\$0	\$113,875	\$467,275	\$467	\$1.43
Sweetwater	Groundwater	5,100	5,100	\$12,681,280	\$4,291,139	\$16,972,419	\$1,233,000	\$123,500	\$581,640	\$141,260	\$0	\$612,100	\$2,691,500	\$528	\$1.62
Lawn	New pipeline from Abilene to Lawn		150	\$1,786,000	\$604,353	\$2,390,353	\$173,700	\$3,100	\$0	\$68,400	\$0	\$19,400	\$264,600	\$1,764	\$5.41
	Abilene supply through Steamboat Mtn WSC		150	\$1,400,000	\$473,737	\$1,873,737	\$136,100	\$3,100	\$0	\$97,800	unknown	\$18,425	\$255,425	\$1,703	\$5.23
Anson	Anson Connection to Abilene-Hamlin Pipeline with upgrades		700	\$1,865,840	\$659,649	\$2,525,489	\$183,500	\$16,700	\$0	\$319,300	unknown	\$18,408	\$537,908	\$768	\$2.36
	Anson Connection to Abilene-Hamlin Pipeline (without upgrades)		550	\$662,480	\$224,172	\$886,652	\$64,400	\$18,400	\$0	\$250,900	unknown	\$6,150	\$339,850	NA	NA
NE Brown County	Zephyr WSC expansion		170	\$2,102,700	\$711,520	\$2,814,220	\$204,400	\$2,800	\$0	\$69,200	unknown	\$26,400	\$302,800	\$1,781	\$5.47
Gordon	Palo Pinto Lake	100	100	\$823,500	\$255,285	\$1,078,785	\$80,070	\$1,900	\$11,400	\$32,590	\$0	\$6,740	\$132,700	NA	NA
3P Water Group	Eastland Co. WSD		850	\$14,320,280	\$4,439,287	\$18,759,567	\$1,392,390	\$5,300	\$0	\$415,460	\$0	\$118,850	\$1,932,000	Varies	Varies

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

Lawn
Abilene-Lawn
150

Construction Costs	Size	Amount	Unit	Unit cost	Cost
8" PVC Water Line	8 in.	71,800	LF	\$20	\$1,436,000
Pipeline crossings		5	LS	\$30,000	\$150,000
Pump Station	20HP	1	EA	\$200,000	\$200,000
<i>Subtotal - Construction Costs</i>					<i>\$1,786,000</i>
Engineering and Contingencies					\$535,800
Mitigation and Permitting					\$17,860
<i>Subtotal</i>					<i>\$2,339,660</i>
Interest During Construction					\$50,693
Total Capital Project Costs					\$2,390,353
Annual Costs					
Debt Service - Total Capital					\$173,700
Water Purchase					\$68,400
Operation and Maintenance					
Pipelines & storage tanks (1%)					\$14,400
Pump stations (2.5%)					\$5,000
Surface Water Treatment					\$0
Pumping Costs					\$3,100
Total Annual Costs					\$264,600
Annual Cost (\$ per acre-foot)					\$1,764
Annual Cost (\$ per 1000 gallons)					\$5.41

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

Lawn
Steamboat Mtn WSC-Lawn
150

Construction Costs	Size	Amount	Unit	Unit cost	Cost
10" PVC Water Line	10 in.	15,000	LF	\$23	\$345,000
8" PVC Water Line	8 in	34,000	LF	\$20	\$680,000
Pipeline crossings		1	LS	\$50,000	\$50,000
Pump Station		1	EA	\$200,000	\$200,000
Pump Station Improvements		1	EA	\$75,000	\$75,000
Master meter and regulator		1	EA	\$10,000	\$10,000
SCADA system		2	EA	\$20,000	\$40,000

Subtotal - Construction Costs *\$1,400,000*

Engineering and Contingencies \$420,000
 Mitigation and Permitting \$14,000

Subtotal *\$1,834,000*

Interest During Construction \$39,737
Total Capital Project Costs **\$1,873,737**

Annual Costs

Debt Service - Total Capital	\$136,100
Water Purchase	\$97,800
Operation and Maintenance	
Pipelines & storage tanks (1%)	\$10,300
Pump stations (2.5%)	\$8,125
Surface Water Treatment	\$0
Pumping Costs	\$3,100
Total Annual Costs	\$255,425

Annual Cost (\$ per acre-foot) **\$1,703**
Annual Cost (\$ per 1000 gallons) **\$5.23**

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

Hamlin, Stamford, NCTMWA
Abilene - NCTMWA Interconnection
700

Construction Costs	Size	Amount	Unit	Unit cost	Cost
14" PVC Water Line	14 in	85,100	LF	\$32	\$2,723,200
Bore & Encasement		1	LS	\$114,000	\$114,000
Pump Station		2	EA	\$200,000	\$400,000
Pump Station Improvements		3	EA	\$50,000	\$150,000
Upsize 0.5 MG ground storage tank	1 MG	1	EA	\$200,000	\$200,000
Master meter and regulator		3	EA	\$10,000	\$30,000
SCADA system		6	EA	\$20,000	\$120,000
<i>Subtotal - Construction Costs</i>					<i>\$3,737,200</i>
Engineering and Contingencies					\$1,121,160
Mitigation and Permitting					\$37,372
<i>Subtotal</i>					<i>\$4,895,732</i>
Interest During Construction					\$106,076
Total Capital Project Costs					\$5,001,808
Annual Costs					
Debt Service - Total Capital					\$363,400
Water Purchase					\$319,300
Operation and Maintenance					
Pipelines & storage tanks (1%)					\$29,200
Pump stations (2.5%)					\$17,500
Surface Water Treatment					\$0
Pumping Costs					\$36,300
Total Annual Costs					\$765,700
Annual Cost (\$ per acre-foot)					\$1,094
Annual Cost (\$ per 1000 gallons)					\$3.36

WATER USER**STRATEGY:****AMOUNT with upgrades (ac-ft/yr):****Abilene - Anson****Abilene - Hamlin- Anson Interconnection****700**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Upsize 14 PVC Water line to 18"	18 in	114,000	LF	\$10	\$1,140,000
14" PVC Water Line	14 in	21,120	LF	\$32	\$675,840
Bore & Encasement		1	LS	\$40,000	\$40,000
Master meter and regulator		1	EA	\$10,000	\$10,000
ROW Easement		21,120	LF	\$1	\$21,120
<i>Subtotal - Construction Costs w/ upgrades</i>					\$1,886,960
Engineering and Contingencies w/ upgrades					\$566,100
Mitigation and Permitting					\$18,870
<i>Subtotal w/ upgrades</i>					<i>\$2,471,930</i>
Interest During Construction w/ upgrades					\$53,559
Total Capital Project Costs w/ upgrades					\$2,525,489
Annual Costs					
Debt Service - Total Capital w/ upgrades					\$183,500
Water Purchase					\$319,300
Operation and Maintenance					
Pipelines & storage tanks (1%)					\$18,158
Pump stations (2.5%)					\$250
Surface Water Treatment					\$0
Pumping Costs					\$16,700
Total Annual Costs					\$537,908
Annual Cost (\$ per acre-foot)					\$768
Annual Cost (\$ per 1000 gallons)					\$2.36

WATER USER

Abilene - Anson

STRATEGY:

Abilene - Hamlin- Anson Interconnection

AMOUNT with no upgrades (ac-ft/yr):**550**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
12" PVC Water Line	12	21,120	LF	\$28	\$591,360
Bore & Encasement		1	LS	\$40,000	\$40,000
Master meter and regulator		1	EA	\$10,000	\$10,000
ROW Easement		21,120	LF	\$1	\$21,120
<i>Subtotal - Construction Costs w/o upgrades</i>					<i>\$662,480</i>
Engineering and Contingencies w/o upgrades					\$198,744
Mitigation and Permitting					\$6,625
Interest During Construction w/o upgrades					\$18,804
Total Capital Project Costs w/o upgrades					\$886,652

Annual Costs

Debt Service - Total Capital w/o upgrades	\$64,400
Water Purchase	\$250,900
Operation and Maintenance	
Pipelines & storage tanks (1%)	\$5,900
Pump stations (2.5%)	\$250
Surface Water Treatment	\$0
Pumping Costs	\$18,400
Total Annual Costs	\$339,850

Annual Cost (\$ per acre-foot)**Annual Cost (\$ per 1000 gallons)**

WATER USER**STRATEGY:****AMOUNT: Raw water (ac-ft/yr):****AMOUNT: Increased firm yield (ac-ft/yr):****NCTMWA****Lake Creek Diversions to Brushy Crk****292 to 5583****800**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
<i>Raw Water</i>					
24" Pipeline	24	9,240	LF	\$65	\$600,600
Diversion Weir and Intake canal		1	LS	\$3,000,000	\$3,000,000
Pump station	350 HP	1	EA	\$1,350,000	\$1,350,000
Discharge structure		1	EA	\$500,000	\$500,000
<i>Subtotal - Construction Costs</i>					<i>\$5,450,600</i>
Engineering and Contingencies					\$1,785,180
Mitigation and Permitting					\$272,530
ROW Land Acquisition		9,240	LF	\$1	\$9,240
<i>Subtotal</i>					<i>\$7,517,550</i>
Interest During Construction					\$162,880
Total Capital Project Costs - Raw Water					\$7,680,430

Annual Costs

Debt Service - Raw water	\$557,970
Water Purchase	\$11,930
Operation and Maintenance	
Pipelines	\$6,010
Pumpstations	\$121,250
Surface Water Treatment	\$91,240
Pumping Costs - Raw water	\$21,400
Total Annual Costs - Raw water	\$718,560
Total Annual Costs - Treated water	\$809,800

Annual Raw Water Cost (\$ per acre-foot)	\$898
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Annual Raw Water Cost (\$ per 1000 gallons)	\$2.76
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Annual Treated Water Cost (\$ per acre-foot)	\$1,012
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Annual Treated Water Cost (\$ per 1000 gallons)	\$3.11
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**WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):***

