

APPENDIX G

O&M and Pipeline Cost Calculations and Financial Evaluations

December 2013



Alternative 2: BWA WTP Expands to Meet Existing Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

Financial Evaluation

Interest Rate = 4.5 %
 Payment Period = 20 years

Capital Costs	2010	2015	2020	2025	2030	2035	2040
BWA Phase Capital Cost	\$0	\$13,996,800	\$0	\$0	\$0	\$9,101,700	\$0
New Plant Phase Capital Cost	\$0	\$70,221,600	\$0	\$38,475,000	\$0	\$20,520,000	\$0

Financing Cost

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Alt #2 - BWA WTP																
Current Debt Service	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	-	-	-	-	-	-	-	-
New Debt Service - Plant Upgrades	-	-	-	-	-	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$4,361,444	\$4,456,815	\$4,552,186	\$4,719,087	\$4,938,081	\$5,165,754	\$5,298,744	\$5,433,319	\$5,570,906	\$5,715,998	\$5,869,079	\$6,038,232	\$6,213,755	\$6,386,749	\$6,555,393	\$6,723,194
Total Cost	\$6,059,264	\$6,154,635	\$6,250,006	\$6,416,907	\$6,635,901	\$7,940,574	\$8,073,564	\$8,208,139	\$6,647,906	\$6,792,998	\$6,946,079	\$7,115,232	\$7,290,755	\$7,463,749	\$7,632,393	\$7,800,194
Avg Water Sold (mgd)	9.29	9.49	9.70	9.90	10.10	10.31	10.31	10.31	10.32	10.32	10.32	10.33	10.33	10.33	10.34	10.34
Cost per 1,000 gal	\$1.79	\$1.78	\$1.77	\$1.78	\$1.80	\$2.11	\$2.15	\$2.18	\$1.77	\$1.80	\$1.84	\$1.89	\$1.93	\$1.98	\$2.02	\$2.07
Alt #2 - New WTP																
New Debt Service - Initial Construction	-	-	-	-	-	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$2,958,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$0	\$0	\$0	\$0	\$0	\$1,145,361	\$1,327,408	\$1,517,359	\$1,715,896	\$1,924,850	\$2,144,840	\$2,517,686	\$2,910,548	\$3,320,128	\$3,744,809	\$4,185,976
Total Cost	\$0	\$0	\$0	\$0	\$0	\$6,544,361	\$6,726,408	\$6,916,359	\$7,114,896	\$7,323,850	\$7,543,840	\$7,916,686	\$8,309,548	\$8,719,128	\$9,143,809	\$12,542,976
Avg Water Sold (mgd)	0.00	0.00	0.00	0.00	0.00	2.29	2.58	2.88	3.18	3.47	3.77	4.31	4.84	5.37	5.90	6.44
Cost per 1,000 gal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.85	\$7.14	\$6.58	\$6.14	\$5.77	\$5.48	\$5.04	\$4.71	\$4.45	\$4.24	\$5.34
Both Plants																
Total Cost	\$6,059,264	\$6,154,635	\$6,250,006	\$6,416,907	\$6,635,901	\$14,484,934	\$14,799,971	\$15,124,498	\$13,762,802	\$14,116,848	\$14,489,919	\$15,031,917	\$15,600,303	\$16,182,877	\$16,776,201	\$20,343,170
Avg Water Sold (mgd)	9.29	9.49	9.70	9.90	10.10	12.59	12.89	13.19	13.49	13.79	14.09	14.63	15.17	15.70	16.24	16.78
Cost per 1,000 gal	\$1.79	\$1.78	\$1.77	\$1.78	\$1.80	\$3.15	\$3.15	\$3.14	\$2.79	\$2.80	\$2.82	\$2.81	\$2.82	\$2.82	\$2.83	\$3.32

Alternative 2: BWA WTP Expands to Meet Existing Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

Financial Evaluation

Financing Cost

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
<i>Alt #2 - BWA WTP</i>																
Current Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$13,582,560
New Debt Service - Plant Upgrades	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	-	-	-	-	-	-	\$21,540,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	\$700,000	\$700,000	\$700,000	\$700,000	\$700,000	\$700,000	\$4,200,000
O&M Costs (Inflated)	\$6,905,617	\$7,089,879	\$7,271,157	\$7,457,067	\$7,647,943	\$7,843,620	\$8,044,529	\$8,250,348	\$8,461,674	\$8,678,162	\$8,900,348	\$9,128,486	\$9,362,197	\$9,602,172	\$9,848,005	\$212,489,940
Total Cost	\$7,982,617	\$8,166,879	\$8,348,157	\$8,534,067	\$8,724,943	\$8,920,620	\$9,121,529	\$9,327,348	\$9,538,674	\$9,378,162	\$9,600,348	\$9,828,486	\$10,062,197	\$10,302,172	\$10,548,005	\$251,812,500
Avg Water Sold (mgd)	10.34	10.35	10.35	10.35	10.36	10.36	10.37	10.37	10.37	10.38	10.38	10.38	10.39	10.39	10.40	115,913
Cost per 1,000 gal	\$2.11	\$2.16	\$2.21	\$2.26	\$2.31	\$2.36	\$2.41	\$2.46	\$2.52	\$2.48	\$2.53	\$2.59	\$2.65	\$2.72	\$2.78	-
<i>Alt #2 - New WTP</i>																
New Debt Service - Initial Construction	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	-	-	-	-	-	-	\$107,980,000
New Debt Service - Plant Expansion #1	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$47,328,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$9,468,000
O&M Costs (Inflated)	\$4,781,824	\$5,404,066	\$6,049,325	\$6,723,692	\$7,428,223	\$8,220,928	\$9,048,891	\$9,913,150	\$10,815,486	\$11,756,779	\$12,832,491	\$13,954,981	\$15,125,924	\$16,347,050	\$17,619,854	\$182,477,523
Total Cost	\$13,138,824	\$13,761,066	\$14,406,325	\$15,080,692	\$15,785,223	\$16,577,928	\$17,405,891	\$18,270,150	\$19,172,486	\$16,292,779	\$17,368,491	\$18,490,981	\$19,661,924	\$20,883,050	\$22,155,854	\$347,253,523
Avg Water Sold (mgd)	7.16	7.89	8.61	9.34	10.06	10.86	11.66	12.46	13.26	14.06	14.97	15.88	16.78	17.69	18.60	85,521
Cost per 1,000 gal	\$5.03	\$4.78	\$4.58	\$4.43	\$4.30	\$4.18	\$4.09	\$4.02	\$3.96	\$3.18	\$3.18	\$3.19	\$3.21	\$3.23	\$3.26	-
<i>Both Plants</i>																
Total Cost	\$21,121,441	\$21,927,945	\$22,754,482	\$23,614,759	\$24,510,166	\$25,498,548	\$26,527,419	\$27,597,499	\$28,711,160	\$25,670,941	\$26,968,839	\$28,319,467	\$29,724,121	\$31,185,222	\$32,703,858	-
Avg Water Sold (mgd)	17.51	18.23	18.96	19.69	20.42	21.22	22.02	22.83	23.63	24.44	25.35	26.26	27.17	28.09	29.00	-
Cost per 1,000 gal	\$3.31	\$3.29	\$3.29	\$3.29	\$3.29	\$3.29	\$3.30	\$3.31	\$3.33	\$2.88	\$2.91	\$2.95	\$3.00	\$3.04	\$3.09	-

Alternative 2: BWA WTP Expands to Meet Existing Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

O&M Costs

5-Year Avg O&M Costs = \$1.08 per 1,000 gallon
 Beginning year = 2013
 Inflation rate = 0.0250
 Interest rate = 0.0350
 2012 current operations ADD = 8.0000 mgd
 Percentage of water purchased = 10.0000 % of Avg Day Demand
 Cost of HSPS operations = \$0.05 \$/1000 gal

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
BWA WTP (Avg day demand, MGD)	9.29	9.49	9.70	9.90	10.10	10.31	10.31	10.31	10.32	10.32	10.32	10.33	10.33	10.33	10.34	10.34	10.34
Avg Amt of Water Purchased (acre-ft)	0	0	0	1,109	1,132	1,155	1,155	1,156	1,156	1,156	1,157	1,157	1,158	1,158	1,158	1,159	1,159
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00	\$132.50
Annual O&M at WTP	\$3,660,976	\$3,741,030	\$3,821,084	\$3,901,138	\$3,981,192	\$4,061,246	\$4,062,547	\$4,063,849	\$4,065,150	\$4,066,451	\$4,067,752	\$4,069,120	\$4,070,487	\$4,071,855	\$4,073,222	\$4,074,590	\$4,076,027
Annual Water Purchase Cost	\$0	\$0	\$0	\$71,531	\$74,712	\$78,540	\$80,561	\$80,920	\$80,920	\$84,388	\$91,403	\$108,180	\$126,222	\$138,381	\$143,592	\$144,875	\$153,568
Annual Quality Control Costs	\$47,309	\$48,343	\$49,378	\$50,412	\$51,447	\$52,481	\$52,498	\$52,515	\$52,532	\$52,549	\$52,565	\$52,583	\$52,601	\$52,618	\$52,636	\$52,654	\$52,672
Annual Maintenance Costs	\$298,329	\$304,853	\$311,376	\$317,900	\$324,423	\$330,947	\$331,053	\$331,159	\$331,265	\$331,371	\$331,477	\$331,588	\$331,700	\$331,811	\$331,923	\$332,034	\$332,151
Annual Admin Costs	\$185,288	\$189,340	\$193,391	\$197,443	\$201,495	\$205,546	\$205,612	\$205,678	\$205,744	\$205,810	\$205,876	\$205,945	\$206,014	\$206,083	\$206,153	\$206,222	\$206,295
High Service Pump Station Costs	\$169,541	\$173,249	\$176,956	\$180,663	\$184,371	\$188,078	\$188,138	\$188,199	\$188,259	\$188,319	\$188,379	\$188,443	\$188,506	\$188,569	\$188,633	\$188,696	\$188,763
Total O&M Costs	\$4,361,444	\$4,456,815	\$4,552,186	\$4,719,087	\$4,817,640	\$4,916,839	\$4,920,410	\$4,922,319	\$4,923,869	\$4,928,887	\$4,937,452	\$4,955,858	\$4,975,530	\$4,989,318	\$4,996,158	\$4,999,071	\$5,009,475
Inflated Total O&M Costs	\$4,361,444	\$4,456,815	\$4,552,186	\$4,719,087	\$4,938,081	\$5,165,754	\$5,298,744	\$5,433,319	\$5,570,906	\$5,715,998	\$5,869,079	\$6,038,232	\$6,213,755	\$6,386,749	\$6,555,393	\$6,723,194	\$6,905,617
New WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	2.29	2.58	2.88	3.18	3.47	3.77	4.31	4.84	5.37	5.90	6.44	7.16
Avg Amt of Water Purchased (acre-ft)	0	0	0	0	0	256	290	323	356	390	423	483	542	602	662	722	803
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00	\$132.50
Annual O&M at WTP	\$0	\$0	\$0	\$0	\$0	\$900,472	\$1,017,685	\$1,134,898	\$1,252,112	\$1,369,325	\$1,486,538	\$1,696,604	\$1,906,670	\$2,116,737	\$2,326,803	\$2,536,869	\$2,822,413
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$17,408	\$20,228	\$22,610	\$24,920	\$28,470	\$33,417	\$45,161	\$59,078	\$71,939	\$82,088	\$90,250	\$106,398
Annual Quality Control Costs	\$0	\$0	\$0	\$0	\$0	\$11,636	\$13,151	\$14,666	\$16,180	\$17,695	\$19,210	\$21,924	\$24,639	\$27,353	\$30,068	\$32,783	\$36,472
Annual Maintenance Costs	\$0	\$0	\$0	\$0	\$0	\$73,379	\$82,930	\$92,482	\$102,033	\$111,585	\$121,136	\$138,255	\$155,373	\$172,491	\$189,609	\$206,727	\$229,995
Annual Admin Costs	\$0	\$0	\$0	\$0	\$0	\$45,574	\$51,507	\$57,439	\$63,371	\$69,304	\$75,236	\$85,868	\$96,500	\$107,132	\$117,763	\$128,395	\$142,847
High Service Pump Station Costs	\$0	\$0	\$0	\$0	\$0	\$41,701	\$47,129	\$52,558	\$57,986	\$63,414	\$68,842	\$78,570	\$88,299	\$98,027	\$107,755	\$117,483	\$130,707
Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,090,171	\$1,232,630	\$1,374,653	\$1,516,602	\$1,659,792	\$1,804,379	\$2,066,382	\$2,330,558	\$2,593,678	\$2,854,086	\$3,112,507	\$3,468,832
New WTP Inflated Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,145,361	\$1,327,408	\$1,517,359	\$1,715,896	\$1,924,850	\$2,144,840	\$2,517,686	\$2,910,548	\$3,320,128	\$3,744,809	\$4,185,976	\$4,781,824