**Rising Star
Westbound WSC - Rising Star
150**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Upsizing 8" to 12" pipeline	12	18,500	LF	\$8	\$148,000
Upsizing 8" to 10" pipeline	10	25,000	LF	\$3	\$75,000
Upsizing 6" to 10"	10	17,200	LF	\$8	\$137,600
Upsizing 4" to 8"	8	39,000	LF	\$8	\$312,000
Upsize 3" to 6"		5,300	LF	\$5	\$26,500
6" PVC Water Line	6	2,650	LF	\$15	\$39,750
Upsizing wellfield pump station		1	EA	\$100,000	\$100,000
Upsizing FM 169 pump station		1	EA	\$100,000	\$100,000
Cisco pump station improvements		1	EA	\$100,000	\$100,000
Master meter & regulator		2	EA	\$10,000	\$20,000
SCADA system		2	EA	\$20,000	\$40,000
<i>Subtotal - Construction Costs</i>					<i>\$1,098,850</i>
Engineering and Contingencies					\$329,655
Mitigation and Permitting					\$10,989
<i>Subtotal</i>					<i>\$1,439,494</i>
Interest During Construction					\$31,190
Total Capital Project Costs					\$1,470,683
Annual Costs					
Debt Service - Total Capital					\$106,800
Water Purchase					\$73,300
Operation and Maintenance					
Pipelines					\$7,400
Pumpstations					\$9,000
Surface Water Treatment					\$0
Pumping Costs					\$9,998
Total Annual Costs					\$206,498
Annual Cost (\$ per acre-foot)					\$1,377
Annual Cost (\$ per 1000 gallons)					\$4.22

* Assumes peak capacity provided is 200 gpm. Average yearly supply is estimated at one-half of the peak.

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):*

Rising Star
Nitrate treatment with backup to Westbound WSC
150

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Ion Exchange treatment facility	0.2 MGD	1	EA	\$500,000	\$500,000
3" PVC Water Line	3	2,650	LF	\$10	\$26,500
Master meter & regulator		1	EA	\$10,000	\$10,000
<i>Subtotal - Construction Costs</i>					<i>\$536,500</i>
Engineering and Contingencies					\$185,950
Mitigation and Permitting					\$5,365
<i>Subtotal</i>					<i>\$727,815</i>
Interest During Construction					\$15,770
Total Capital Project Costs					\$743,585
Annual Costs					
Debt Service - Total Capital					\$54,000
Water Purchase					16,290 Kgal \$1.50 \$24,400
Operation and Maintenance					
Pipelines					\$300
Pumpstations					\$300
Surface Water Treatment					32,590 Kgal \$0.25 \$8,150
Pumping Costs					\$2,000
Reject water disposal					6,520 Kgal \$0.25 \$1,630
Total Annual Costs					\$90,780
Annual Cost (\$ per acre-foot)					\$605
Annual Cost (\$ per 1000 gallons)					\$1.86

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

Throckmorton
Lake Stamford
340

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Pipeline	8 in	146,000	LF	\$20	\$2,920,000.00
Pump station and intake structure at Lake Stamford	50 HP	1	EA	\$550,000	\$550,000.00
In-line pump station	35 HP	1	EA	\$310,000	\$310,000.00
Ground storage tank	0.10 MG	1	EA	\$75,000	\$75,000.00
					\$0.00
<i>Subtotal - Construction Costs</i>					<i>\$3,855,000.00</i>
Engineering and Contingencies					\$1,156,500.00
Mitigation and Permitting					\$38,550.00
ROW Land Acquisition		37,000	LF	\$1.00	\$37,000.00
					\$0.00
<i>Subtotal</i>					<i>\$5,087,050.00</i>
Interest During Construction					\$110,200.00
Total Capital Project Costs					\$5,197,300.00
Annual Costs					
Debt Service - Total Capital					\$377,580.00
Water Purchase					\$110,790.00
Operation and Maintenance					
Pipelines					\$29,200.00
Pumpstations					\$23,375.00
Surface Water Treatment					\$38,780.00
Pumping Costs					\$10,200.00
Total Annual Costs					\$589,925.00
Annual Cost (\$ per acre-foot)					\$1,735.07
Annual Cost (\$ per 1000 gallons)					\$5.32

**WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):**

**Throckmorton
Lake Stamford
800**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Pipeline	12 in	146,000	LF	\$28	\$4,088,000
Pump station and intake structure at Lake Stamford	120 HP	1	EA	\$900,000	\$900,000
In-line pump station	40 HP	1	EA	\$350,000	\$350,000
Ground storage tank	0.5 MG	1	EA	\$150,000	\$150,000
WTP expansion	1 MGD	1	LS	\$2,000,000	\$2,000,000
<i>Subtotal - Construction Costs</i>					<i>\$7,488,000</i>
Engineering and Contingencies					\$2,346,400
Mitigation and Permitting					\$74,880
ROW Land Acquisition		37,000	LF	\$1.00	\$37,000
					\$0
<i>Subtotal</i>					<i>\$9,946,280</i>
Interest During Construction					\$215,500
Total Capital Project Costs					\$10,161,800
Annual Costs					
Debt Service - Total Capital					\$738,240
Water Purchase					\$260,680
Operation and Maintenance					
Pipelines					\$42,380
Pumpstations					\$31,250
Surface Water Treatment					\$91,240
Pumping Costs					\$20,800
Total Annual Costs					\$1,184,590
Annual Cost (\$ per acre-foot)					\$1,481
Annual Cost (\$ per 1000 gallons)					\$4.54

**WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):**

**Strawn
Eastland Co. WSD - Strawn
200**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
6" PVC Water Line	6in	68,200	LF	\$15	\$1,023,000
Bore and encasement		1	LS	\$40,000	\$40,000
Master meter and regulator		1	EA	\$10,000	\$10,000
SCADA system		2	EA	\$20,000	\$20,000
<i>Subtotal - Construction Costs</i>					<i>\$1,093,000</i>
Engineering and Contingencies					\$327,900
Mitigation and Permitting					\$10,930
ROW Land Acquisition			LF	\$1	\$0
					\$0
<i>Subtotal</i>					<i>\$1,431,830</i>
Interest During Construction					\$31,023
Total Capital Project Costs					\$1,462,853
Annual Costs					
Debt Service - Total Capital					\$106,270
Water Purchase					\$97,760
Operation and Maintenance					
Pipelines					\$10,230
Pumpstations					\$750
Surface Water Treatment					\$0
Pumping Costs					\$2,300
Total Annual Costs					\$217,310
Annual Cost (\$ per acre-foot)					\$1,087
Annual Cost (\$ per 1000 gallons)					\$3.33

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

3P Water Group
Eastland Co. WSD - 3P Water Group
850

Construction Costs	Size	Amount	Unit	Unit cost	Cost
16" PVC Water Line	16 in	116,160	LF	\$37	\$4,297,920
14" PVC Water Line	14 in	84,480	LF	\$32	\$2,703,360
10" PVC Water Line	10 in	84,000	LF	\$23	\$1,932,000
6" PVC Water Line	6 in	9,600	LF	\$15	\$144,000
4" PVC Water Line	4 in	15,600	LF	\$10	\$156,000
Upgrade raw water line	20 in.	27,000	LF	\$51	\$1,377,000
Upgrade ECWSD WTP	1.5 mgd	1	EA	\$2,750,000	\$2,750,000
Upgrade ECWSD Pump station/Intake		1	EA	\$250,000	\$250,000
Ground Storage Tank	1 mgd	2	EA	\$275,000	\$550,000
Bore and encasement		6	LS	\$20,000	\$120,000
Master meter and regulator		1	EA	\$10,000	\$10,000
SCADA system		1	EA	\$30,000	\$30,000
<i>Subtotal - Construction Costs</i>					<i>\$14,320,280</i>
Engineering and Contingencies					\$4,296,084
Mitigation and Permitting					\$143,203
ROW Land Acquisition					\$0
<i>Subtotal</i>					<i>\$18,759,567</i>
Interest During Construction					\$406,464
Total Capital Project Costs					\$19,166,030
Annual Costs					
Debt Service - Total Capital					\$1,392,390
Water Purchase					\$415,460
Operation and Maintenance					
Pipelines					\$111,600
Pumpstations					\$7,250
Surface Water Treatment					\$0
Pumping Costs					\$5,300
Total Annual Costs					\$1,932,000
Annual Cost (\$ per acre-foot)					\$2,273
Annual Cost (\$ per 1000 gallons)					\$6.98

**WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):**

**3P Water Group (by participant)
Eastland Co. WSD - 3P Water Group**

	61	92	232	232	232
Construction Costs	Strawn	Gordon	Santos	Sturdivant- Progress	North Rural
16" PVC Water Line	\$182,259	\$480,160	\$1,210,838	\$1,210,838	\$1,210,838
14" PVC Water Line	\$0	\$0	\$576,000	\$1,063,680	\$1,063,680
10" PVC Water Line	\$0	\$0	\$0	\$0	\$1,932,000
6" PVC Water Line	\$0	\$144,000	\$0	\$0	\$0
4" PVC Water Line	\$156,000	\$0	\$0	\$0	\$0
Upgrade raw water line	\$98,820	\$149,040	\$375,840	\$375,840	\$375,840
Upgrade ECWSD WTP	\$197,353	\$297,647	\$750,588	\$750,588	\$750,588
Upgrade ECWSD Pump station/Intake	\$17,941	\$27,059	\$68,235	\$68,235	\$68,235
Ground Storage Tank	\$19,735	\$29,765	\$75,059	\$212,559	\$212,559
Bore and encasement	\$3,588	\$7,747	\$26,202	\$33,702	\$48,702
Master meter and regulator	\$718	\$1,082	\$2,729	\$2,729	\$2,729
SCADA system	\$2,153	\$3,247	\$8,188	\$8,188	\$8,188
<i>Subtotal - Construction Costs</i>	\$678,567	\$1,139,747	\$3,093,680	\$3,726,360	\$5,673,360
Engineering and Contingencies	\$203,570	\$341,924	\$928,104	\$1,117,908	\$1,702,008
Mitigation and Permitting	\$6,786	\$11,397	\$30,937	\$37,264	\$56,734
ROW Land Acquisition					
<i>Subtotal</i>	\$888,923	\$1,493,068	\$4,052,720	\$4,881,531	\$7,432,101
Interest During Construction	\$19,260	\$32,350	\$87,810	\$105,768	\$161,031
Total Capital Project Costs	\$908,183	\$1,525,418	\$4,140,531	\$4,987,299	\$7,593,133
Annual Costs					
Debt Service - Total Capital	\$65,980	\$110,820	\$300,810	\$362,320	\$551,630
Water Purchase	\$29,820	\$44,970	\$113,400	\$113,400	\$113,400
Operation and Maintenance					
Pipelines	\$4,570	\$8,030	\$22,380	\$28,630	\$47,950
Pumpstations	\$520	\$785	\$1,979	\$1,979	\$1,979
Surface Water Treatment	\$0	\$0	\$0	\$0	\$0
Pumping Costs	\$380	\$574	\$1,447	\$1,447	\$1,447
Total Annual Costs	\$101,271	\$165,178	\$440,015	\$507,775	\$716,405
Annual Cost (\$ per acre-foot)	\$1,660	\$1,795	\$1,897	\$2,189	\$3,088
Annual Cost (\$ per 1000 gallons)	\$5.09	\$5.51	\$5.82	\$6.72	\$9.48

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

Cisco
Eastland Co. WSD - Cisco
500

Construction Costs	Size	Amount	Unit	Unit cost	Cost
10" PVC Water Line	10	96,600	LF	\$23	\$2,221,800
Bore and encasement		1	LS	\$200,000	\$200,000
Pump Station Improvements		2	EA	\$75,000	\$150,000
Master meter and regulator		2	EA	\$10,000	\$20,000
SCADA system		4	EA	\$20,000	\$80,000
<i>Subtotal - Construction Costs</i>					<i>\$2,671,800</i>
Engineering and Contingencies					\$801,540
Mitigation and Permitting					\$26,718
ROW Land Acquisition		4,800	LF	\$1	\$4,800
<i>Subtotal</i>					<i>\$3,504,858</i>
Interest During Construction					\$75,940
Total Capital Project Costs					\$3,580,798
Annual Costs					
Debt Service - Total Capital					\$260,140
Water Purchase					\$244,390
Operation and Maintenance					
Pipelines					\$22,220
Pumpstations					\$2,500
Surface Water Treatment					\$0
Pumping Costs					\$12,700
Total Annual Costs					\$541,950

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

Cisco
Eastland Co. WSD - Cisco
780

Construction Costs	Size	Amount	Unit	Unit cost	Cost
14" PVC Water Line	14	96,600	LF	\$32	\$3,091,200
Bore and encasement		1	LS	\$200,000	\$200,000
Pump Station Improvements		2	EA	\$75,000	\$150,000
Master meter and regulator		2	EA	\$10,000	\$20,000
SCADA system		4	EA	\$20,000	\$80,000
					\$0
<i>Subtotal - Construction Costs</i>					<i>\$3,541,200</i>
Engineering and Contingencies					\$1,062,360
Mitigation and Permitting					\$35,412
ROW Land Acquisition		4,800	LF	\$1	\$4,800
					\$0
<i>Subtotal</i>					<i>\$4,643,772</i>
Interest During Construction					\$100,617
Total Capital Project Costs					\$4,744,389
Annual Costs					
Debt Service - Total Capital					\$344,670
Water Purchase					\$381,250
Operation and Maintenance					
Pipelines					\$30,910
Pumpstations					\$2,500
Surface Water Treatment					\$0
Pumping Costs					\$27,600
Total Annual Costs					\$786,930

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

Gordon
Lake Palo Pinto- Gordon
100

Construction Costs	Size	Amount	Unit	Unit cost	Cost
6" PVC Water Line	6	39,900	LF	\$15	\$598,500
Bore and encasement		1	LS	\$20,000	\$20,000
Pump Station/Intake		1	EA	\$175,000	\$175,000
Master meter and regulator		1	EA	\$10,000	\$10,000
SCADA system		1	EA	\$20,000	\$20,000
					\$0
<i>Subtotal - Construction Costs</i>					\$823,500
Engineering and Contingencies					\$247,050
Mitigation and Permitting					\$8,235
ROW Land Acquisition		0	LF	\$1	\$0
					\$0
<i>Subtotal</i>					\$1,078,785
Interest During Construction					\$23,374
Total Capital Project Costs					\$1,102,159
Annual Costs					
Debt Service - Total Capital					\$80,070
Water Purchase					\$32,590
Operation and Maintenance					
Pipelines					\$5,990
Pumpstations					\$750
Surface Water Treatment					\$11,400
Pumping Costs					\$1,900
Total Annual Costs					\$132,700

WATER USER**STRATEGY:****AMOUNT: Raw water (ac-ft/yr):****AMOUNT: Treated water (ac-ft/yr):****Midway Group****Lake Possum Kingdom with Regional WTP****2,000****1,400**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
20" Pipeline (PK to Breckenridge)	20	36,100	LF	\$54	\$1,949,400
Upsize 8" to 10" Pipeline		15,000	LF	\$3	\$45,000
Upsize 6" to 8" Pipeline		33,000	LF	\$5	\$165,000
Upsize 3" to 6" Pipeline		13,000	LF	\$5	\$65,000
6" PVC pipe	6	68,000	LF	\$15	\$1,020,000
Bore & encasement			LS	\$250,000	\$250,000
Pump station improvements		9	EA	\$100,000	\$900,000
Upsize elevated tank		1	EA	\$75,000	\$75,000
In-line pump station		1	EA	\$150,000	\$150,000
Master meter & regulator		4	EA	\$10,000	\$40,000
SCADA system		14	EA	\$20,000	\$280,000
Water treatment plant w/ RO (assume expansion of Breckenridge's plant)	2.5 MGD		LS	\$7,000,000	\$7,000,000
<i>Subtotal - Construction Costs</i>					<i>\$11,939,400</i>
Engineering and Contingencies (assume 30% for transmission, 35% for WTP)					\$3,931,820
Mitigation and Permitting					\$119,394
<i>Subtotal</i>					<i>\$15,990,614</i>
Interest During Construction (24 months)					\$1,250,377
Total Capital Project Costs					\$17,240,991

WATER USER**STRATEGY:****AMOUNT: Raw water (ac-ft/yr):****AMOUNT: Treated water (ac-ft/yr):****Midway Group****Lake Possum Kingdom with Regional WTP****2,000****1,400****Annual Costs**

Debt Service - Total Capital

\$1,252,540

Use of WCBWDS pipeline by WCT

Water Purchase

\$79,500

Operation and Maintenance

Pipelines

\$32,440

Pumpstations

\$34,250

Surface Water Treatment (\$0.75/1,000 gallons)

\$342,140

RO Reject water disposal

\$48,880

Pumping Costs

\$90,000

Total Annual Costs**\$1,879,750****Annual Cost (\$ per acre-foot)****\$1,343****Annual Cost (\$ per 1000 gallons)****\$4.12**

WATER USER

Abilene

STRATEGY:

Lake Possum Kingdom

AMOUNT: Raw water (ac-ft/yr):**20,000****AMOUNT: Treated water (ac-ft/yr):****14,000**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
36" Water Line	36 in	380,000	LF	\$98	\$37,240,000
Bore & encasement			LS	\$1,500,000	\$1,500,000
Intake Structure		1	EA	\$2,000,000	\$2,000,000
Pump Station at Possum Kingdom	3500 HP	1	EA	\$4,700,000	\$4,700,000
Booster station	2500 HP	2	EA	\$3,900,000	\$7,800,000
Ground storage tank	6 MG	2	EA	\$1,100,000	\$2,200,000
Water treatment plant w/ RO (assume new plant at PK)	20 MGD	1	EA	\$33,600,000	\$33,600,000
<i>Subtotal - Construction Costs</i>					<i>\$89,040,000</i>
Engineering and Contingencies					\$28,392,000
Mitigation and Permitting					\$890,400
<i>Subtotal</i>					<i>\$118,322,400</i>
Interest During Construction					\$9,252,154
Total Capital Project Costs					\$127,574,554
Annual Costs					
Debt Service - Total Capital					\$9,268,153
Water Purchase					\$795,000
Operation and Maintenance					
Pipelines					\$394,400
Pumpstations					\$312,500
Surface Water Treatment (\$0.75/1,000 gallons)					\$3,421,440
Pumping Costs					\$799,800
Reject disposal					\$488,780
Total Annual Costs					\$15,480,073
Annual Cost (\$ per acre-foot)					\$1,106
Annual Cost (\$ per 1000 gallons)					\$3.39

WATER USER**STRATEGY:****AMOUNT: Raw water (ac-ft/yr):****AMOUNT: Treated water (ac-ft/yr):****Cisco****Lake Possum Kingdom****500****350**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
10" PVC Pipeline	10	89,800	LF	\$23	\$2,065,400
Bore & Encasement		4	EA	\$50,000	\$200,000
Pump Station at WCTWDS line	75 HP	1	EA	\$400,000	\$400,000
Expansion of treatment system with RC	1 MGD	1	EA	\$3,500,000	\$3,500,000
<i>Subtotal - Construction Costs</i>					<i>\$6,165,400</i>
Engineering and Contingencies					\$2,024,620
Mitigation and Permitting					\$61,654
ROW Land Acquisition		89,800	LF	\$1	\$89,800
<i>Subtotal</i>					<i>\$8,341,474</i>
Interest During Construction					\$347,561
Total Capital Project Costs					\$8,689,035
Annual Costs					
Debt Service - Total Capital					\$631,250
Water Purchase					\$19,880
Use of the WCBWDS					unknown
Operation and Maintenance					
Pipelines					\$20,650
Pumpstations					\$10,000
Surface Water Treatment					\$85,540
Pumping Costs					\$8,600
Reject disposal					\$12,220
Total Annual Costs					\$788,140