2013 Present Worth of Annual O&M Costs

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
BWA WTP	\$4,719,087	\$4,700,136	\$4,679,918	\$4,569,090	\$4,459,378	\$4,351,983	\$4,250,164	\$4,153,707	\$4,067,504	\$3,984,048	\$3,897,647	\$3,807,796	\$3,717,088	\$3,633,976
New Harris Reservoir WTP	\$0	\$0	\$1,037,640	\$1,144,620	\$1,245,367	\$1,340,456	\$1,431,234	\$1,517,962	\$1,695,976	\$1,866,144	\$2,026,177	\$2,175,227	\$2,314,323	\$2,516,362

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 2: BWA WTP Expands to Meet Existing Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

O&M Costs

Annual O&M Costs

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
BWA WTP (Avg day demand, MGD)	10.35	10.35	10.35	10.36	10.36	10.37	10.37	10.37	10.38	10.38	10.38	10.39	10.39	10.40
Avg Amt of Water Purchased (acre-ft)	1,160	1,160	1,160	1,161	1,161	1,162	1,162	1,163	1,163	1,163	1,164	1,164	1,165	1,165
Cost/acre-ft purchased	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$4,077,465	\$4,078,902	\$4,080,339	\$4,081,777	\$4,083,287	\$4,084,798	\$4,086,309	\$4,087,819	\$4,089,330	\$4,090,917	\$4,092,505	\$4,094,093	\$4,095,681	\$4,097,268
Annual Water Purchase Cost	\$160,080	\$161,151	\$162,222	\$163,433	\$164,505	\$165,719	\$166,792	\$168,009	\$169,082	\$170,156	\$171,377	\$172,451	\$173,675	\$174,750
Annual Quality Control Costs	\$52,691	\$52,709	\$52,728	\$52,747	\$52,766	\$52,786	\$52,805	\$52,825	\$52,844	\$52,865	\$52,885	\$52,906	\$52,926	\$52,947
Annual Maintenance Costs	\$332,268	\$332,385	\$332,503	\$332,620	\$332,743	\$332,866	\$332,989	\$333,112	\$333,235	\$333,365	\$333,494	\$333,623	\$333,753	\$333,882
Annual Admin Costs	\$206,367	\$206,440	\$206,513	\$206,586	\$206,662	\$206,738	\$206,815	\$206,891	\$206,968	\$207,048	\$207,129	\$207,209	\$207,289	\$207,370
High Service Pump Station Costs	\$188,829	\$188,896	\$188,962	\$189,029	\$189,099	\$189,169	\$189,239	\$189,309	\$189,379	\$189,452	\$189,526	\$189,599	\$189,673	\$189,746
Total O&M Costs	\$5,017,700	\$5,020,483	\$5,023,266	\$5,026,190	\$5,029,062	\$5,032,076	\$5,034,948	\$5,037,965	\$5,040,838	\$5,043,803	\$5,046,915	\$5,049,881	\$5,052,996	\$5,055,963
Inflated Total O&M Costs	\$7,089,879	\$7,271,157	\$7,457,067	\$7,647,943	\$7,843,620	\$8,044,529	\$8,250,348	\$8,461,674	\$8,678,162	\$8,900,348	\$9,128,486	\$9,362,197	\$9,602,172	\$9,848,005
New WTP (Avg day demand, MGD)	7.89	8.61	9.34	10.06	10.86	11.66	12.46	13.26	14.06	14.97	15.88	16.78	17.69	18.60
Avg Amt of Water Purchased (acre-ft)	884	965	1,046	1,127	1,217	1,307	1,396	1,486	1,575	1,677	1,779	1,881	1,983	2,084
Cost/acre-ft purchased	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$3,107,956	\$3,393,500	\$3,679,043	\$3,964,587	\$4,279,691	\$4,594,795	\$4,909,900	\$5,225,004	\$5,540,108	\$5,898,247	\$6,256,385	\$6,614,524	\$6,972,662	\$7,330,800
Annual Water Purchase Cost	\$121,992	\$134,061	\$146,279	\$158,647	\$172,440	\$186,398	\$200,380	\$214,670	\$228,981	\$245,358	\$261,924	\$278,677	\$295,620	\$312,600
Annual Quality Control Costs	\$40,162	\$43,852	\$47,542	\$51,232	\$55,304	\$59,376	\$63,448	\$67,520	\$71,592	\$76,220	\$80,848	\$85,476	\$90,104	\$94,732
Annual Maintenance Costs	\$253,264	\$276,533	\$299,801	\$323,070	\$348,748	\$374,425	\$400,103	\$425,780	\$451,458	\$480,642	\$509,826	\$539,011	\$568,195	\$597,379
Annual Admin Costs	\$157,299	\$171,751	\$186,203	\$200,654	\$216,602	\$232,550	\$248,498	\$264,446	\$280,394	\$298,520	\$316,646	\$334,772	\$352,898	\$371,024
High Service Pump Station Costs	\$143,931	\$157,154	\$170,378	\$183,602	\$198,194	\$212,787	\$227,380	\$241,972	\$256,565	\$273,150	\$289,736	\$306,321	\$322,907	\$339,492
Total O&M Costs	\$3,824,604	\$4,176,851	\$4,529,246	\$4,881,792	\$5,270,979	\$5,660,332	\$6,049,708	\$6,439,392	\$6,829,098	\$7,272,137	\$7,715,365	\$8,158,781	\$8,602,385	\$9,046,028
New WTP Inflated Total O&M Costs	\$5,404,066	\$6,049,325	\$6,723,692	\$7,428,223	\$8,220,928	\$9,048,891	\$9,913,150	\$10,815,486	\$11,756,779	\$12,832,491	\$13,954,981	\$15,125,924	\$16,347,050	\$17,619,854

2013 Present Worth of Annual O&M Costs

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
BWA WTP	\$3,551,163	\$3,466,471	\$3,383,798	\$3,303,187	\$3,224,463	\$3,147,703	\$3,072,682	\$2,999,535	\$2,928,045	\$2,858,309	\$2,790,315	\$2,723,858	\$2,659,062	\$2,595,730	\$101,695,843
New Harris Reservoir WTP	\$2,706,776	\$2,883,971	\$3,051,013	\$3,208,289	\$3,379,572	\$3,540,694	\$3,691,961	\$3,833,926	\$3,966,781	\$4,121,100	\$4,265,635	\$4,400,770	\$4,526,874	\$4,644,228	\$72,533,079

Notes:

1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)

2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)

3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 2: BWA WTP Expands to Meet Existing Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Pipe (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
1	Leaving BWA WTP to West/South Split	WTP	West/South Split	Existing	1.23	16	5.00	4.51	0	14,700	\$0.00	\$0
2	From West/South Split to Brazoria	West/South Split	Brazoria	Existing	0.78	10	5.00	1.76	0	25,300	\$0.00	\$0
5	From West/South Split to TDCJ Clemens	West/South Split	TDCJ Clemens	Existing	0.46	8	5.00	1.13	0	11,100	\$0.00	\$0
7	Leaving BWA WTP to the North	WTP	North/East Split	Existing	16.32	30	5.00	15.86	0	7,200	\$0.00	\$0
8	Main Line to Lake Jackson (Beechwood)	North/East Split	Lake Jackson (Beechwood) Take-Off	Existing	8.32	24	5.00	10.15	0	10,900	\$0.00	\$0
9	To Lake Jackson (Beechwood)	Lake Jackson (Beechwood) Take-Off	Lake Jackson	Existing	2.21	10	5.00	1.76	6	9,500	\$8.00	\$456,000
10	Main line to TDCJ Wayne Scott	Lake Jackson (Beechwood) Take-Off	TDCJ Wayne Scott Take-Off	Existing	6.11	20	5.00	7.05	0	10,300	\$0.00	\$0
11	To TDCJ Wayne Scott	TDCJ Wayne Scott Take-Off	TDCJ Wayne Scott	Existing	0.39	8	5.00	1.13	0	8,900	\$0.00	\$0
12	Main line to Angleton (Jamison)	TDCJ Wayne Scott Take-Off	Angleton (Jamison) Take-Off	Existing	5.72	20	5.00	7.05	0	26,000	\$0.00	\$0
13	To Angleton (Jamison)	Angleton (Jamison) Take-Off	Angleton	Existing	0.78	8	5.00	1.13	0	5,000	\$0.00	\$0
14	Main line to Angleton	Angleton (Jamison) Take-Off	Angleton	Existing	3.14	20	5.00	7.05	0	18,000	\$0.00	\$0
15	From North/East Split to Lake Jackson (Oak Drive)	North/East Split	Lake Jackson (Oak Drive) Take-Off Point	Existing	8.00	24	5.00	10.15	0	2,100	\$0.00	\$0
16	To Lake Jackson (Oak Drive)	Lake Jackson (Oak Drive) Take-Off Point	Lake Jackson (Oak Drive)	Existing	2.21	10	5.00	1.76	6	7,200	\$8.00	\$346,000
17	Main line to Clute/Richwood	Lake Jackson (Oak Drive) Take-Off Point	Clute/Richwood Take-Off Point	Existing	5.79	20	5.00	7.05	0	19,100	\$0.00	\$0
18	To Clute/Richwood	Clute/Richwood Take-Off Point	Clute	Existing	1.69	14	5.00	3.45	0	9,370	\$0.00	\$0
19	From Clute to Richwood	Clute	Richwood	Existing	0.69	14	5.00	3.45	0	6,300	\$0.00	\$0
20	Main line to Dow-B	Clute/Richwood Take-Off Point	Dow-B Take-Off Point	Existing	4.10	20	5.00	7.05	0	14,400	\$0.00	\$0
21	To Dow-B	Dow-B Take-Off Point	Dow-B	Existing	0.67	8	5.00	1.13	0	5,000	\$0.00	\$0
22	Main line to Proposed Dow	Dow-B Take-Off Point	Proposed Dow Take-Off Point	Existing	3.43	20	5.00	7.05	0	8,400	\$0.00	\$0
23	To Proposed Dow	Proposed Dow Take-Off Point	Proposed Dow	Proposed	0.67	8	5	-	6	5,000	\$8.00	\$240,000
24	Main line to Oyster Creek	Proposed Dow Take-Off Point	Oyster Creek/Freeport Take-Off Point	Existing	2.76	20	5.00	7.05	0	6,000	\$0.00	\$0
25	To Oyster Creek	Oyster Creek/Freeport Take-Off Point	Oyster Creek	Existing	0.10	8	5.00	1.13	0	10,800	\$0.00	\$0
26	Main line to Dow-A	Oyster Creek/Freeport Take-Off Point	Dow-A Take-Off Point	Existing	3.33	16	5.00	4.51	0	10,000	\$0.00	\$0
27	To Dow-A	Dow-A Take-Off Point	Dow-A	Existing	0.67	8	5.00	1.13	0	2,000	\$0.00	\$0

Alternative 2: BWA WTP Expands to Meet Existing Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Pipe (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
28	Main line to Freeport North	Dow-A Take-Off Point	Freeport North Take-Off Point	Existing	2.00	16	5.00	4.51	0	3,000	\$0.00	\$0
29	To Freeport North	Freeport North Take-Off Point	Freeport North	Existing	1.00	12	5.00	2.54	0	3,000	\$0.00	\$0
30	Main line to Freeport South	Freeport North Take-Off Point	Freeport South	Existing	1.00	16	5.00	4.51	0	6,000	\$0.00	\$0
32	Leaving New Harris Reservoir Plant to East	New Harris Reservoir WTP	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	New	28.29	-	5	-	36	45,700	\$6.15	\$10,118,000
33	To TDCJ Ramsey, Stringfellow, and Terell	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	TDCJ Ramsey, Stringfellow, and Terell	New	1.52	-	5	-	10	18,000	\$6.70	\$1,206,000
34	To County Other #1	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	County Other #1	New	6.58	-	5	-	20	5,000	\$5.50	\$550,000
35	Main line to Alvin Take-Off Point	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	Alvin Take-Off Point	New	7.02	-	5	-	20	17,100	\$5.50	\$1,881,000
38	Main line to TDCJ Darrington	Alvin Take-Off	TDCJ Darrington Take-Off Point	New	7.02	-	5	-	20	20,100	\$5.50	\$2,211,000
39	To TDCJ Darrington	TDCJ Darrington Take-Off Point	TDCJ Darrington	New	0.76	-	5	-	6	12,200	\$8.00	\$586,000
40	To County Other #2	TDCJ Darrington Take-Off Point	County Other #2	New	6.58	-	5	-	20	5,000	\$5.50	\$550,000
41	Main line to County Other #3	TDCJ Darrington Take-Off Point	County Other #3 Take-Off Point	New	12.84	-	5	-	24	12,000	\$5.50	\$1,584,000
42	To County Other #3	County Other #3 Take-Off Point	County Other #3 Take-Off Point	New	6.58	-	5	-	20	5,000	\$5.50	\$550,000
43	Main line to Manvel	TDCJ Darrington Take-Off Point	Manvel	New	6.26	-	5	-	16	10,000	\$5.50	\$880,000

Total BWA WTP Pipeline Costs: \$1,042,000
 Total New Harris Reservoir WTP Pipeline Costs: \$20,116,000

Alternative 2: BWA WTP Expands to Meet Existing Customer Demands (67% Water Shortage Purchase), New WTP on Harris Reservoir

Financial Evaluation

Interest Rate = 4.5 %
 Payment Period = 20 years

Capital Costs	2010	2015	2020	2025	2030	2035	2040
BWA Phase Capital Cost	\$0	\$13,996,800	\$0	\$0	\$0	\$9,101,700	\$0
New Plant Phase Capital Cost	\$0	\$70,221,600	\$0	\$38,475,000	\$0	\$20,520,000	\$0

Financing Cost

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Alt 2 - BWA WTP																
Current Debt Service	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	-	-	-	-	-	-	-	-
New Debt Service - Plant Upgrades	-	-	-	-	-	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$4,361,444	\$4,456,815	\$4,552,186	\$5,148,399	\$5,386,803	\$5,637,989	\$5,795,241	\$5,943,976	\$6,094,329	\$6,275,500	\$6,489,611	\$6,791,020	\$7,113,140	\$7,397,422	\$7,630,343	\$7,833,736
Total Cost	\$6,059,264	\$6,154,635	\$6,250,006	\$6,846,219	\$7,084,623	\$8,412,809	\$8,570,061	\$8,718,796	\$7,171,329	\$7,352,500	\$7,566,611	\$7,868,020	\$8,190,140	\$8,474,422	\$8,707,343	\$8,910,736
Avg Water Sold (mgd)	9.29	9.49	9.70	9.90	10.10	10.31	10.31	10.31	10.32	10.32	10.32	10.33	10.33	10.33	10.34	10.34
Cost per 1,000 gal	\$1.79	\$1.78	\$1.77	\$1.89	\$1.92	\$2.24	\$2.28	\$2.32	\$1.90	\$1.95	\$2.01	\$2.09	\$2.17	\$2.25	\$2.31	\$2.36
Alt 2 - New WTP																
New Debt Service - Initial Construction	-	-	-	-	-	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$2,958,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$0	\$0	\$0	\$0	\$0	\$2,119,622	\$2,349,172	\$2,565,871	\$2,788,008	\$3,067,982	\$3,409,756	\$4,045,362	\$4,727,967	\$5,353,253	\$5,897,476	\$6,400,168
Total Cost	\$0	\$0	\$0	\$0	\$0	\$7,518,622	\$7,748,172	\$7,964,871	\$8,187,008	\$8,466,982	\$8,808,756	\$9,444,362	\$10,126,967	\$10,752,253	\$11,296,476	\$14,757,168
Avg Water Sold (mgd)	0.00	0.00	0.00	0.00	0.00	2.29	2.58	2.88	3.18	3.47	3.77	4.31	4.84	5.37	5.90	6.44
Cost per 1,000 gal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$9.01	\$8.22	\$7.58	\$7.06	\$6.68	\$6.40	\$6.01	\$5.73	\$5.48	\$5.24	\$6.28
Both Plants																
Total Cost	\$6,059,264	\$6,154,635	\$6,250,006	\$6,846,219	\$7,084,623	\$15,931,431	\$16,318,233	\$16,683,667	\$15,358,337	\$15,819,482	\$16,375,367	\$17,312,381	\$18,317,107	\$19,226,676	\$20,003,819	\$23,667,904
Avg Water Sold (mgd)	9.29	9.49	9.70	9.90	10.10	12.59	12.89	13.19	13.49	13.79	14.09	14.63	15.17	15.70	16.24	16.78
Cost per 1,000 gal	\$1.79	\$1.78	\$1.77	\$1.89	\$1.92	\$3.47	\$3.47	\$3.46	\$3.12	\$3.14	\$3.18	\$3.24	\$3.31	\$3.35	\$3.37	\$3.87

Alternative 2: BWA WTP Expands to Meet Existing Customer Demands (67% Water Shortage Purchase), New WTP on Harris Reservoir

Financial Evaluation

Financing Cost

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
Alt 2 - BWA WTP																
Current Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$13,582,560
New Debt Service - Plant Upgrades	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	-	-	-	-	-	-	\$21,540,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	\$700,000	\$700,000	\$700,000	\$700,000	\$700,000	\$700,000	\$4,200,000
O&M Costs (Inflated)	\$8,112,221	\$8,377,791	\$8,600,096	\$8,828,281	\$9,062,500	\$9,303,049	\$9,549,961	\$9,803,404	\$10,063,550	\$10,330,577	\$10,604,827	\$10,886,333	\$11,175,287	\$11,471,884	\$11,776,327	\$244,854,043
Total Cost	\$9,189,221	\$9,454,791	\$9,677,096	\$9,905,281	\$10,139,500	\$10,380,049	\$10,626,961	\$10,880,404	\$11,140,550	\$11,030,577	\$11,304,827	\$11,586,333	\$11,875,287	\$12,171,884	\$12,476,327	\$284,176,603
Avg Water Sold (mgd)	10.34	10.35	10.35	10.35	10.36	10.36	10.37	10.37	10.37	10.38	10.38	10.38	10.39	10.39	10.40	115,913
Cost per 1,000 gal	\$2.43	\$2.50	\$2.56	\$2.62	\$2.68	\$2.74	\$2.81	\$2.87	\$2.94	\$2.91	\$2.98	\$3.06	\$3.13	\$3.21	\$3.29	-
Alt 2 - New WTP																
New Debt Service - Initial Construction	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	\$5,399,000	-	-	-	-	-	-	\$107,980,000
New Debt Service - Plant Expansion #1	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$2,958,000	\$47,328,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$9,468,000
O&M Costs (Inflated)	\$7,172,748	\$7,940,696	\$8,650,465	\$9,390,760	\$10,162,663	\$11,022,218	\$11,918,399	\$12,852,501	\$13,825,858	\$14,839,851	\$15,986,370	\$17,180,940	\$18,425,247	\$19,721,031	\$21,070,089	\$242,884,472
Total Cost	\$15,529,748	\$16,297,696	\$17,007,465	\$17,747,760	\$18,519,663	\$19,379,218	\$20,275,399	\$21,209,501	\$22,182,858	\$19,375,851	\$20,522,370	\$21,716,940	\$22,961,247	\$24,257,031	\$25,606,089	\$407,660,472
Avg Water Sold (mgd)	7.16	7.89	8.61	9.34	10.06	10.86	11.66	12.46	13.26	14.06	14.97	15.88	16.78	17.69	18.60	85,521
Cost per 1,000 gal	\$5.94	\$5.66	\$5.41	\$5.21	\$5.04	\$4.89	\$4.76	\$4.66	\$4.58	\$3.78	\$3.76	\$3.75	\$3.75	\$3.76	\$3.77	-
Both Plants																
Total Cost	\$24,718,969	\$25,752,486	\$26,684,561	\$27,653,041	\$28,659,163	\$29,759,267	\$30,902,360	\$32,089,905	\$33,323,409	\$30,406,428	\$31,827,197	\$33,303,274	\$34,836,534	\$36,428,916	\$38,082,416	-
Avg Water Sold (mgd)	17.51	18.23	18.96	19.69	20.42	21.22	22.02	22.83	23.63	24.44	25.35	26.26	27.17	28.09	29.00	-
Cost per 1,000 gal	\$3.87	\$3.87	\$3.86	\$3.85	\$3.85	\$3.84	\$3.84	\$3.85	\$3.86	\$3.41	\$3.44	\$3.47	\$3.51	\$3.55	\$3.60	-

Alternative 2: BWA WTP Expands to Meet Existing Customer Demands (67% Water Shortage Purchase), New WTP on Harris Reservoir

O&M Costs

5-Year Avg O&M Costs = \$1.08 per 1,000 gallon
 Beginning year = 2013
 Inflation rate = 0.0250
 Interest rate = 0.0350
 2012 current operations ADD = 8.0000 mgd
 Percentage of water purchased = 67% % of 2040 Avg Day (based on 8 months of water purchased)
 Cost of HSPS operations = \$0.05 \$/1000 gal

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
BWA WTP (Avg day demand, MGD)	9.29	9.49	9.70	9.90	10.10	10.31	10.31	10.31	10.32	10.32	10.32	10.33	10.33	10.33	10.34	10.34	10.34
Avg Amt of Water Purchased (acre-ft)	0	0	0	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00	\$132.50
Annual O&M at WTP	\$3,660,976	\$3,741,030	\$3,821,084	\$3,901,138	\$3,981,192	\$4,061,246	\$4,062,547	\$4,063,849	\$4,065,150	\$4,066,451	\$4,067,752	\$4,069,120	\$4,070,487	\$4,071,855	\$4,073,222	\$4,074,590	\$4,076,027
Annual Water Purchase Cost	\$0	\$0	\$0	\$500,843	\$512,490	\$528,020	\$541,609	\$543,550	\$543,550	\$566,845	\$613,435	\$726,028	\$846,385	\$927,918	\$962,860	\$970,625	\$1,028,863
Annual Quality Control Costs	\$47,309	\$48,343	\$49,378	\$50,412	\$51,447	\$52,481	\$52,498	\$52,515	\$52,532	\$52,549	\$52,565	\$52,583	\$52,601	\$52,618	\$52,636	\$52,654	\$52,672
Annual Maintenance Costs	\$298,329	\$304,853	\$311,376	\$317,900	\$324,423	\$330,947	\$331,053	\$331,159	\$331,265	\$331,371	\$331,477	\$331,588	\$331,700	\$331,811	\$331,923	\$332,034	\$332,151
Annual Admin Costs	\$185,288	\$189,340	\$193,391	\$197,443	\$201,495	\$205,546	\$205,612	\$205,678	\$205,744	\$205,810	\$205,876	\$205,945	\$206,014	\$206,083	\$206,153	\$206,222	\$206,295
High Service Pump Station Costs	\$169,541	\$173,249	\$176,956	\$180,663	\$184,371	\$188,078	\$188,138	\$188,199	\$188,259	\$188,319	\$188,379	\$188,443	\$188,506	\$188,569	\$188,633	\$188,696	\$188,763
Total O&M Costs	\$4,361,444	\$4,456,815	\$4,552,186	\$5,148,399	\$5,255,418	\$5,366,319	\$5,381,458	\$5,384,949	\$5,386,499	\$5,411,344	\$5,459,484	\$5,573,706	\$5,695,693	\$5,778,855	\$5,815,426	\$5,824,821	\$5,884,770
Inflated Total O&M Costs	\$4,361,444	\$4,456,815	\$4,552,186	\$5,148,399	\$5,386,803	\$5,637,989	\$5,795,241	\$5,943,976	\$6,094,329	\$6,275,500	\$6,489,611	\$6,791,020	\$7,113,140	\$7,397,422	\$7,630,343	\$7,833,736	\$8,112,221
New WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	2.29	2.58	2.88	3.18	3.47	3.77	4.31	4.84	5.37	5.90	6.44	7.16
Avg Amt of Water Purchased (acre-ft)	0	0	0	0	0	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00	\$132.50
Annual O&M at WTP	\$0	\$0	\$0	\$0	\$0	\$900,472	\$1,017,685	\$1,134,898	\$1,252,112	\$1,369,325	\$1,486,538	\$1,696,604	\$1,906,670	\$2,116,737	\$2,326,803	\$2,536,869	\$2,822,413
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$944,724	\$969,037	\$972,510	\$972,510	\$1,014,189	\$1,097,547	\$1,298,996	\$1,514,337	\$1,660,214	\$1,722,732	\$1,736,625	\$1,840,823
Annual Quality Control Costs	\$0	\$0	\$0	\$0	\$0	\$11,636	\$13,151	\$14,666	\$16,180	\$17,695	\$19,210	\$21,924	\$24,639	\$27,353	\$30,068	\$32,783	\$36,472
Annual Maintenance Costs	\$0	\$0	\$0	\$0	\$0	\$73,379	\$82,930	\$92,482	\$102,033	\$111,585	\$121,136	\$138,255	\$155,373	\$172,491	\$189,609	\$206,727	\$229,995
Annual Admin Costs	\$0	\$0	\$0	\$0	\$0	\$45,574	\$51,507	\$57,439	\$63,371	\$69,304	\$75,236	\$85,868	\$96,500	\$107,132	\$117,763	\$128,395	\$142,847
High Service Pump Station Costs	\$0	\$0	\$0	\$0	\$0	\$41,701	\$47,129	\$52,558	\$57,986	\$63,414	\$68,842	\$78,570	\$88,299	\$98,027	\$107,755	\$117,483	\$130,707
Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$2,017,487	\$2,181,439	\$2,324,553	\$2,464,192	\$2,645,511	\$2,868,509	\$3,320,217	\$3,785,817	\$4,181,953	\$4,494,730	\$4,758,882	\$5,203,257
New WTP Inflated Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$2,119,622	\$2,349,172	\$2,565,871	\$2,788,008	\$3,067,982	\$3,409,756	\$4,045,362	\$4,727,967	\$5,353,253	\$5,897,476	\$6,400,168	\$7,172,748