WATER USER**STRATEGY:****AMOUNT: Raw water (ac-ft/yr):****AMOUNT: Treated water (ac-ft/yr):****Cisco****Lake Possum Kingdom with Blending****250****250**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
8" PVC Pipeline	8	89,800	LF	\$20	\$1,796,000
Bore & Encasement		4	EA	\$50,000	\$200,000
Pump Station at WCBWDS line	30 HP	1	EA	\$250,000	\$250,000
<i>Subtotal - Construction Costs</i>					<i>\$2,246,000</i>
Engineering and Contingencies					\$673,800
Mitigation and Permitting					\$22,460
ROW Land Acquisition		89,800	LF	\$1	\$89,800
<i>Subtotal</i>					<i>\$3,032,060</i>
Interest During Construction					\$126,336
Total Capital Project Costs					\$3,158,396
Annual Costs					
Debt Service - Total Capital					\$229,450
Water Purchase					\$9,940
Use of the WCBWDS					unknown
Operation and Maintenance					
Pipelines					\$17,960
Pumpstations					\$6,250
Surface Water Treatment					\$61,100
Pumping Costs					\$4,300
Total Annual Costs					\$329,000

WATER USER**Graham****STRATEGY:****Lake Possum Kingdom with treatment****AMOUNT: Raw water (ac-ft/yr):****1,000****AMOUNT: Treated water (ac-ft/yr):****700**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
14" PVC Pipeline	14	82,000	LF	\$32	\$2,624,000
Bore & Encasement		1	LS	\$100,000	\$100,000
Intake and Pump station at PK	175 HP	1	EA	\$850,000	\$850,000
In-line Booster Pump	50 HP	1	EA	\$150,000	\$150,000
Ground storage tank	0.5 MG	1	EA	\$150,000	\$150,000
Water treatment plant expansion with reverse osmosis treatment	1.5 MGD	1	EA	\$4,500,000	\$4,500,000
<i>Subtotal - Construction Costs</i>					<i>\$8,374,000</i>
Engineering and Contingencies					\$2,737,200
Mitigation and Permitting					\$83,740
ROW Land Acquisition					\$0
					\$0
<i>Subtotal</i>					<i>\$11,194,940</i>
Interest During Construction					\$644,746
Total Capital Project Costs					\$11,839,686
Annual Costs					
Debt Service - Total Capital					\$860,140
Water Purchase					\$39,750
Operation and Maintenance					
Pipelines					\$26,240
Pumpstations					\$25,000
Surface Water Treatment (\$0.75/1,000 gallons)					\$171,070
Pumping Costs					\$29,200
Reject disposal					\$24,440
Total Annual Costs					\$1,175,840
Annual Cost (\$ per acre-foot)					\$1,680
Annual Cost (\$ per 1000 gallons)					\$5.16

WATER USER**Graham****STRATEGY:****Lake Possum Kingdom with blending in lake****AMOUNT: Raw water (ac-ft/yr):****1,000****AMOUNT: Increased yield (ac-ft/yr):****700****Total Yield (holding inflows):****8,519**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
14" PVC Pipeline	14	88,400	LF	\$32	\$2,828,800
Bore & Encasement		1	LS	\$100,000	\$100,000
Intake and Pump station at PK	175 HP	1	EA	\$850,000	\$850,000
In-line Booster Pump	40 HP	1	EA	\$340,000	\$340,000
Ground storage tank	0.5 MG	1	EA	\$150,000	\$150,000
<i>Subtotal - Construction Costs</i>					<i>\$4,268,800</i>
Engineering and Contingencies					\$1,280,640
Mitigation and Permitting					\$42,688
<i>Subtotal</i>					<i>\$5,592,128</i>
Interest During Construction					\$233,005
Total Capital Project Costs					\$5,825,133
Annual Costs					
Debt Service - Total Capital					\$423,190
Water Purchase					\$39,750
Operation and Maintenance					
Pipelines					\$28,290
Pumpstations					\$29,750
Surface Water Treatment					\$79,830
Pumping Costs					\$29,200
Total Annual Costs					\$630,010
Annual Cost (\$ per acre-foot)					\$900
Annual Cost (\$ per 1000 gallons)					\$2.76

WATER USER**STRATEGY:****AMOUNT: Raw water (ac-ft/yr):****AMOUNT: Increased yield (ac-ft/yr):****Graham****Lake Possum Kingdom with blending at WTP****360****360**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
10" PVC Pipeline	10	82,000	LF	\$23	\$1,886,000
Bore & Encasement		1	LS	\$100,000	\$100,000
Intake and Pump station at PK	55 HP	1	EA	\$550,000	\$550,000
In-line Booster Pump	15 HP	1	EA	\$150,000	\$150,000
Ground storage tank	0.25 MG	1	EA	\$100,000	\$100,000
<i>Subtotal - Construction Costs</i>					<i>\$2,786,000</i>
Engineering and Contingencies					\$835,800
Mitigation and Permitting					\$27,860
<i>Subtotal</i>					<i>\$3,649,660</i>
Interest During Construction					\$152,069
Total Capital Project Costs					\$3,801,729
Annual Costs					
Debt Service - Total Capital					\$276,190
Water Purchase					\$14,310
Operation and Maintenance					
Pipelines					\$18,860
Pumpstations					\$17,500
Surface Water Treatment					\$41,060
Pumping Costs					\$10,600
Total Annual Costs					\$378,520
Annual Cost (\$ per acre-foot)					\$1,051
Annual Cost (\$ per 1000 gallons)					\$3.23

WATER USER**STRATEGY:****AMOUNT: Raw water (ac-ft/yr):****AMOUNT: Increased firm yield (ac-ft/yr):****Total Firm Yield (holding all inflows)****WCTMWD****Lake Possum Kingdom with blending****2,500**safe yield
increase 1,600**1,475****43,370**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
14" Pipeline	14	15,000	LF	\$32	\$480,000
Upgrade 20" pipeline for Midway Group to 27" pipeline		36,100	LF	\$8	\$288,800
New 24" pipeline	24	29,000	LF	\$65	\$1,885,000
Bore & Encasement		1	LS	\$100,000	\$100,000
Pump station improvements		2	EA	\$150,000	\$300,000
In-line Pump Station		1	EA	\$200,000	\$200,000
Master meter and regulator		2	EA	\$10,000	\$20,000
SCADA system		3	EA	\$20,000	\$60,000

Subtotal - Construction Costs \$3,333,800

Engineering and Contingencies \$1,000,140

Mitigation and Permitting \$33,338

Subtotal \$4,367,278

Interest During Construction \$181,970

Total Capital Project Costs **\$4,549,248****Annual Costs**

Debt Service - Total Capital \$330,500

Water Purchase \$99,380

Use of WCBWDS pipeline unknown

Operation and Maintenance

Pipelines \$4,800

Pumpstations \$14,500

Surface Water Treatment \$0

Pumping Costs \$126,200

Total Annual Costs **\$575,380****Annual Cost - Raw water (\$ per acre-foot)** **\$390****Annual Cost - Raw water (\$ per 1000 gallons)** **\$1.20**

WATER USER**STRATEGY:****AMOUNT: Increased firm yield (ac-ft/yr):****AMOUNT: Total Firm Yield (priority order)****WCTMWD****Clear Fork Diversions to Hubbard Crk****6,000****28,000**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
2- 120" Pipelines	120	52,800	LF	\$576	\$30,412,800
Pipeline Crossings		5	EA	\$75,000	\$375,000
Diversion Weir and Intake canal		1	LS	\$8,000,000	\$8,000,000
Pump station	33000 HP	1	EA	\$18,000,000	\$18,000,000
Discharge structure		1	EA	\$1,500,000	\$1,500,000
<i>Subtotal - Construction Costs</i>					<i>\$58,287,800</i>
Engineering and Contingencies					\$17,886,340
Mitigation and Permitting					\$1,457,195
ROW Land Acquisition		52,800	LF	\$1	\$52,800
<i>Subtotal</i>					<i>\$77,684,135</i>
Interest During Construction					\$3,236,839
Total Capital Project Costs					\$80,920,974
Annual Costs					
Debt Service - Total Capital					\$5,878,820
Water Purchase					
Operation and Maintenance					
Pipelines					\$304,130
Pumpstations					\$687,500
Surface Water Treatment					\$0
Pumping Costs					\$260,400
Total Annual Costs					\$7,130,850
Annual Cost (\$ per acre-foot)					\$1,188
Annual Cost (\$ per 1000 gallons)					\$3.65

WATER USER**STRATEGY:****AMOUNT: Raw water (ac-ft/yr):****AMOUNT: Increased firm yield (ac-ft/yr):****AMOUNT: Treated water (ac-ft/yr):****WCTMWD****Clear Fork Diversions to Hubbard Crk****22,500****16,000****12,500** based on safe yield

Construction Costs	Size	Amount	Unit	Unit cost	Cost
<i>Raw Water</i>					
2- 120" Pipelines	120	52,800	LF	\$576	\$30,412,800
Pipeline Crossings		5	EA	\$75,000	\$375,000
Diversion Weir and Intake canal		1	LS	\$8,000,000	\$8,000,000
Pump station	33000 HP	1	EA	\$18,000,000	\$18,000,000
Discharge structure		1	EA	\$1,500,000	\$1,500,000
<i>Subtotal - Construction Costs</i>					<i>\$58,287,800</i>
Engineering and Contingencies					\$17,886,340
Mitigation and Permitting					\$1,457,195
ROW Land Acquisition		52,800	LF	\$1	\$52,800
<i>Subtotal</i>					<i>\$77,684,135</i>
Interest During Construction					\$3,236,839
Total Capital Project Costs - Raw Water					\$80,920,974
<i>Transmission & Treatment</i>					
WTP expansion	15 MGD				\$12,500,000
Engineering and Contingencies					\$4,375,000
Interest During Construction					\$1,319,531
Total Capital Project Costs - Treatment					\$18,194,531
Annual Costs					
Debt Service - Raw water					\$5,878,820
Debt Service - Treatment					\$1,321,810
Water Purchase					\$327,940
Operation and Maintenance					
Pipelines					\$304,130
Pumpstations					\$687,500
Surface Water Treatment					\$1,425,600
Pumping Costs - Raw water					\$286,400
Pumping Costs - Treated water					\$790,500
Total Annual Costs - Raw water					\$7,484,790
Additional Annual Costs - Treated Water at Abilene					\$3,537,910
Annual Raw Water Cost (\$ per acre-foot)					\$468
Annual Raw Water Cost (\$ per 1000 gallons)					\$1.44
Annual Treated Cost (\$ per acre-foot)					\$751
Annual Treated Cost (\$ per 1000 gallons)					\$2.30

WATER USER

Abilene

STRATEGY:

**Clear Fork Diversions to Hubbard Crk
with supply from Possum Kingdom**

AMOUNT: Water - Hubbard Creek (ac-ft/yr):

12,500 based on safe yield

AMOUNT: Water - Possum Kingdom (ac-ft/yr):

8,000

AMOUNT: Water - Treated (ac-ft/yr):

18,100

Construction Costs	Size	Amount	Unit	Unit cost	Cost
<i>Transmission & Treatment</i>					
WTP expansion	15 MGD		EA	\$12,500,000	\$12,500,000
30" Pipeline (Hubbard to Abilene)	30	260,000	LF	\$80	\$20,800,000
30" pipeline (NE WTP to South WTP)	30	26,400	LF	\$80	\$2,112,000
Pump Station at Hubbard Crk	1800 HP	1	EA	\$3,300,000	\$3,300,000
Booster pump station	1400 HP	2	EA	\$2,800,000	\$5,600,000
Ground Storage Tank	3 MG	2	EA	\$435,000	\$870,000
27" Pipeline improvements - WCBWDS	27	86,000	LF	\$73	\$6,278,000
Pump Station Improvements - WCBWDS		1	LS	\$500,000	\$500,000
WTP expansion with RO	8 MGD	1	LS	\$15,000,000	\$15,000,000
<i>Subtotal - Construction Costs</i>					\$66,960,000
Engineering and Contingencies					\$21,463,000
Interest During Construction					\$2,655,718
Total Capital Project Costs - Transmission and Treatment					\$91,078,718

Annual Costs

Debt Service - Transmission & Treatment	\$6,616,770
Water Purchase - Hubbard Creek	\$5,847,490
Water Purchase - Possum Kingdom	\$318,000
Operation and Maintenance	
Pipelines	\$279,480
Pumpstations	\$235,000
Surface Water Treatment (Hubbard Creek)	\$1,425,600
Surface Water Treatment (Possum Kingdom)	\$1,368,570
Pumping Costs - Possum Kingdom to Hubbard	\$713,900
Pumping Costs - Hubbard to Abilene	\$1,475,300
Reject disposal	\$195,510
Total Annual Costs - Treated Water at Abilene	\$18,475,620

Annual Treated Cost (\$ per acre-foot) \$1,021
Annual Treated Cost (\$ per 1000 gallons) \$3.13

WATER USER**STRATEGY:****AMOUNT: Raw water (ac-ft/yr):****AMOUNT: Treated water (ac-ft/yr):****Mineral Wells****Lake Possum Kingdom to Palo Pinto MWD****2,500****1,750**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
18" Pipeline	18	20,000	LF	\$42	\$840,000
Pump Station and Diversion Structure	200 HP	1	EA	\$1,500,000	\$1,500,000
Bore & Encasement		1	EA	\$50,000	\$50,000
Ground storage tank	2 MG	1	EA	\$430,000	\$430,000
Water treatment plant expansion with reverse osmosis treatment	3 MGD	1	EA	\$8,250,000	\$8,250,000
<i>Subtotal - Construction Costs</i>					<i>\$11,070,000</i>
Engineering and Contingencies					\$3,733,500
Mitigation and Permitting					\$110,700
ROW Land Acquisition		20,000	LF	\$1	\$20,000
					\$0
<i>Subtotal</i>					<i>\$14,934,200</i>
Interest During Construction					\$860,099
Total Capital Project Costs					\$15,794,299
Annual Costs					
Debt Service - Total Capital					\$1,147,440
Water Purchase					\$99,380
Operation and Maintenance					
Pipelines					\$12,700
Pumpstations					\$37,500
Surface Water Treatment (\$0.75/1,000 gallons)					\$427,680
Pumping Costs					\$30,200
Reject disposal					\$61,100
Total Annual Costs					\$1,816,000
Annual Cost (\$ per acre-foot)					\$1,038
Annual Cost (\$ per 1000 gallons)					\$3.18

WATER USER**Mineral Wells
Lake Possum Kingdom to Palo Pinto MWD,
with blending****STRATEGY:****AMOUNT: Raw water (ac-ft/yr):****1,000****AMOUNT: Treated water (ac-ft/yr):****1,000**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
12" Pipeline	12	20,000	LF	\$28	\$560,000
Pump Station and Diversion Structure	110 HP	1	EA	\$1,200,000	\$1,200,000
Bore & Encasement		1	EA	\$50,000	\$50,000
Ground storage tank	1 MG	1	EA	\$220,000	\$220,000
<i>Subtotal - Construction Costs</i>					\$2,030,000
Engineering and Contingencies					\$609,000
Mitigation and Permitting					\$20,300
ROW Land Acquisition		20,000	LF	\$1	\$20,000
<i>Subtotal</i>					\$2,679,300
Interest During Construction					\$154,308
Total Capital Project Costs					\$2,833,608
Annual Costs					
Debt Service - Total Capital					\$205,860
Water Purchase					\$39,750
Operation and Maintenance					
Pipelines					\$7,800
Pumpstations					\$30,000
Surface Water Treatment					\$114,050
Pumping Costs					\$15,300
Total Annual Costs					\$412,760
Annual Cost (\$ per acre-foot)					\$413
Annual Cost (\$ per 1000 gallons)					\$1.27

WATER USER

Abilene, Stonewall County

STRATEGY:**Double Mountain Fork Reservoir - East****AMOUNT: Raw water (ac-ft/yr):****43,000****AMOUNT: Treated water (ac-ft/yr):****14,000**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Dam and Spillway		1	LS	\$55,000,000	\$55,000,000
Conflicts		1	LS	\$32,800,000	\$32,800,000
Land Acquisition		21,000	AC	\$500	\$10,500,000
Engineering and Contingencies - reservoir					\$34,405,000
Mitigation and Permitting - reservoir					\$11,378,000
Interest during construction					\$17,116,527
<i>Subtotal Reservoir construction</i>					<i>\$161,199,527</i>
Pipeline	36	232,300	LF	\$98	\$22,765,400
Bore & Encasement		12	EA	\$100,000	\$1,200,000
Intake Structure		1	EA	\$2,000,000	\$2,000,000
Pump Station	2100 HP	1	EA	\$3,600,000	\$3,600,000
Booster Pump station	800 HP	1	EA	\$2,100,000	\$2,100,000
Ground storage tank	6 MG	1	EA	\$1,050,000	\$1,050,000
<i>Subtotal Pipeline construction</i>					<i>\$32,715,400</i>
Water treatment plant w/ RO (assume new plant)	20 MGD	1	EA	\$33,600,000	\$33,600,000
Engineering and Contingencies - pipeline & treatment					\$21,574,620
Mitigation and Permitting - pipeline & treatment					\$663,154
Interest during construction					\$6,924,366
<i>Subtotal - Transmission and treatment Construction Costs</i>					<i>\$95,477,540</i>
Total Capital Project Costs					\$256,677,067

WATER USER	Abilene, Stonewall County
STRATEGY:	Double Mountain Fork Reservoir - East
AMOUNT: Raw water (ac-ft/yr):	43,000
AMOUNT: Treated water (ac-ft/yr):	14,000

Annual Costs

Debt Service - Reservoir	\$10,713,570
Debt Service - Transmission and treatment	\$6,936,340
Water Purchase (compensation to decrease in PK firm yield)	\$978,650
Operation and Maintenance	
Pipelines	\$238,154
Pumpstations	\$102,500
Dam & spillway	\$550,000
Surface Water Treatment (\$0.75/1,000 gallons)	\$3,421,440
Pumping Costs	\$527,900
Reject water disposal	\$488,780
Total Annual Costs - Raw water	\$12,242,220
Additional Annual Costs - Treated Water at Abilene	\$11,715,114

Annual Raw Water Cost (\$ per acre-foot)	\$285
Annual Raw Water Cost (\$ per 1000 gallons)	\$0.87

Annual Treated Cost (\$ per acre-foot)	\$1,244
Annual Treated Cost (\$ per 1000 gallons)	\$3.82

WATER USER

Abilene, Stonewall County

STRATEGY:**Double Mountain Fork Reservoir - East****AMOUNT: Raw water (ac-ft/yr):****9,500****AMOUNT: Treated water (ac-ft/yr):****6,650**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Dam and Spillway		1	LS	\$55,000,000	\$55,000,000
Conflicts		1	LS	\$32,800,000	\$32,800,000
Land Acquisition		21,000	AC	\$500	\$10,500,000
Engineering and Contingencies - reservoir					\$34,405,000
Mitigation and Permitting - reservoir					\$11,378,000
Interest during construction					\$17,116,527
<i>Subtotal Reservoir construction</i>					<i>\$161,199,527</i>
Pipeline	30	232,300	LF	\$80	\$18,584,000
Bore & Encasement		12	EA	\$100,000	\$1,200,000
Intake and pump station	800 HP	1	EA	\$3,000,000	\$3,000,000
Booster Pump station	0	1	EA	\$0	\$0
Ground storage tank	0	1	EA	\$0	\$0
<i>Subtotal Pipeline construction</i>					<i>\$22,784,000</i>
Water treatment plant w/ RO (assume new plant)	10 MGD	1	EA	\$22,500,000	\$22,500,000
Engineering and Contingencies - pipeline & treatment					\$14,710,200
Mitigation and Permitting - pipeline & treatment					\$452,840
Interest during construction					\$4,726,623
<i>Subtotal - Transmission and treatment Construction Costs</i>					<i>\$65,173,663</i>
Total Capital Project Costs					\$226,373,189