2013 Present Worth of Annual O&M Costs

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
BWA WTP	\$5,148,399	\$5,127,237	\$5,107,739	\$4,997,218	\$4,878,498	\$4,760,880	\$4,666,185	\$4,592,874	\$4,574,600	\$4,560,703	\$4,514,432	\$4,432,197	\$4,331,080	\$4,268,932
New Harris Reservoir WTP	\$0	\$0	\$1,920,273	\$2,025,683	\$2,105,930	\$2,177,987	\$2,281,216	\$2,413,177	\$2,725,057	\$3,031,411	\$3,266,935	\$3,425,635	\$3,538,495	\$3,774,549

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.
- 4) Average Amount of Water purchased based on Enterra study that 8 months out of the year there could be water shortages. The annual water purchase is for 8 months of 2040 ADD.
- 5) Water purchases begin in 2020.

Alternative 2: BWA WTP Expands to Meet Existing Customer Demands (67% Water Shortage Purchase), New WTP on Harris Reservoir

O&M Costs

Annual O&M Costs

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
BWA WTP (Avg day demand, MGD)	10.35	10.35	10.35	10.36	10.36	10.37	10.37	10.37	10.38	10.38	10.38	10.39	10.39	10.40
Avg Amt of Water Purchased (acre-ft)	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765	7,765
Cost/acre-ft purchased	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$4,077,465	\$4,078,902	\$4,080,339	\$4,081,777	\$4,083,287	\$4,084,798	\$4,086,309	\$4,087,819	\$4,089,330	\$4,090,917	\$4,092,505	\$4,094,093	\$4,095,681	\$4,097,268
Annual Water Purchase Cost	\$1,071,570	\$1,078,738	\$1,085,905	\$1,093,073	\$1,100,241	\$1,107,408	\$1,114,576	\$1,121,744	\$1,128,912	\$1,136,079	\$1,143,247	\$1,150,415	\$1,157,582	\$1,164,750
Annual Quality Control Costs	\$52,691	\$52,709	\$52,728	\$52,747	\$52,766	\$52,786	\$52,805	\$52,825	\$52,844	\$52,865	\$52,885	\$52,906	\$52,926	\$52,947
Annual Maintenance Costs	\$332,268	\$332,385	\$332,503	\$332,620	\$332,743	\$332,866	\$332,989	\$333,112	\$333,235	\$333,365	\$333,494	\$333,623	\$333,753	\$333,882
Annual Admin Costs	\$206,367	\$206,440	\$206,513	\$206,586	\$206,662	\$206,738	\$206,815	\$206,891	\$206,968	\$207,048	\$207,129	\$207,209	\$207,289	\$207,370
High Service Pump Station Costs	\$188,829	\$188,896	\$188,962	\$189,029	\$189,099	\$189,169	\$189,239	\$189,309	\$189,379	\$189,452	\$189,526	\$189,599	\$189,673	\$189,746
Total O&M Costs	\$5,929,190	\$5,938,070	\$5,946,950	\$5,955,830	\$5,964,798	\$5,973,765	\$5,982,732	\$5,991,700	\$6,000,667	\$6,009,726	\$6,018,785	\$6,027,845	\$6,036,904	\$6,045,963
Inflated Total O&M Costs	\$8,377,791	\$8,600,096	\$8,828,281	\$9,062,500	\$9,303,049	\$9,549,961	\$9,803,404	\$10,063,550	\$10,330,577	\$10,604,827	\$10,886,333	\$11,175,287	\$11,471,884	\$11,776,327
New WTP (Avg day demand, MGD)	7.89	8.61	9.34	10.06	10.86	11.66	12.46	13.26	14.06	14.97	15.88	16.78	17.69	18.60
Avg Amt of Water Purchased (acre-ft)	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893	13,893
Cost/acre-ft purchased	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$3,107,956	\$3,393,500	\$3,679,043	\$3,964,587	\$4,279,691	\$4,594,795	\$4,909,900	\$5,225,004	\$5,540,108	\$5,898,247	\$6,256,385	\$6,614,524	\$6,972,662	\$7,330,800
Annual Water Purchase Cost	\$1,917,234	\$1,930,058	\$1,942,883	\$1,955,707	\$1,968,531	\$1,981,356	\$1,994,180	\$2,007,004	\$2,019,828	\$2,032,653	\$2,045,477	\$2,058,301	\$2,071,126	\$2,083,950
Annual Quality Control Costs	\$40,162	\$43,852	\$47,542	\$51,232	\$55,304	\$59,376	\$63,448	\$67,520	\$71,592	\$76,220	\$80,848	\$85,476	\$90,104	\$94,732
Annual Maintenance Costs	\$253,264	\$276,533	\$299,801	\$323,070	\$348,748	\$374,425	\$400,103	\$425,780	\$451,458	\$480,642	\$509,826	\$539,011	\$568,195	\$597,379
Annual Admin Costs	\$157,299	\$171,751	\$186,203	\$200,654	\$216,602	\$232,550	\$248,498	\$264,446	\$280,394	\$298,520	\$316,646	\$334,772	\$352,898	\$371,024
High Service Pump Station Costs	\$143,931	\$157,154	\$170,378	\$183,602	\$198,194	\$212,787	\$227,380	\$241,972	\$256,565	\$273,150	\$289,736	\$306,321	\$322,907	\$339,492
Total O&M Costs	\$5,619,846	\$5,972,848	\$6,325,850	\$6,678,852	\$7,067,070	\$7,455,289	\$7,843,508	\$8,231,727	\$8,619,945	\$9,059,432	\$9,498,918	\$9,938,405	\$10,377,891	\$10,817,378
New WTP Inflated Total O&M Costs	\$7,940,696	\$8,650,465	\$9,390,760	\$10,162,663	\$11,022,218	\$11,918,399	\$12,852,501	\$13,825,858	\$14,839,851	\$15,986,370	\$17,180,940	\$18,425,247	\$19,721,031	\$21,070,089

2013 Present Worth of Annual O&M Costs

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
BWA WTP	\$4,196,249	\$4,100,033	\$4,006,014	\$3,914,142	\$3,824,425	\$3,736,756	\$3,651,088	\$3,567,376	\$3,485,576	\$3,405,695	\$3,327,638	\$3,251,363	\$3,176,828	\$3,103,996	\$116,708,154
New Harris Reservoir WTP	\$3,977,318	\$4,124,046	\$4,261,250	\$4,389,308	\$4,531,165	\$4,663,490	\$4,786,665	\$4,901,057	\$5,007,022	\$5,133,955	\$5,251,718	\$5,360,682	\$5,461,207	\$5,553,639	\$100,088,870

Notes:

1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)

2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)

3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

4) Average Amount of Water purchased based on Enterra study that 8 months out of the year there could be water shortages. The annual water purchase is for 8 months of 2040 ADD.

5) Water purchases begin in 2020.

Alternative 3: BWA WTP Expansion (10% Water Shortage Purchase), New Plant in Manvel

Financial Evaluation

Interest Rate = 4.5 %
 Payment Period = 20 years

Capital Costs	2010	2015	2020	2025	2030	2035	2040
BWA Phase Capital Costs	\$0	\$32,726,700	\$0	\$40,593,150	\$0	\$23,787,000	\$0
New Plant Phase Capital Costs	\$0	\$41,534,100	\$0	\$23,085,000	\$0	\$12,825,000	\$0

Financing Cost

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Alt 3 - BWA WTP																
Current Debt Service	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	-	-	-	-	-	-	-	-
New Debt Service - Plant Upgrades and Tank Farm Initial Construction	-	-	-	-	-	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	\$0	\$0	\$0	\$0	\$0	\$0
New Debt Service - Tank Farm Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$3,121,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service - Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$5,104,420	\$5,199,791	\$5,295,162	\$5,473,093	\$5,711,199	\$5,958,559	\$6,186,426	\$6,419,775	\$6,660,546	\$6,914,178	\$7,181,458	\$7,515,346	\$7,864,125	\$8,217,139	\$8,571,725	\$8,931,843
Total Cost	\$6,802,240	\$6,897,611	\$6,992,982	\$7,170,913	\$7,409,019	\$10,172,379	\$10,400,246	\$10,633,595	\$9,176,546	\$9,430,178	\$9,697,458	\$10,031,346	\$10,380,125	\$10,733,139	\$11,087,725	\$14,568,843
Avg Water Sold (mgd)	10.81	11.02	11.22	11.42	11.63	11.83	11.97	12.12	12.26	12.40	12.55	12.76	12.97	13.19	13.40	13.61
Cost per 1,000 gal	\$1.72	\$1.72	\$1.71	\$1.72	\$1.75	\$2.36	\$2.38	\$2.40	\$2.05	\$2.08	\$2.12	\$2.15	\$2.19	\$2.23	\$2.27	\$2.93
Alt 3 - New North Brazoria Regional WTP																
New Debt Service - Initial Construction	-	-	-	-	-	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$1,775,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$0	\$0	\$0	\$0	\$0	\$1,209,291	\$1,330,085	\$1,435,466	\$1,541,749	\$1,695,938	\$1,901,448	\$2,325,380	\$2,784,931	\$3,186,001	\$3,506,977	\$3,783,172
Total Cost	\$0	\$0	\$0	\$0	\$0	\$4,402,291	\$4,523,085	\$4,628,466	\$4,734,749	\$4,888,938	\$5,094,448	\$5,518,380	\$5,977,931	\$6,379,001	\$6,699,977	\$8,751,172
Avg Water Sold (mgd)	0.00	0.00	0.00	0.00	0.00	0.76	0.92	1.08	1.23	1.39	1.55	1.87	2.19	2.52	2.84	3.16
Cost per 1,000 gal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$15.84	\$13.48	\$11.78	\$10.51	\$9.63	\$9.01	\$8.08	\$7.46	\$6.94	\$6.46	\$7.58
Both Plants																
Total Cost	\$6,802,240	\$6,897,611	\$6,992,982	\$7,170,913	\$7,409,019	\$14,574,670	\$14,923,331	\$15,262,061	\$13,911,295	\$14,319,116	\$14,791,906	\$15,549,726	\$16,358,056	\$17,112,139	\$17,787,702	\$23,320,016
Avg Water Sold (mgd)	10.81	11.02	11.22	11.42	11.63	12.59	12.89	13.19	13.49	13.79	14.09	14.63	15.17	15.70	16.24	16.78
Cost per 1,000 gal	\$1.72	\$1.72	\$1.71	\$1.72	\$1.75	\$3.17	\$3.17	\$3.17	\$2.82	\$2.84	\$2.88	\$2.91	\$2.95	\$2.99	\$3.00	\$3.81

Alternative 3: BWA WTP Expansion (10% Water Shortage Purchase), New Plant in Manvel

Financial Evaluation

Financing Cost

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
Alt 3 - BWA WTP																
Current Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$13,582,560
New Debt Service - Plant Upgrades and Tank Farm Initial Construction	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	-	-	-	-	-	-	\$50,320,000
New Debt Service - Plant Expansion #1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-	\$0
New Debt Service - Tank Farm Expansion #1	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$49,936,000
New Debt Service - Plant Expansion #2	-	-	-	-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
New Debt Service - Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	\$1,829,000	\$1,829,000	\$1,829,000	\$1,829,000	\$1,829,000	\$1,829,000	\$10,974,000
O&M Costs (Inflated)	\$9,367,367	\$9,815,273	\$10,269,483	\$10,740,358	\$11,228,233	\$11,734,236	\$12,258,616	\$12,801,978	\$13,364,702	\$13,947,911	\$14,552,193	\$15,178,079	\$15,826,274	\$16,497,504	\$17,192,227	\$301,979,218
Total Cost	\$15,004,367	\$15,452,273	\$15,906,483	\$16,377,358	\$16,865,233	\$17,371,236	\$17,895,616	\$18,438,978	\$19,001,702	\$18,897,911	\$19,502,193	\$20,128,079	\$20,776,274	\$21,447,504	\$22,142,227	\$426,791,778
Avg Water Sold (mgd)	13.90	14.18	14.46	14.75	15.03	15.31	15.60	15.88	16.17	16.45	16.73	17.02	17.30	17.59	17.87	146,125.88
Cost per 1,000 gal	\$2.96	\$2.99	\$3.01	\$3.04	\$3.07	\$3.11	\$3.14	\$3.18	\$3.22	\$3.15	\$3.19	\$3.24	\$3.29	\$3.34	\$3.39	-
Alt 3 - New North Brazoria Regional WTP																
New Debt Service - Initial Construction	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	-	-	-	-	-	-	\$63,860,000
New Debt Service - Plant Expansion #1	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$28,400,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	\$986,000	\$986,000	\$986,000	\$986,000	\$986,000	\$986,000	\$5,916,000
O&M Costs (Inflated)	\$4,249,198	\$4,700,836	\$5,089,541	\$5,494,743	\$5,917,025	\$6,403,224	\$6,910,034	\$7,438,183	\$7,988,421	\$8,561,522	\$9,234,442	\$9,935,656	\$10,666,160	\$11,426,979	\$12,219,173	\$140,935,575
Total Cost	\$9,217,198	\$9,668,836	\$10,057,541	\$10,462,743	\$10,885,025	\$11,371,224	\$11,878,034	\$12,406,183	\$12,956,421	\$11,322,522	\$11,995,442	\$12,696,656	\$13,427,160	\$14,187,979	\$14,980,173	\$239,111,575
Avg Water Sold (mgd)	3.61	4.05	4.50	4.94	5.39	5.91	6.43	6.95	7.47	7.99	8.61	9.24	9.87	10.50	11.13	46,025.41
Cost per 1,000 gal	\$7.00	\$6.54	\$6.13	\$5.80	\$5.54	\$5.27	\$5.06	\$4.89	\$4.75	\$3.88	\$3.82	\$3.76	\$3.73	\$3.70	\$3.69	-
Both Plants																
Total Cost	\$24,221,565	\$25,121,109	\$25,964,025	\$26,840,101	\$27,750,258	\$28,742,460	\$29,773,650	\$30,845,161	\$31,958,123	\$30,220,433	\$31,497,635	\$32,824,735	\$34,203,434	\$35,635,483	\$37,122,401	-
Avg Water Sold (mgd)	17.51	18.23	18.96	19.69	20.42	21.22	22.02	22.83	23.63	24.44	25.35	26.26	27.17	28.09	29.00	-
Cost per 1,000 gal	\$3.79	\$3.77	\$3.75	\$3.73	\$3.72	\$3.71	\$3.70	\$3.70	\$3.71	\$3.39	\$3.40	\$3.42	\$3.45	\$3.48	\$3.51	-

Alternative 3: BWA WTP Expansion (10% Water Shortage Purchase), New Plant in Manvel

O&M Costs

5-Year Avg O&M Costs for BWA WTP =	\$1.08 per 1,000 gallon
O&M Cost for New North Brazoria Regional WTP =	\$0.88 per 1,000 gallon
Beginning year =	2013
Inflation rate =	0.0250
Interest rate =	0.0350
2012 current operations ADD =	8.0000 mgd
Percentage of water purchased =	10.0000 % of Avg Day Demand
Tank Farm Operations Cost =	\$0.05 \$/1,000 gal
Cost of HSPS operations =	\$0.05 \$/1000 gal

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BWA WTP (Avg day demand, MGD)	10.81	11.02	11.22	11.42	11.63	11.83	11.97	12.12	12.26	12.40	12.55	12.76	12.97	13.19	13.40	13.61
Avg Amt of Water Purchased (acre-ft)	0	0	0	1,280	1,303	1,326	1,342	1,358	1,374	1,390	1,406	1,430	1,454	1,478	1,502	1,525
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00
Annual O&M at WTP	\$4,261,291	\$4,341,345	\$4,421,399	\$4,501,453	\$4,581,507	\$4,661,561	\$4,718,033	\$4,774,506	\$4,830,978	\$4,887,450	\$4,943,923	\$5,028,047	\$5,112,171	\$5,196,296	\$5,280,420	\$5,364,544
Annual Water Purchase Cost	\$0	\$0	\$0	\$82,560	\$85,998	\$90,168	\$93,605	\$95,060	\$96,180	\$101,470	\$111,074	\$133,705	\$158,486	\$176,621	\$186,248	\$190,625
Annual Quality Control Costs	\$55,066	\$56,101	\$57,135	\$58,170	\$59,204	\$60,239	\$60,969	\$61,698	\$62,428	\$63,158	\$63,888	\$64,975	\$66,062	\$67,149	\$68,236	\$69,323
Annual Maintenance Costs	\$347,248	\$353,772	\$360,295	\$366,819	\$373,342	\$379,866	\$384,468	\$389,070	\$393,671	\$398,273	\$402,875	\$409,730	\$416,586	\$423,441	\$430,296	\$437,151
Annual Admin Costs	\$215,671	\$219,723	\$223,774	\$227,826	\$231,878	\$235,929	\$238,788	\$241,646	\$244,504	\$247,362	\$250,220	\$254,478	\$258,736	\$262,993	\$267,251	\$271,509
Avg Demand to Tank Farm	1.52	1.52	1.52	1.52	1.52	1.52	1.66	1.80	1.94	2.08	2.22	2.43	2.64	2.85	3.06	3.27
Annual Tank Farm Operations Costs	\$27,801	\$27,801	\$27,801	\$27,801	\$27,801	\$27,801	\$30,356	\$32,911	\$35,466	\$38,021	\$40,576	\$44,408	\$48,241	\$52,073	\$55,906	\$59,738
High Service Pump Station Costs	\$197,342	\$201,050	\$204,757	\$208,464	\$212,172	\$215,879	\$218,494	\$221,109	\$223,725	\$226,340	\$228,955	\$232,851	\$236,747	\$240,643	\$244,538	\$248,434
Total O&M Costs	\$5,104,420	\$5,199,791	\$5,295,162	\$5,473,093	\$5,571,902	\$5,671,443	\$5,744,712	\$5,815,999	\$5,886,952	\$5,962,074	\$6,041,511	\$6,168,194	\$6,297,028	\$6,419,216	\$6,532,895	\$6,641,325
Inflated Total O&M Costs	\$5,104,420	\$5,199,791	\$5,295,162	\$5,473,093	\$5,711,199	\$5,958,559	\$6,186,426	\$6,419,775	\$6,660,546	\$6,914,178	\$7,181,458	\$7,515,346	\$7,864,125	\$8,217,139	\$8,571,725	\$8,931,843
New WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	0.76	0.92	1.08	1.23	1.39	1.55	1.87	2.19	2.52	2.84	3.16
Raw Water Purchased (acre-ft)	0	0	0	0	0	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
Avg Amt of Water Purchased, Shortage (acre-ft)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00
Annual O&M at WTP	\$0	\$0	\$0	\$0	\$0	\$243,590	\$293,940	\$344,289	\$394,639	\$444,989	\$495,338	\$598,655	\$701,972	\$805,289	\$908,606	\$1,011,923
Annual Raw Water Costs	\$0	\$0	\$0	\$0	\$0	\$850,000	\$871,875	\$875,000	\$875,000	\$912,500	\$987,500	\$1,168,750	\$1,362,500	\$1,493,750	\$1,550,000	\$1,562,500
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Quality Control Costs	\$0	\$0	\$0	\$0	\$0	\$3,879	\$4,681	\$5,482	\$6,284	\$7,086	\$7,887	\$9,533	\$11,178	\$12,823	\$14,468	\$16,113
Annual Maintenance Costs	\$0	\$0	\$0	\$0	\$0	\$24,460	\$29,515	\$34,571	\$39,627	\$44,682	\$49,738	\$60,113	\$70,487	\$80,861	\$91,235	\$101,610
Annual Admin Costs	\$0	\$0	\$0	\$0	\$0	\$15,191	\$18,332	\$21,472	\$24,612	\$27,752	\$30,892	\$37,335	\$43,778	\$50,222	\$56,665	\$63,108
High Service Pump Station Costs	\$0	\$0	\$0	\$0	\$0	\$13,900	\$16,774	\$19,647	\$22,520	\$25,393	\$28,266	\$34,162	\$40,058	\$45,954	\$51,849	\$57,745
Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,151,020	\$1,235,116	\$1,300,461	\$1,362,681	\$1,462,402	\$1,599,622	\$1,908,548	\$2,229,973	\$2,488,899	\$2,672,824	\$2,813,000
New WTP Inflated Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,209,291	\$1,330,085	\$1,435,466	\$1,541,749	\$1,695,938	\$1,901,448	\$2,325,380	\$2,784,931	\$3,186,001	\$3,506,977	\$3,783,172

2013 Present Worth of Annual O&M Costs

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BWA WTP	\$5,473,093	\$5,383,480	\$5,294,352	\$5,181,401	\$5,068,308	\$4,956,656	\$4,850,151	\$4,748,573	\$4,684,198	\$4,620,324	\$4,550,703	\$4,474,679	\$4,395,118
New WTP	\$0	\$0	\$1,074,490	\$1,114,004	\$1,133,277	\$1,147,341	\$1,189,665	\$1,257,288	\$1,449,373	\$1,636,200	\$1,764,427	\$1,830,740	\$1,861,596

Notes:

1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)

2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)

3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 3: BWA WTP Expansion (10% Water Shortage Purchase), New Plant in Manvel