WATER USER

Abilene, Stonewall County

STRATEGY:**Double Mountain Fork Reservoir - East****AMOUNT: Raw water (ac-ft/yr):****9,500****AMOUNT: Treated water (ac-ft/yr):****6,650****Annual Costs**

Debt Service - Reservoir	\$10,713,570
Debt Service - Transmission and treatment	\$4,734,800
Water Purchase	\$0
Operation and Maintenance	
Pipelines	\$185,840
Pumpstations	\$75,000
Dam & spillway	\$550,000
Surface Water Treatment (\$0.75/1,000 gallons)	\$1,625,180
Pumping Costs	\$159,600
Reject water disposal	\$232,170
Total Annual Costs - Raw water	\$11,263,570
Additional Annual Costs - Treated Water at Abilene	\$7,012,590

Annual Raw Water Cost (\$ per acre-foot) \$1,186**Annual Raw Water Cost (\$ per 1000 gallons) \$3.64****Annual Treated Cost (\$ per acre-foot) \$2,748****Annual Treated Cost (\$ per 1000 gallons) \$8.43**

WATER USER

Abilene, Stonewall County

STRATEGY:**Double Mountain Fork Reservoir - West****AMOUNT: Raw water (ac-ft/yr):****34,000****AMOUNT: Treated water (ac-ft/yr):****14,000**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Dam and Spillway		1	LS	\$46,000,000	\$46,000,000
Conflicts		1	LS	\$19,250,000	\$19,250,000
Land Acquisition		10,500	AC	\$500	\$5,250,000
Engineering and Contingencies - reservoir					\$24,675,000
Mitigation and Permitting - reservoir					\$5,902,500
Interest during construction					\$12,007,633
<i>Subtotal Reservoir construction</i>					<i>\$113,085,133</i>
Pipeline	36	264,000	LF	\$98	\$25,872,000
Bore & Encasement		10	EA	\$100,000	\$1,000,000
Intake structure		1	EA	\$2,000,000	\$2,000,000
Pump station	2000 HP	1	EA	\$3,500,000	\$3,500,000
Booster Pump station	800 HP	1	EA	\$2,100,000	\$2,100,000
Ground storage tank	6 MG	1	EA	\$1,050,000	\$1,050,000
<i>Subtotal Pipeline construction</i>					<i>\$35,522,000</i>
Water treatment plant w/ RO (assume new plant)	20 MGD	1	EA	\$33,600,000	\$33,600,000
Engineering and Contingencies - pipeline & treatment					\$22,416,600
Mitigation and Permitting - pipeline & treatment					\$691,220
Interest during construction					\$7,211,860.00
<i>Subtotal - Transmission and treatment Construction Costs</i>					<i>\$99,441,680</i>
Total Capital Project Costs					\$212,526,813

WATER USER	Abilene, Stonewall County
STRATEGY:	Double Mountain Fork Reservoir - West
AMOUNT: Raw water (ac-ft/yr):	34,000
AMOUNT: Treated water (ac-ft/yr):	14,000

Annual Costs

Debt Service - Reservoir	\$7,515,810
Debt Service - Transmission and treatment	\$7,224,330
Water Purchase (compensation to decrease in PK firm yield)	\$638,660
Operation and Maintenance	
Pipelines	\$269,220
Pumpstations	\$102,500
Dam & spillway	\$460,000
Surface Water Treatment (\$0.75/1,000 gallons)	\$3,421,440
Pumping Costs	\$435,500
Reject water disposal	\$488,780
Total Annual Costs - Raw water	\$8,614,470
Additional Annual Costs - Treated	\$11,941,770

Annual Raw Water Cost (\$ per acre-foot)	\$253
Annual Raw Water Cost (\$ per 1000 gallons)	\$0.78

Annual Cost for Treated Water at Abilene (\$ per acre-foot)	\$1,215
Annual Cost for Treated Water at Abilene (\$ per 1000 gallons)	\$3.73

WATER USER

Abilene, Stonewall County

STRATEGY:**Double Mountain Fork Reservoir - West****AMOUNT: Raw water (ac-ft/yr):****8,000****AMOUNT: Treated water (ac-ft/yr):****5,600**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Dam and Spillway		1	LS	\$46,000,000	\$46,000,000
Conflicts		1	LS	\$19,250,000	\$19,250,000
Land Acquisition		10,500	AC	\$500	\$5,250,000
Engineering and Contingencies - reservoir					\$24,675,000
Mitigation and Permitting - reservoir					\$5,902,500
Interest during construction					\$12,007,633
<i>Subtotal Reservoir construction</i>					<i>\$113,085,133</i>
Pipeline	24	264,000	LF	\$65	\$17,160,000
Bore & Encasement		10	EA	\$100,000	\$1,000,000
Intake and pump station	700 HP	1	EA	\$2,500,000	\$2,500,000
Booster Pump station	300 HP	1	EA	\$1,200,000	\$1,200,000
Ground storage tank	2.5 MG	1	EA	\$510,000	\$510,000
<i>Subtotal Pipeline construction</i>					<i>\$22,370,000</i>
Water treatment plant w/ RO (assume new plant)	7.5 MGD	1	EA	\$19,500,000	\$19,500,000
Engineering and Contingencies - pipeline & treatment					\$13,536,000
Mitigation and Permitting - pipeline & treatment					\$418,700
Interest during construction					\$4,365,180.00
<i>Subtotal - Transmission and treatment Construction Costs</i>					<i>\$60,189,880</i>
Total Capital Project Costs					\$173,275,013

WATER USER

Abilene, Stonewall County

STRATEGY:

Double Mountain Fork Reservoir - West

AMOUNT: Raw water (ac-ft/yr):**8,000****AMOUNT: Treated water (ac-ft/yr):****5,600****Annual Costs**

Debt Service - Reservoir	\$7,515,810
Debt Service - Transmission and treatment	\$4,372,730
Water Purchase	\$0
Operation and Maintenance	
Pipelines	\$176,700
Pumpstations	\$92,500
Dam & spillway	\$460,000
Surface Water Treatment (\$0.75/1,000 gallons)	\$1,368,570
Pumping Costs	\$158,400
Reject water disposal	\$195,510
Total Annual Costs - Raw water	\$7,975,810
Additional Annual Costs - Treated	\$6,364,410

Annual Raw Water Cost (\$ per acre-foot) \$997**Annual Raw Water Cost (\$ per 1000 gallons) \$3.06****Annual Cost for Treated Water at Abilene (\$ per acre-foot) \$2,561****Annual Cost for Treated Water at Abilene (\$ per 1000 gallons) \$7.86**

WATER USER**STRATEGY:****AMOUNT (ac-ft/yr) - Priority Analysis:****Throckmorton****Elm Creek Reservoir****220**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Mobilization & site preparation		1	LS	\$750,000	\$750,000
Cut-off trench		20,000	CY	\$5.00	\$100,000
Fill		1,000,000	CY	\$2.50	\$2,500,000
Outlet works/ Drains		1	LS	\$750,000	\$750,000
Spillway (roller compacted concrete)		1	LS	\$5,000,000	\$5,000,000
Emergency Spillway		1	LS	\$500,000	\$500,000
Pump Station and intake structure	15 HP	1	EA	\$100,000	\$100,000
Land Acquisition - reservoir		2,500	Acre	\$500	\$1,250,000
Relocations		1	LS	\$500,000	\$500,000
Seeding		20	Acre	\$3,850	\$77,000
Pipeline to city	8	29,050	LF	\$20	\$581,000
ROW acquisition - pipeline		6,000	LF	\$1	\$6,000
<i>Subtotal - Construction Costs</i>					<i>\$12,114,000</i>
Engineering and Contingencies (35%)					\$4,239,900
Mitigation and Permitting					\$1,358,640
<i>Subtotal</i>					<i>\$17,712,540</i>
Interest During Construction					\$383,778
Total Capital Project Costs					\$18,096,318
Annual Costs					
Debt Service - Total Capital					\$1,206,923
Water Purchase					\$0
Operation and Maintenance					
Pipelines					\$5,810
Pumpstations					\$2,500
Dam & Spillway					\$87,500
Surface Water Treatment					\$25,102
Pumping Costs					\$2,600
Total Annual Costs					\$1,330,435
Annual Cost (\$ per acre-foot)					\$6,047
Annual Cost (\$ per 1000 gallons)					\$18.56

WATER USER**STRATEGY:**

AMOUNT - Raw water (ac-ft/yr):

AMOUNT - Treated (ac-ft/yr):

Throckmorton**Elm Creek Reservoir****1,300****340**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Mobilization & site preparation		1	LS	\$750,000	\$750,000
Cut-off trench		20,000	CY	\$5.00	\$100,000
Fill		1,000,000	CY	\$2.50	\$2,500,000
Outlet works/ Drains		1	LS	\$750,000	\$750,000
Spillway (Roller compacted concrete)		1	LS	\$5,000,000	\$5,000,000
Emergency Spillway		1	LS	\$500,000	\$500,000
Pump Station and intake structure	15 HP	1	EA	\$300,000	\$300,000
Land Acquisition - reservoir		2,500	Acre	\$500	\$1,250,000
Relocations		1	LS	\$500,000	\$500,000
Seeding		20	Acre	\$3,850	\$77,000
Pipeline to city	8	29,050	LF	\$20	\$581,000
ROW acquisition - pipeline		6,000	LF	\$1	\$6,000
<i>Subtotal - Construction Costs</i>					<i>\$12,314,000</i>
Engineering and Contingencies					\$4,676,450
Mitigation and Permitting					\$1,360,640
<i>Subtotal</i>					<i>\$18,351,090</i>
Interest During Construction					\$397,613
Total Capital Project Costs					\$18,748,703
Annual Costs					
Debt Service - Total Capital (reservoir)					\$1,166,385
Debt Service - Total Capital (pipeline)					\$87,101
Water Purchase					\$19,875
Operation and Maintenance					
Pipelines					\$5,810
Pumpstations					\$7,500
Dam & Spillway					\$87,500
Surface Water Treatment					\$38,794
Pumping Costs					\$2,600
Total Annual Costs - Raw water					\$1,273,760
Additional Annual Costs - Treated					\$141,805
Annual Raw Water Cost (\$ per acre-foot)					\$979.82
Annual Raw Water Cost (\$ per 1000 gallons)					\$3.01
Annual Treated Cost (\$ per acre-foot)					\$1,396.89
Annual Treated Cost (\$ per 1000 gallons)					\$4.29