O&M Costs

Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
BWA WTP (Avg day demand, MGD)	13.90	14.18	14.46	14.75	15.03	15.31	15.60	15.88	16.17	16.45	16.73	17.02	17.30	17.59	17.87
Avg Amt of Water Purchased (acre-ft)	1,557	1,589	1,621	1,653	1,684	1,716	1,748	1,780	1,811	1,843	1,875	1,907	1,939	1,971	2,002
Cost/acre-ft purchased	\$132.50	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$5,476,324	\$5,588,104	\$5,699,883	\$5,811,663	\$5,923,443	\$6,035,296	\$6,147,148	\$6,259,001	\$6,370,854	\$6,482,707	\$6,594,637	\$6,706,567	\$6,818,497	\$6,930,427	\$7,042,358
Annual Water Purchase Cost	\$206,303	\$219,282	\$225,194	\$231,166	\$237,055	\$243,144	\$249,292	\$255,498	\$261,620	\$267,944	\$274,327	\$280,769	\$287,270	\$293,831	\$300,300
Annual Quality Control Costs	\$70,768	\$72,212	\$73,656	\$75,101	\$76,545	\$77,991	\$79,436	\$80,882	\$82,327	\$83,772	\$85,219	\$86,665	\$88,112	\$89,558	\$91,005
Annual Maintenance Costs	\$446,260	\$455,369	\$464,478	\$473,586	\$482,695	\$491,810	\$500,925	\$510,040	\$519,154	\$528,269	\$537,390	\$546,511	\$555,632	\$564,753	\$573,874
Annual Admin Costs	\$277,166	\$282,823	\$288,481	\$294,138	\$299,795	\$305,456	\$311,117	\$316,778	\$322,440	\$328,101	\$333,766	\$339,431	\$345,096	\$350,760	\$356,425
Avg Demand to Tank Farm	3.55	3.83	4.11	4.39	4.67	4.95	5.23	5.51	5.79	6.07	6.35	6.63	6.91	7.19	7.47
Annual Tank Farm Operations Costs	\$64,848	\$69,958	\$75,068	\$80,178	\$85,288	\$90,398	\$95,508	\$100,618	\$105,728	\$110,838	\$115,948	\$121,058	\$126,168	\$131,278	\$136,388
High Service Pump Station Costs	\$253,611	\$258,787	\$263,964	\$269,141	\$274,317	\$279,497	\$284,677	\$289,857	\$295,037	\$300,217	\$305,400	\$310,584	\$315,768	\$320,951	\$326,135
Total O&M Costs	\$6,795,279	\$6,946,535	\$7,090,725	\$7,234,973	\$7,379,139	\$7,523,592	\$7,668,104	\$7,812,675	\$7,957,161	\$8,101,849	\$8,246,688	\$8,391,586	\$8,536,543	\$8,681,559	\$8,826,485
Inflated Total O&M Costs	\$9,367,367	\$9,815,273	\$10,269,483	\$10,740,358	\$11,228,233	\$11,734,236	\$12,258,616	\$12,801,978	\$13,364,702	\$13,947,911	\$14,552,193	\$15,178,079	\$15,826,274	\$16,497,504	\$17,192,227
New WTP (Avg day demand, MGD)	3.61	4.05	4.50	4.94	5.39	5.91	6.43	6.95	7.47	7.99	8.61	9.24	9.87	10.50	11.13
Raw Water Purchased (acre-ft)	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
Avg Amt of Water Purchased, Shortage (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost/acre-ft purchased	\$132.50	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$1,154,106	\$1,296,289	\$1,438,472	\$1,580,655	\$1,722,838	\$1,889,011	\$2,055,184	\$2,221,357	\$2,387,530	\$2,553,703	\$2,754,800	\$2,955,896	\$3,156,993	\$3,358,090	\$3,559,187
Annual Raw Water Costs	\$1,656,250	\$1,725,000	\$1,736,538	\$1,748,077	\$1,759,615	\$1,771,154	\$1,782,692	\$1,794,231	\$1,805,769	\$1,817,308	\$1,828,846	\$1,840,385	\$1,851,923	\$1,863,462	\$1,875,000
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Quality Control Costs	\$18,377	\$20,641	\$22,905	\$25,169	\$27,433	\$30,079	\$32,725	\$35,371	\$38,017	\$40,663	\$43,866	\$47,068	\$50,270	\$53,472	\$56,674
Annual Maintenance Costs	\$115,887	\$130,164	\$144,441	\$158,718	\$172,995	\$189,680	\$206,366	\$223,052	\$239,738	\$256,424	\$276,616	\$296,809	\$317,002	\$337,194	\$357,387
Annual Admin Costs	\$71,976	\$80,843	\$89,710	\$98,577	\$107,445	\$117,808	\$128,171	\$138,535	\$148,898	\$159,261	\$171,803	\$184,344	\$196,885	\$209,427	\$221,968
High Service Pump Station Costs	\$65,859	\$73,972	\$82,086	\$90,200	\$98,313	\$107,796	\$117,279	\$126,761	\$136,244	\$145,726	\$157,202	\$168,678	\$180,153	\$191,629	\$203,104
Total O&M Costs	\$3,082,455	\$3,326,910	\$3,514,153	\$3,701,396	\$3,888,639	\$4,105,529	\$4,322,418	\$4,539,307	\$4,756,196	\$4,973,086	\$5,233,133	\$5,493,179	\$5,753,226	\$6,013,273	\$6,273,320
New WTP Inflated Total O&M Costs	\$4,249,198	\$4,700,836	\$5,089,541	\$5,494,743	\$5,917,025	\$6,403,224	\$6,910,034	\$7,438,183	\$7,988,421	\$8,561,522	\$9,234,442	\$9,935,656	\$10,666,160	\$11,426,979	\$12,219,173

2013 Present Worth of Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
BWA WTP	\$4,344,930	\$4,291,443	\$4,232,387	\$4,172,452	\$4,111,684	\$4,050,410	\$3,988,608	\$3,926,384	\$3,863,766	\$3,800,987	\$3,738,105	\$3,675,155	\$3,612,213	\$3,549,349	\$3,486,570	\$122,525,475
New WTP	\$1,970,934	\$2,055,304	\$2,097,565	\$2,134,617	\$2,166,765	\$2,210,257	\$2,248,330	\$2,281,301	\$2,309,471	\$2,333,126	\$2,372,104	\$2,405,777	\$2,434,460	\$2,458,453	\$2,478,038	\$49,414,903

Notes:

1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)

2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)

3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 3: BWA WTP Expansion (10% Water Shortage Purchase), New Plant in Manvel

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
1	Leaving BWA WTP to West/South Split	WTP	West/South Split	Existing	1.23	16.00	5.00	4.51	0	14,700	\$0.00	\$0
2	From West/South Split to Brazoria	West/South Split	Brazoria	Existing	0.78	10.00	5	1.76	0	25,300	\$0.00	\$0
5	From West/South Split to TDCJ Clemens	West/South Split	TDCJ Clemens	Existing	0.46	8.00	5	1.13	0	11,100	\$0.00	\$0
7	Leaving BWA WTP to the North	WTP	North/East Split	Existing	16.32	30	5.00	15.86	0	7,200	\$0.00	\$0
8	Main Line to Lake Jackson (Beechwood)	North/East Split	Lake Jackson (Beechwood) Take-Off	Existing	8.32	24.00	5	10.15	0	10,900	\$0.00	\$0
9	To Lake Jackson (Beechwood)	Lake Jackson (Beechwood) Take-Off	Lake Jackson	Existing	2.21	10.00	5	1.76	6	9,500	\$8.00	\$456,000
10	Main line to TDCJ Wayne Scott	Lake Jackson (Beechwood) Take-Off	TDCJ Wayne Scott Take-Off	Existing	6.11	20.00	5	7.05	0	10,300	\$0.00	\$0
11	To TDCJ Wayne Scott	TDCJ Wayne Scott Take-Off	TDCJ Wayne Scott	Existing	0.39	8.00	5	1.13	0	8,900	\$0.00	\$0
12	Main line to Angleton (Jamison)	TDCJ Wayne Scott Take-Off	Angleton (Jamison) Take-Off	Existing	5.72	20	5	7.05	0	26,000	\$0.00	\$0
13	To Angleton (Jamison)	Angleton (Jamison) Take-Off	Angleton	Existing	1.14	8	5.00	1.13	0	5,000	\$0.00	\$0
14	Main line to Angleton	Angleton (Jamison) Take-Off	Angleton	Existing	4.58	20	5.00	7.05	0	18,000	\$0.00	\$0
48	Leaving BWA WTP to Tank Farm	WTP	Tank Farm	New	11.40	-	5	-	24	39,900	\$5.50	\$5,267,000
49	Main line to TDCJ Ramsey, Stringfellow and Terell	Tank Farm	TDCJ Ramsey, Stringfellow and Terell Take-Off Point	New	11.40	-	5	-	24	29,900	\$5.50	\$3,947,000
33	To TDCJ Ramsey, Stringfellow and Terell	TDCJ Ramsey, Stringfellow and Terell Take-Off Point	TDCJ Ramsey, Stringfellow and Terell	New	1.52	-	5	-	10	19,200	\$6.70	\$1,287,000
34	To County Other Future Districts	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	County Other Future Districts	New	4.94	-	5	-	16	5,000	\$5.50	\$440,000
15	From North/East Split to Lake Jackson (Oak Drive)	North/East Split	Lake Jackson (Oak Drive) Take-Off Point	Existing	8.00	24	5.00	10.15	0	2,100	\$0.00	\$0
16	To Lake Jackson (Oak Drive)	Lake Jackson (Oak Drive) Take-Off Point	Lake Jackson (Oak Drive)	Existing	2.21	10	5.00	1.76	6	7,200	\$8.00	\$346,000
17	Main line to Clute/Richwood	Lake Jackson (Oak Drive) Take-Off Point	Clute/Richwood Take-Off Point	Existing	5.79	20	5.00	7.05	0	19,100	\$0.00	\$0
18	To Clute/Richwood	Clute/Richwood Take-Off Point	Clute	Existing	1.69	14	5.00	3.45	0	9,370	\$0.00	\$0
19	From Clute to Richwood	Clute	Richwood	Existing	0.69	14	5.00	3.45	0	6,300	\$0.00	\$0

Alternative 3: BWA WTP Expansion (10% Water Shortage Purchase), New Plant in Manvel

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
20	Main line to Dow-B	Clute/Richwood Take-Off Point	Dow-B Take-Off Point	Existing	4.10	20	5.00	7.05	0	14,400	\$0.00	\$0
21	To Dow-B	Dow-B Take-Off Point	Dow-B	Existing	0.67	8	5.00	1.13	0	5,000	\$0.00	\$0
22	Main line to Proposed Dow	Dow-B Take-Off Point	Proposed Dow Take-Off Point	Existing	3.43	20	5.00	7.05	0	8,400	\$0.00	\$0
23	To Proposed Dow	Proposed Dow Take-Off Point	Proposed Dow	Proposed	0.67	-	5.00	-	6	5,000	\$8.00	\$240,000
24	Main line to Oyster Creek	Proposed Dow Take-Off Point	Oyster Creek/Freeport Take-Off Point	Existing	2.76	20	5.00	7.05	0	6,000	\$0.00	\$0
25	To Oyster Creek	Oyster Creek/Freeport Take-Off Point	Oyster Creek	Existing	0.00	8	5.00	1.13	0	10,800	\$0.00	\$0
26	Main line to Dow-A	Oyster Creek/Freeport Take-Off Point	Dow-A Take-Off Point	Existing	2.67	16	5.00	4.51	0	10,000	\$0.00	\$0
27	To Dow-A	Dow-A Take-Off Point	Dow-A	Existing	0.67	8	5.00	1.13	0	2,000	\$0.00	\$0
28	Main line to Freeport North	Dow-A Take-Off Point	Freeport North Take-Off Point	Existing	2.00	16	5.00	4.51	0	3,000	\$0.00	\$0
29	To Freeport North	Freeport North Take-Off Point	Freeport North	Existing	1.00	12	5.00	2.54	0	3,000	\$0.00	\$0
30	Main line to Freeport South	Freeport North Take-Off Point	Freeport South	Existing	1.00	16	5.00	4.51	0	6,000	\$0.00	\$0
58	From River to New North Brazoria Regional WTP	BRA Water Source	WTP	New	11.13	-	5.00	-	24	53,150	\$5.50	\$7,016,000
51	Leaving New North Brazoria Regional WTP South to Manvel	New North Brazoria Regional WTP	Manvel	New	6.26	-	5.00	-	16	5,000	\$5.50	\$440,000
54	Leaving New North Brazoria Regional WTP South	New North Brazoria Regional WTP	County Other Future Districts #1 Take-Off	New	10.64	-	5.00	-	24	25,000	\$5.50	\$3,300,000
55	To County Other Future Districts #1	County Other Future Districts #1 Take-Off	County Other Future Districts	New	4.94	-	5.00	-	16	5,000	\$5.50	\$440,000
56	Main Line to TDCJ Darrington	County Other Future Districts #1 Take-Off	TDCJ Darrington/County Other Future Districts Take-Off Pt	New	5.70	-	5.00	-	16	13,000	\$5.50	\$1,144,000
50	To TDCJ Darrington	TDCJ Darrington/County Other Future Districts Take-Off Pt	TDCJ Darrington	New	0.76	-	5.00	-	6	12,200	\$8.00	\$586,000
57	To County Other Future Districts #2	TDCJ Darrington/County Other Future Districts	County Other Future Districts #2	New	4.94	-	5.00	-	16	5,000	\$5.50	\$440,000

Total BWA WTP Pipeline Costs for 2015: \$5,234,000
 Total BWA WTP Pipeline Costs for 2020: \$6,749,000
 Total New WTP Pipeline Costs: \$13,366,000

Alternative 3: BWA WTP Expansion (67% Water Shortage Purchase), New Plant in Manvel

Financial Evaluation

Interest Rate = 4.5 %
 Payment Period = 20 years

Capital Costs	2010	2015	2020	2025	2030	2035	2040
BWA Phase Capital Costs	\$0	\$32,726,700	\$0	\$40,593,150	\$0	\$23,787,000	\$0
New Plant Phase Capital Costs	\$0	\$41,534,100	\$0	\$23,085,000	\$0	\$12,825,000	\$0

Financing Cost

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Alt 3 - BWA WTP																
Current Debt Service	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	-	-	-	-	-	-	-	-
New Debt Service - Plant Upgrades and Tank Farm Initial Construction	-	-	-	-	-	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	\$0	\$0	\$0	\$0	\$0	\$0
New Debt Service - Tank Farm Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$3,121,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service - Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$5,104,420	\$5,199,791	\$5,295,162	\$6,251,350	\$6,525,908	\$6,817,298	\$7,088,084	\$7,346,051	\$7,608,711	\$7,926,345	\$8,302,697	\$8,872,825	\$9,482,936	\$10,032,588	\$10,498,728	\$10,919,085
Total Cost	\$6,802,240	\$6,897,611	\$6,992,982	\$7,949,170	\$8,223,728	\$11,031,118	\$11,301,904	\$11,559,871	\$10,124,711	\$10,442,345	\$10,818,697	\$11,388,825	\$11,998,936	\$12,548,588	\$13,014,728	\$16,556,085
Avg Water Sold (mgd)	10.81	11.02	11.22	11.42	11.63	11.83	11.97	12.12	12.26	12.40	12.55	12.76	12.97	13.19	13.40	13.61
Cost per 1,000 gal	\$1.72	\$1.72	\$1.71	\$1.91	\$1.94	\$2.55	\$2.59	\$2.61	\$2.26	\$2.31	\$2.36	\$2.45	\$2.53	\$2.61	\$2.66	\$3.33
Alt 3 - New North Brazoria Regional WTP																
New Debt Service - Initial Construction	-	-	-	-	-	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$1,775,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$0	\$0	\$0	\$0	\$0	\$1,209,291	\$1,330,085	\$1,435,466	\$1,541,749	\$1,695,938	\$1,901,448	\$2,325,380	\$2,784,931	\$3,186,001	\$3,506,977	\$3,783,172
Total Cost	\$0	\$0	\$0	\$0	\$0	\$4,402,291	\$4,523,085	\$4,628,466	\$4,734,749	\$4,888,938	\$5,094,448	\$5,518,380	\$5,977,931	\$6,379,001	\$6,699,977	\$8,751,172
Avg Water Sold (mgd)	0.00	0.00	0.00	0.00	0.00	0.76	0.92	1.08	1.23	1.39	1.55	1.87	2.19	2.52	2.84	3.16
Cost per 1,000 gal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$15.84	\$13.48	\$11.78	\$10.51	\$9.63	\$9.01	\$8.08	\$7.46	\$6.94	\$6.46	\$7.58
Both Plants																
Total Cost	\$6,802,240	\$6,897,611	\$6,992,982	\$7,949,170	\$8,223,728	\$15,433,409	\$15,824,988	\$16,188,336	\$14,859,460	\$15,331,282	\$15,913,145	\$16,907,204	\$17,976,867	\$18,927,589	\$19,714,706	\$25,307,257
Avg Water Sold (mgd)	10.81	11.02	11.22	11.42	11.63	12.59	12.89	13.19	13.49	13.79	14.09	14.63	15.17	15.70	16.24	16.78
Cost per 1,000 gal	\$1.72	\$1.72	\$1.71	\$1.91	\$1.94	\$3.36	\$3.36	\$3.36	\$3.02	\$3.05	\$3.09	\$3.17	\$3.25	\$3.30	\$3.33	\$4.13

Alternative 3: BWA WTP Expansion (67% Water Shortage Purchase), New Plant in Manvel

Financial Evaluation

Financing Cost

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
Alt 3 - BWA WTP																
Current Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$13,582,560
New Debt Service - Plant Upgrades and Tank Farm Initial Construction	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	\$2,516,000	-	-	-	-	-	-	\$50,320,000
New Debt Service - Plant Expansion #1	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	-	\$0
New Debt Service - Tank Farm Expansion #1	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$3,121,000	\$49,936,000
New Debt Service - Plant Expansion #2	-	-	-	-	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
New Debt Service - Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	\$1,829,000	\$1,829,000	\$1,829,000	\$1,829,000	\$1,829,000	\$1,829,000	\$10,974,000
O&M Costs (Inflated)	\$11,520,660	\$12,107,775	\$12,628,577	\$13,167,853	\$13,726,199	\$14,304,369	\$14,902,868	\$15,522,353	\$16,163,497	\$16,826,997	\$17,513,732	\$18,224,286	\$18,959,422	\$19,719,925	\$20,506,604	\$359,067,094
Total Cost	\$17,157,660	\$17,744,775	\$18,265,577	\$18,804,853	\$19,363,199	\$19,941,369	\$20,539,868	\$21,159,353	\$21,800,497	\$21,776,997	\$22,463,732	\$23,174,286	\$23,909,422	\$24,669,925	\$25,456,604	\$483,879,654
Avg Water Sold (mgd)	13.90	14.18	14.46	14.75	15.03	15.31	15.60	15.88	16.17	16.45	16.73	17.02	17.30	17.59	17.87	146,125.88
Cost per 1,000 gal	\$3.38	\$3.43	\$3.46	\$3.49	\$3.53	\$3.57	\$3.61	\$3.65	\$3.69	\$3.63	\$3.68	\$3.73	\$3.79	\$3.84	\$3.90	-
Alt 3 - New North Brazoria Regional WTP																
New Debt Service - Initial Construction	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	-	-	-	-	-	-	\$63,860,000
New Debt Service - Plant Expansion #1	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$28,400,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	\$986,000	\$986,000	\$986,000	\$986,000	\$986,000	\$986,000	\$5,916,000
O&M Costs (Inflated)	\$4,249,198	\$4,700,836	\$5,089,541	\$5,494,743	\$5,917,025	\$6,403,224	\$6,910,034	\$7,438,183	\$7,988,421	\$8,561,522	\$9,234,442	\$9,935,656	\$10,666,160	\$11,426,979	\$12,219,173	\$140,935,575
Total Cost	\$9,217,198	\$9,668,836	\$10,057,541	\$10,462,743	\$10,885,025	\$11,371,224	\$11,878,034	\$12,406,183	\$12,956,421	\$11,322,522	\$11,995,442	\$12,696,656	\$13,427,160	\$14,187,979	\$14,980,173	\$239,111,575
Avg Water Sold (mgd)	3.61	4.05	4.50	4.94	5.39	5.91	6.43	6.95	7.47	7.99	8.61	9.24	9.87	10.50	11.13	46,025.41
Cost per 1,000 gal	\$7.00	\$6.54	\$6.13	\$5.80	\$5.54	\$5.27	\$5.06	\$4.89	\$4.75	\$3.88	\$3.82	\$3.76	\$3.73	\$3.70	\$3.69	-
Both Plants																
Total Cost	\$26,374,858	\$27,413,611	\$28,323,118	\$29,267,596	\$30,248,224	\$31,312,592	\$32,417,903	\$33,565,536	\$34,756,918	\$33,099,519	\$34,459,173	\$35,870,942	\$37,336,583	\$38,857,905	\$40,436,777	-
Avg Water Sold (mgd)	17.51	18.23	18.96	19.69	20.42	21.22	22.02	22.83	23.63	24.44	25.35	26.26	27.17	28.09	29.00	-
Cost per 1,000 gal	\$4.13	\$4.12	\$4.09	\$4.07	\$4.06	\$4.04	\$4.03	\$4.03	\$4.03	\$3.71	\$3.72	\$3.74	\$3.76	\$3.79	\$3.82	-

Alternative 3: BWA WTP Expansion (67% Water Shortage Purchase), New Plant in Manvel

O&M Costs

5-Year Avg O&M Costs for BWA WTP =	\$1.08 per 1,000 gallon
O&M Cost for New North Brazoria Regional WTP =	\$0.88 per 1,000 gallon
Beginning year =	2013
Inflation rate =	0.0250
Interest rate =	0.0350
2012 current operations ADD =	8.0000 mgd
Percentage of water purchased =	67% % of 2040 Avg Day (based on 8 months of water purchased)
Tank Farm Operations Cost =	\$0.05 \$/1,000 gal
Cost of HSPS operations =	\$0.05 \$/1000 gal

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BWA WTP (Avg day demand, MGD)	10.81	11.02	11.22	11.42	11.63	11.83	11.97	12.12	12.26	12.40	12.55	12.76	12.97	13.19	13.40	13.61
Avg Amt of Water Purchased (acre-ft)	0	0	0	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00
Annual O&M at WTP	\$4,261,291	\$4,341,345	\$4,421,399	\$4,501,453	\$4,581,507	\$4,661,561	\$4,718,033	\$4,774,506	\$4,830,978	\$4,887,450	\$4,943,923	\$5,028,047	\$5,112,171	\$5,196,296	\$5,280,420	\$5,364,544
Annual Water Purchase Cost	\$0	\$0	\$0	\$860,817	\$880,836	\$907,528	\$930,884	\$934,220	\$934,220	\$974,258	\$1,054,334	\$1,247,851	\$1,454,714	\$1,594,847	\$1,654,904	\$1,668,250
Annual Quality Control Costs	\$55,066	\$56,101	\$57,135	\$58,170	\$59,204	\$60,239	\$60,969	\$61,698	\$62,428	\$63,158	\$63,888	\$64,975	\$66,062	\$67,149	\$68,236	\$69,323
Annual Maintenance Costs	\$347,248	\$353,772	\$360,295	\$366,819	\$373,342	\$379,866	\$384,468	\$389,070	\$393,671	\$398,273	\$402,875	\$409,730	\$416,586	\$423,441	\$430,296	\$437,151
Annual Admin Costs	\$215,671	\$219,723	\$223,774	\$227,826	\$231,878	\$235,929	\$238,788	\$241,646	\$244,504	\$247,362	\$250,220	\$254,478	\$258,736	\$262,993	\$267,251	\$271,509
Avg Demand to Tank Farm	1.52	1.52	1.52	1.52	1.52	1.52	1.66	1.80	1.94	2.08	2.22	2.43	2.64	2.85	3.06	3.27
Annual Tank Farm Operations Costs	\$27,801	\$27,801	\$27,801	\$27,801	\$27,801	\$27,801	\$30,356	\$32,911	\$35,466	\$38,021	\$40,576	\$44,408	\$48,241	\$52,073	\$55,906	\$59,738
High Service Pump Station Costs	\$197,342	\$201,050	\$204,757	\$208,464	\$212,172	\$215,879	\$218,494	\$221,109	\$223,725	\$226,340	\$228,955	\$232,851	\$236,747	\$240,643	\$244,538	\$248,434
Total O&M Costs	\$5,104,420	\$5,199,791	\$5,295,162	\$6,251,350	\$6,366,740	\$6,488,803	\$6,581,991	\$6,655,159	\$6,724,992	\$6,834,862	\$6,984,771	\$7,282,340	\$7,593,256	\$7,837,442	\$8,001,551	\$8,118,950
Inflated Total O&M Costs	\$5,104,420	\$5,199,791	\$5,295,162	\$6,251,350	\$6,525,908	\$6,817,298	\$7,088,084	\$7,346,051	\$7,608,711	\$7,926,345	\$8,302,697	\$8,872,825	\$9,482,936	\$10,032,588	\$10,498,728	\$10,919,085
New WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	0.76	0.92	1.08	1.23	1.39	1.55	1.87	2.19	2.52	2.84	3.16
Raw Water Purchased (acre-ft)	0	0	0	0	0	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
Avg Amt of Water Purchased, Shortage (acre-ft)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00
Annual O&M at WTP	\$0	\$0	\$0	\$0	\$0	\$243,590	\$293,940	\$344,289	\$394,639	\$444,989	\$495,338	\$598,655	\$701,972	\$805,289	\$908,606	\$1,011,923
Annual Raw Water Costs	\$0	\$0	\$0	\$0	\$0	\$850,000	\$871,875	\$875,000	\$875,000	\$912,500	\$987,500	\$1,168,750	\$1,362,500	\$1,493,750	\$1,550,000	\$1,562,500
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Quality Control Costs	\$0	\$0	\$0	\$0	\$0	\$3,879	\$4,681	\$5,482	\$6,284	\$7,086	\$7,887	\$9,533	\$11,178	\$12,823	\$14,468	\$16,113
Annual Maintenance Costs	\$0	\$0	\$0	\$0	\$0	\$24,460	\$29,515	\$34,571	\$39,627	\$44,682	\$49,738	\$60,113	\$70,487	\$80,861	\$91,235	\$101,610
Annual Admin Costs	\$0	\$0	\$0	\$0	\$0	\$15,191	\$18,332	\$21,472	\$24,612	\$27,752	\$30,892	\$37,335	\$43,778	\$50,222	\$56,665	\$63,108
High Service Pump Station Costs	\$0	\$0	\$0	\$0	\$0	\$13,900	\$16,774	\$19,647	\$22,520	\$25,393	\$28,266	\$34,162	\$40,058	\$45,954	\$51,849	\$57,745
Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,151,020	\$1,235,116	\$1,300,461	\$1,362,681	\$1,462,402	\$1,599,622	\$1,908,548	\$2,229,973	\$2,488,899	\$2,672,824	\$2,813,000
New WTP Inflated Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,209,291	\$1,330,085	\$1,435,466	\$1,541,749	\$1,695,938	\$1,901,448	\$2,325,380	\$2,784,931	\$3,186,001	\$3,506,977	\$3,783,172