WATER USER**STRATEGY:****AMOUNT: Priority Analysis - Raw water (ac-ft/yr):****AMOUNT: Treated water (ac-ft/yr):****WCTMWD****Cedar Ridge Reservoir****14,700****9,400**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Mobilization		1	LS	\$1,500,000	\$1,500,000
Site preparation			LS	\$1,650,000	\$1,650,000
Core trench excavation		250,200	CY	\$2.50	\$625,500
Embankment		6,213,200	CY	\$2.50	\$15,533,000
Rip Rap		125,000	CY	\$65	\$8,125,000
Service spillway and outlet		1	LS	\$30,000,000	\$30,000,000
Emergency spillway		1,994,300	CY	\$2.00	\$3,988,600
Sand/ gravel filters		331,100	CY	\$25	\$8,277,500
Seeding		10	Ac	\$3,850	\$38,500
Roads and instrumentation		1	LS	\$1,000,000	\$1,000,000
Land acquisition		8,000	Ac	\$750	\$6,000,000
Relocations					\$0
<i>Subtotal - Construction Costs</i>					<i>\$76,738,100</i>
Engineering and Contingencies - reservoir					\$26,858,335
Mitigation and Permitting - reservoir					\$6,707,381
Interest During Construction					\$13,103,685
<i>Subtotal - Reservoir</i>					<i>\$123,407,501</i>
Pipeline	33 in	171,500	LF	\$90	\$15,435,000
Boring & Encasement		24	EA	\$50,000	\$1,200,000
Pump station	2000 HP	1	EA	\$3,500,000	\$3,500,000
Intake structure	18 MGD	1	EA	\$500,000	\$500,000
Booster station	1000 HP	1	EA	\$2,400,000	\$2,400,000
Ground storage tank	6 MG	1	EA	\$750,000	\$750,000
WTP Expansion with RO	12 MGD	1	LS	\$18,000,000	\$18,000,000
<i>Subtotal - Construction Costs</i>					<i>\$41,785,000</i>
Engineering and Contingencies - Transmission & treatment					\$13,435,500
Mitigation and Permitting - Transmission & treatment					\$417,850
Interest During Construction					\$4,350,610
<i>Subtotal - Transmission & treatment</i>					<i>\$59,988,960</i>
Total Capital Project Costs					\$183,396,461

WATER USER**STRATEGY:****AMOUNT: Priority Analysis - Raw water (ac-ft/yr):****AMOUNT: Treated water (ac-ft/yr):****WCTMWD****Cedar Ridge Reservoir****14,700****9,400****Annual Costs**

Debt Service - Reservoir	\$8,201,852
Debt Service - Transmission/WTP	\$4,358,133
Water Purchase	\$0
Operation and Maintenance	
Dam & Spillway	\$659,241
Pipelines	\$161,850
Pumpstations	\$147,500
Surface Water Treatment (\$0.75/1,000 gallons)	\$2,297,250
Pumping Costs	\$596,900
Reject disposal	\$327,480
Total Annual Costs - Raw water	\$8,861,093
Additional Annual Costs - Treated	\$7,889,112
Annual Raw Water Cost (\$ per acre-foot)	\$603
Annual Raw Water Cost (\$ per 1000 gallons)	\$1.85
Annual Treated Cost (\$ per acre-foot)	\$1,782
Annual Treated Cost (\$ per 1000 gallons)	\$5.47

WATER USER**STRATEGY:****AMOUNT: Natural Order - Raw water (ac-ft/yr):****AMOUNT: Treated water (ac-ft/yr):****WCTMWD****Cedar Ridge Reservoir, treat at reservoir****24,000****14,000**

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Mobilization		1	LS	\$1,500,000	\$1,500,000
Site preparation		1	LS	\$1,650,000	\$1,650,000
Core trench excavation		250,200	CY	\$2.50	\$625,500
Embankment		6,213,200	CY	\$2.50	\$15,533,000
Rip Rap		125,000	CY	\$65	\$8,125,000
Service spillway and outlet		1	LS	\$30,000,000	\$30,000,000
Emergency spillway		1,994,300	CY	\$2.00	\$3,988,600
Sand/ gravel filters		331,100	CY	\$25	\$8,277,500
Seeding		10	Ac	\$3,850	\$38,500
Roads and instrumentation		1	LS	\$1,000,000	\$1,000,000
Land acquisition		8,000	Ac	\$750	\$6,000,000
Relocations					\$0
<i>Subtotal - Construction Costs</i>					<i>\$76,738,100</i>
Engineering and Contingencies - reservoir					\$26,858,335
Mitigation and Permitting - reservoir					\$6,707,381
Interest During Construction					\$13,103,685
<i>Subtotal - Reservoir</i>					<i>\$123,407,501</i>
Pipeline	36 in	224,300	LF	\$98	\$21,981,400
Boring & Encasement		26	EA	\$50,000	\$1,300,000
Pump station	2300 HP	1	EA	\$3,710,000	\$3,710,000
Intake structure		1	EA	\$2,000,000	\$2,000,000
Booster station	1400 HP	1	EA	\$2,840,000	\$2,840,000
Ground storage tank	6 MG	2	EA	\$1,100,000	\$2,200,000
Booster Station at Ft Phantom Hill	700 HP	1	EA	\$1,900,000	\$1,900,000
New WTP with RO (lakeside)	20 MGD	1	LS	\$33,600,000	\$33,600,000
<i>Subtotal - Construction Costs</i>					<i>\$69,531,400</i>
Engineering and Contingencies - Transmission & treatment					\$22,539,420
Mitigation and Permitting - Transmission & treatment					\$695,314
Interest During Construction					\$7,253,796
<i>Subtotal - Transmission & treatment</i>					<i>\$100,019,930</i>
Total Capital Project Costs					\$223,427,431

WATER USER**WCTMWD****STRATEGY:****Cedar Ridge Reservoir, treat at reservoir****AMOUNT: Natural Order - Raw water (ac-ft/yr):****24,000****AMOUNT: Treated water (ac-ft/yr):****14,000****Annual Costs**

Debt Service - Reservoir	\$8,201,852
Debt Service - Transmission/WTP	\$7,266,339
Water Purchase (compensation to decrease in PK firm yield)	\$103,350
Operation and Maintenance	
Dam & Spillway	\$659,241
Pipelines	\$241,814
Pumpstations	\$211,250
Surface Water Treatment (\$0.75/1,000 gallons)	\$3,421,436
Pumping Costs	\$725,300
Reject disposal	\$488,780
Total Annual Costs - Raw water	\$8,964,443
Additional Annual Costs - Treated	\$12,354,919
Annual Raw Water Cost (\$ per acre-foot)	\$374
Annual Raw Water Cost (\$ per 1000 gallons)	\$1.15
Annual Treated Cost (\$ per acre-foot)	\$1,416
Annual Treated Cost (\$ per 1000 gallons)	\$4.35

**WATER USER
STRATEGY:**

**Palo Pinto MWD
Turkey Peak Reservoir**

AMOUNT - Raw water (ac-ft/yr):

7,600

(increased amount of safe yield of Palo Pinto system)

AMOUNT - Treated (ac-ft/yr):

4,000

(assume 4,000 af/y is transported to Mineral Wells)

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Dam & spillway (rolled compacted concrete)		1	LS	\$15,000,000	\$15,000,000
Relocations		1	LS	\$6,000,000	\$6,000,000
Lake Palo Pinto modifications		1	LS	\$500,000	\$500,000
Land Acquisition		1	LS	\$3,100,000	\$3,100,000
Engineering and Contingencies - reservoir					\$8,610,000
Mitigation and Permitting - reservoir					\$3,100,000
<i>Subtotal Reservoir construction</i>					<i>\$36,310,000</i>
Pipeline	24 in	21,100	LF	\$65	\$1,371,500
Boring & Encasement		2	EA	\$150,000	\$300,000
Pump Station	750 HP	1	EA	\$2,000,000	\$2,000,000
WTP Expansion	8 MGD	1	EA	\$9,000,000	\$9,000,000
Engineering and Contingencies					\$4,251,450
Mitigation and Permitting					\$126,715
<i>Subtotal - Pipeline Costs</i>					<i>\$17,049,665</i>
<i>Subtotal Construction Costs</i>					<i>\$53,359,665</i>
Interest During Construction					\$6,338,931
Total Capital Project Costs					\$59,698,596
Annual Costs					
Debt Service - Total Capital (reservoir)					\$2,699,900
Debt Service - Total Capital (pipeline)					\$1,385,790
Water Purchase					\$0
Operation and Maintenance					
Dam & Spillway					\$155,000
Pipeline					\$13,715
Pumpstations					\$50,000
Surface Water Treatment					\$456,190
Pumping Costs					\$106,900
Total Annual Costs - Raw water					\$2,854,900
Additional Annual Costs - Treated					\$2,012,595
Annual Raw Water Cost (\$ per acre-foot)					\$376
Annual Raw Water Cost (\$ per 1000 gallons)					\$1.15
Annual Treated Cost (\$ per acre-foot)					\$879

**WATER USER
STRATEGY:**

AMOUNT - Raw water (ac-ft/yr):

AMOUNT - Treated (ac-ft/yr):

Annual Treated Cost (\$ per 1000 gallons)

**Palo Pinto MWD
Turkey Peak Reservoir**

7,600 (increased amount of safe yield of Palo Pinto system)

4,000 (assume 4,000 af/y is transported to Mineral Wells)

\$2.70

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

Northeast Brown County
Zephyr WSC expansion
170

Construction Costs	Size	Amount	Unit	Unit cost	Cost
8" PVC Water Line	8	13,700	LF	\$20	\$274,000
6" PVC Water Line	6	21,100	LF	\$15	\$316,500
4" PVC Water Line	4	61,800	LF	\$12	\$741,600
3" PVC Water Line	3	25,300	LF	\$10	\$253,000
2" PVC Water Line	2	19,700	LF	\$8	\$157,600
Pump station improvements		3	EA	\$100,000	\$300,000
Master meter & regulator		2	EA	\$10,000	\$20,000
SCADA system		2	EA	\$20,000	\$40,000
<i>Subtotal - Construction Costs</i>					<i>\$2,102,700</i>
Engineering and Contingencies					\$630,810
Mitigation and Permitting					\$21,027
<i>Subtotal</i>					<i>\$2,754,537</i>
Interest During Construction					\$59,683
Total Capital Project Costs					\$2,814,220
Annual Costs					
Debt Service - Total Capital					\$204,400
Water Purchase					\$69,200
Operation and Maintenance					
Pipelines					\$17,400
Pumpstations					\$9,000
Surface Water Treatment					\$0
Pumping Costs					\$2,800
Total Annual Costs					\$302,800
Annual Cost (\$ per acre-foot)					\$1,781
Annual Cost (\$ per 1000 gallons)					\$5.47

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

Sweetwater
New groundwater
5,100

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Water wells		50	EA	\$50,000	\$2,500,000
Well field piping	6 in	26,400	LF	\$15	\$396,000
Well field piping	10 in	21,120	LF	\$23	\$485,760
Storage Tank	1.5 MG	2	LS	\$354,000	\$708,000
Well field pump station	400 HP	2	EA	\$1,500,000	\$3,000,000
Transmission pipeline	18 in	10,560	LF	\$42	\$443,520
Transmission pipeline	24 in	79,200	LF	\$65	\$5,148,000
<i>Subtotal - Construction Costs</i>					<i>\$12,681,280</i>
Engineering and Contingencies					\$3,804,384
Mitigation and Permitting					\$126,813
<i>Subtotal</i>					<i>\$16,612,477</i>
Interest During Construction					\$359,943
Total Capital Project Costs					\$16,972,419
Annual Costs					
Debt Service - Total Capital					\$1,233,000
Water Purchase					1,661,840 Kgal 0.085 \$141,260
Operation and Maintenance					
Wells					\$465,300
Pipelines & storage tanks (1%)					\$71,800
Pump stations (2.5%)					\$75,000
Surface Water Treatment					\$581,640
Pumping Costs					\$123,500
Total Annual Costs					\$2,691,500
Annual Cost (\$ per acre-foot)					\$528
Annual Cost (\$ per 1000 gallons)					\$1.62

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

Upper Leon MWD
New groundwater
1,000

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Water wells		12	EA	\$40,000	\$480,000
Well field piping	6 in.	7,920	LF	\$15	\$118,800
Well field piping	10 in	5,280	LF	\$23	\$121,440
Storage Tank	.5 MG	1	LS	\$156,000	\$156,000
Well field pump station	150 HP	1	EA	\$775,000	\$775,000
Transmission pipeline	12 in	52,800	LF	\$28	\$1,478,400
<i>Subtotal - Construction Costs</i>					<i>\$3,129,640</i>
Engineering and Contingencies					\$938,890
Mitigation and Permitting					\$31,300
<i>Subtotal</i>					<i>\$4,099,830</i>
Interest During Construction					\$88,830
Total Capital Project Costs					\$4,188,660
Annual Costs					
Debt Service - Total Capital					\$304,300
Water Purchase					325,851 Kgal 0.085 \$27,700
Operation and Maintenance					
Wells					\$78,200
Pipelines & storage tanks (1%)					\$16,300
Pump stations (2.5%)					\$19,375
Surface Water Treatment					\$0
Pumping Costs					\$21,400
Total Annual Costs					\$467,275
Annual Cost (\$ per acre-foot)					\$467
Annual Cost (\$ per 1000 gallons)					\$1.43

WATER USER
STRATEGY:
AMOUNT (ac-ft/yr):

NCTMWA
New groundwater
500

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Water wells		3	EA	\$55,000	\$165,000
Well field piping	6 in.	3,000	LF	\$15	\$45,000
Storage Tank	0.25	1	LS	\$100,000	\$100,000
Well field pump station	30 HP	1	EA	\$265,000	\$265,000
Transmission pipeline	10 in	52,800	LF	\$23	\$1,214,400
<i>Subtotal - Construction Costs</i>					<i>\$1,789,400</i>
Engineering and Contingencies					\$536,820
Mitigation and Permitting					\$17,890
<i>Subtotal</i>					<i>\$2,344,110</i>
Interest During Construction					\$50,790
Total Capital Project Costs					\$2,394,900
Annual Costs					
Debt Service - Total Capital					\$174,000
Water Purchase					162,926 Kgal 0.085 \$13,850
Operation and Maintenance					
Wells					\$25,000
Pipelines & storage tanks (1%)					\$13,100
Pump stations (2.5%)					\$6,625
Surface Water Treatment					162,926 Kgal 0.35 \$57,020
Pumping Costs					\$10,000
Total Raw Water Annual Costs					\$242,575
Total Treated Water Annual Costs					\$299,595
Annual Raw Water Cost (\$ per acre-foot)					\$485
Annual Raw Water Cost (\$ per 1000 gallons)					\$1.49

Comparative Reservoir costs

	Date of costs	Bid documents - Martin K. Eby				ENR index
Applewhite reservoir	Aug-90					YR 2003
	4752					6581
Construction Costs	Size	Amount	Unit	Unit cost	Cost	1.384890572
Mobilization		1	LS	\$2,000,000	\$2,000,000	\$2,769,781
Site preparation				\$1,012,000	\$1,012,000	\$1,401,509
Excavation		2,855,400	CY	\$2.30	\$6,567,420	\$9,095,158
Fill		2,429,400	CY	\$1.17	\$2,851,450	\$3,948,946
Gravel fill		118,200		\$13.60	\$1,607,520	\$2,226,239
sand fill		16,800		\$8.82	\$148,200	\$205,241
impervious core/drain/fill					\$6,821,540	\$9,447,086
Service spillway and outlet		1	LS		\$13,386,200	\$18,538,422
gates (12 - 40' bays)					\$6,098,000	\$8,445,063
Roadway & fencing				\$757,110	\$757,110	\$1,048,515
Monitoring system				\$370,900	\$370,900	\$513,656
Seeding		23	Ac	\$4,300	\$98,900	\$136,966
Miscellaneous				\$853,140	\$853,140	\$1,181,506
<i>Subtotal - Construction Costs</i>					<i>\$42,572,380</i>	<i>\$58,958,088</i>

Comparative Reservoir costs

Turkey Peak Reservoir	May-01					2003
	6288					6581
						ENR index
Construction Costs	Size	Amount	Unit	Unit cost	Cost	1.046596692
Mobilization				\$709,000	\$709,000	\$742,037
Dam (approx 0.6 miles)		1	LS	\$5,364,000	\$5,364,000	\$5,613,945
Spillway (rolled compacted concrete 600 FT)				\$8,317,000	\$8,317,000	\$8,704,545
Emergency spillway				\$504,000	\$504,000	\$527,485
Relocations		1	LS	\$6,000,000	\$6,000,000	\$6,279,580
<i>Subtotal Reservoir construction</i>					<i>\$20,185,000</i>	<i>\$21,125,554</i>

Lake Eastex

Feb-03

Construction Costs	Size	Amount	Unit	Unit cost	Cost
Mobilization		1	LS	\$1,500,700.00	\$1,500,700
Care of Water During Construction		1	LS	\$874,200.00	\$874,200
Clearing and Grubbing		78	Ac	\$3,000.00	\$234,900
Foundation Preparation		1	LS	\$215,200.00	\$215,200
Unclassified Excavation		2,296,938	CY	\$2.00	\$4,593,900
Borrow Excavation		1,331,894	CY	\$2.00	\$2,663,800
Core Trench Excavation		50,370	CY	\$2.00	\$100,700
Embankment, Select Fill		1,131,894	CY	\$2.50	\$2,829,700
Embankment, Random		1,872,136	CY	\$2.00	\$3,744,300
Berm Fill		475,623	CY	\$2.00	\$951,200
Soil Bentonite Slurry Trench		200,125	SF	\$12.00	\$2,401,500
Drains					
Sand		98	CY	\$15.00	\$1,500
Gravel		1,150	CY	\$45.00	\$51,800
Toe Drains					
Gravel		4,029	CY	\$45.00	\$181,300
Pipe		6,800	LF	\$20.00	\$136,000
Outlets		5	EA	\$15,000.00	\$75,000
Soil Cement		47,888	CY	\$55.00	\$2,633,800
Seeding for Erosion Control		163	Ac	\$2,500.00	\$407,500
Topsoil 6 inches		34,285	CY	\$7.00	\$240,000
Flex Base Roadway 8 inch		18,133	SY	\$10.00	\$181,300

Lake Eastex

Service Spillway	1	LS	\$4,021,200.00	\$4,021,200
Spillway Bridge	1	LS	\$360,000.00	\$360,000
Outlet Works two 48-inch pipes pipes with encasement	1 1	LS LS	\$602,800.00	\$602,800
Intake structure bridge	1	LS	\$300,000.00	\$300,000
Erosion and Sediment Control	1	LS	\$75,000.00	\$75,000
Clearing	5,000	Ac	\$250.00	\$1,250,000
Instrumentation				
Monuments	1	LS	\$7,500.00	\$7,500
Piezometers	30	Ea	\$7,000.00	\$210,000
Fencing	10,000	LF	\$15.00	\$150,000
Office Building	1	LS	\$300,000.00	\$300,000
Boat Ramp	1	LS	\$200,000.00	\$200,000
Bouy System	1	LS	\$20,000.00	\$20,000
Reservoir Construction Total				\$31,514,800