2013 Present Worth of Annual O&M Costs

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BWA WTP	\$6,251,350	\$6,151,439	\$6,057,367	\$5,936,578	\$5,799,587	\$5,662,263	\$5,560,165	\$5,489,967	\$5,530,293	\$5,571,407	\$5,556,110	\$5,480,628	\$5,372,985
New WTP	\$0	\$0	\$1,074,490	\$1,114,004	\$1,133,277	\$1,147,341	\$1,189,665	\$1,257,288	\$1,449,373	\$1,636,200	\$1,764,427	\$1,830,740	\$1,861,596

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.
- 4) Average Amount of Water purchased based on Interra study that 8 months out of the year there could be water shortages. The annual water purchase is for 8 months of 2040 ADD.
- 5) Annual water purchases begin in 2020.

Alternative 3: BWA WTP Expansion (67% Water Shortage Purchase), New Plant in Manvel

O&M Costs

Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
BWA WTP (Avg day demand, MGD)	13.90	14.18	14.46	14.75	15.03	15.31	15.60	15.88	16.17	16.45	16.73	17.02	17.30	17.59	17.87
Avg Amt of Water Purchased (acre-ft)	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13,346	13346.00	13346.00
Cost/acre-ft purchased	\$132.50	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$5,476,324	\$5,588,104	\$5,699,883	\$5,811,663	\$5,923,443	\$6,035,296	\$6,147,148	\$6,259,001	\$6,370,854	\$6,482,707	\$6,594,637	\$6,706,567	\$6,818,497	\$6,930,427	\$7,042,358
Annual Water Purchase Cost	\$1,768,345	\$1,841,748	\$1,854,067	\$1,866,387	\$1,878,706	\$1,891,026	\$1,903,345	\$1,915,664	\$1,927,984	\$1,940,303	\$1,952,622	\$1,964,942	\$1,977,261	\$1,989,581	\$2,001,900
Annual Quality Control Costs	\$70,768	\$72,212	\$73,656	\$75,101	\$76,545	\$77,991	\$79,436	\$80,882	\$82,327	\$83,772	\$85,219	\$86,665	\$88,112	\$89,558	\$91,005
Annual Maintenance Costs	\$446,260	\$455,369	\$464,478	\$473,586	\$482,695	\$491,810	\$500,925	\$510,040	\$519,154	\$528,269	\$537,390	\$546,511	\$555,632	\$564,753	\$573,874
Annual Admin Costs	\$277,166	\$282,823	\$288,481	\$294,138	\$299,795	\$305,456	\$311,117	\$316,778	\$322,440	\$328,101	\$333,766	\$339,431	\$345,096	\$350,760	\$356,425
Avg Demand to Tank Farm	3.55	3.83	4.11	4.39	4.67	4.95	5.23	5.51	5.79	6.07	6.35	6.63	6.91	7.19	7.47
Annual Tank Farm Operations Costs	\$64,848	\$69,958	\$75,068	\$80,178	\$85,288	\$90,398	\$95,508	\$100,618	\$105,728	\$110,838	\$115,948	\$121,058	\$126,168	\$131,278	\$136,388
High Service Pump Station Costs	\$253,611	\$258,787	\$263,964	\$269,141	\$274,317	\$279,497	\$284,677	\$289,857	\$295,037	\$300,217	\$305,400	\$310,584	\$315,768	\$320,951	\$326,135
Total O&M Costs	\$8,357,322	\$8,569,001	\$8,719,598	\$8,870,194	\$9,020,790	\$9,171,474	\$9,322,157	\$9,472,841	\$9,623,524	\$9,774,208	\$9,924,983	\$10,075,759	\$10,226,534	\$10,377,309	\$10,528,085
Inflated Total O&M Costs	\$11,520,660	\$12,107,775	\$12,628,577	\$13,167,853	\$13,726,199	\$14,304,369	\$14,902,868	\$15,522,353	\$16,163,497	\$16,826,997	\$17,513,732	\$18,224,286	\$18,959,422	\$19,719,925	\$20,506,604
New WTP (Avg day demand, MGD)	3.61	4.05	4.50	4.94	5.39	5.91	6.43	6.95	7.47	7.99	8.61	9.24	9.87	10.50	11.13
Raw Water Purchased (acre-ft)	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
Avg Amt of Water Purchased, Shortage (ac-ft)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost/acre-ft purchased	\$132.50	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$1,154,106	\$1,296,289	\$1,438,472	\$1,580,655	\$1,722,838	\$1,889,011	\$2,055,184	\$2,221,357	\$2,387,530	\$2,553,703	\$2,754,800	\$2,955,896	\$3,156,993	\$3,358,090	\$3,559,187
Annual Raw Water Costs	\$1,656,250	\$1,725,000	\$1,736,538	\$1,748,077	\$1,759,615	\$1,771,154	\$1,782,692	\$1,794,231	\$1,805,769	\$1,817,308	\$1,828,846	\$1,840,385	\$1,851,923	\$1,863,462	\$1,875,000
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Quality Control Costs	\$18,377	\$20,641	\$22,905	\$25,169	\$27,433	\$30,079	\$32,725	\$35,371	\$38,017	\$40,663	\$43,866	\$47,068	\$50,270	\$53,472	\$56,674
Annual Maintenance Costs	\$115,887	\$130,164	\$144,441	\$158,718	\$172,995	\$189,680	\$206,366	\$223,052	\$239,738	\$256,424	\$276,616	\$296,809	\$317,002	\$337,194	\$357,387
Annual Admin Costs	\$71,976	\$80,843	\$89,710	\$98,577	\$107,445	\$117,808	\$128,171	\$138,535	\$148,898	\$159,261	\$171,803	\$184,344	\$196,885	\$209,427	\$221,968
High Service Pump Station Costs	\$65,859	\$73,972	\$82,086	\$90,200	\$98,313	\$107,796	\$117,279	\$126,761	\$136,244	\$145,726	\$157,202	\$168,678	\$180,153	\$191,629	\$203,104
Total O&M Costs	\$3,082,455	\$3,326,910	\$3,514,153	\$3,701,396	\$3,888,639	\$4,105,529	\$4,322,418	\$4,539,307	\$4,756,196	\$4,973,086	\$5,233,133	\$5,493,179	\$5,753,226	\$6,013,273	\$6,273,320
New WTP Inflated Total O&M Costs	\$4,249,198	\$4,700,836	\$5,089,541	\$5,494,743	\$5,917,025	\$6,403,224	\$6,910,034	\$7,438,183	\$7,988,421	\$8,561,522	\$9,234,442	\$9,935,656	\$10,666,160	\$11,426,979	\$12,219,173

2013 Present Worth of Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
BWA WTP	\$5,343,706	\$5,293,773	\$5,204,646	\$5,115,493	\$5,026,418	\$4,937,565	\$4,848,973	\$4,760,727	\$4,672,903	\$4,585,576	\$4,498,852	\$4,412,750	\$4,327,327	\$4,242,635	\$4,158,722	\$145,850,207
New WTP	\$1,970,934	\$2,055,304	\$2,097,565	\$2,134,617	\$2,166,765	\$2,210,257	\$2,248,330	\$2,281,301	\$2,309,471	\$2,333,126	\$2,372,104	\$2,405,777	\$2,434,460	\$2,458,453	\$2,478,038	\$49,414,903

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.
- 4) Average Amount of Water purchased based on Interra study that 8 months out of the year there could be water shortages. The annual water purchase is for 8 months of 2040 ADD.
- 5) Annual water purchases begin in 2020.

Alternative 3 – Brackish: BWA WTP Expands/Brackish Groundwater RO Plant to Meet Current Customer Demands, New Plant in Manvel

Financial Evaluation

Interest Rate = 4.5 %
 Payment Period = 20 years

Capital Costs	2010	2015	2020	2025	2030	2035	2040
BWA Phase Capital Cost	\$0	\$71,064,244	\$9,111,150	\$5,832,000	\$17,955,000	\$5,832,000	\$0
New Plant Phase Capital Cost	\$0	\$41,534,100	\$0	\$23,085,000	\$0	\$12,825,000	\$0

Financing Cost

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Alt 3 Brackish GW - BWA WTP & RO Plant																
Current Debt Service	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	-	-	-	-	-	-	-	-
New Debt Service - Plant Upgrades, RO Initial, Tank Farm and Piping Initial	-	-	-	-	-	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000
New Debt Service - Distribution Piping	-	-	-	-	-	-	-	-	-	-	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000
New Debt Service - Tank Farm Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$449,000
New Debt Service - BWA Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service - Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$5,104,420	\$5,199,791	\$5,295,162	\$5,390,533	\$5,623,051	\$5,910,258	\$6,133,793	\$6,364,811	\$6,603,546	\$6,850,240	\$7,105,141	\$7,410,519	\$7,726,726	\$8,054,111	\$8,393,036	\$8,743,874
Total Cost	\$6,802,240	\$6,897,611	\$6,992,982	\$7,088,353	\$7,320,871	\$13,072,078	\$13,295,613	\$13,526,631	\$12,067,546	\$12,314,240	\$13,270,141	\$13,575,519	\$13,891,726	\$14,219,111	\$14,558,036	\$15,357,874
Avg Water Sold (mgd)	10.81	11.02	11.22	11.42	11.63	11.83	11.97	12.12	12.26	12.40	12.55	12.76	12.97	13.19	13.40	13.61
Cost per 1,000 gal	\$1.72	\$1.72	\$1.71	\$1.70	\$1.73	\$3.03	\$3.04	\$3.06	\$2.70	\$2.72	\$2.90	\$2.92	\$2.93	\$2.95	\$2.98	\$3.09
Alt 3 Brackish GW- New North Brazoria Regional WTP																
New Debt Service - Initial Construction	-	-	-	-	-	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$1,775,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$0	\$0	\$0	\$0	\$0	\$1,209,291	\$1,330,085	\$1,435,466	\$1,541,749	\$1,695,938	\$1,901,448	\$2,325,380	\$2,784,931	\$3,186,001	\$3,506,977	\$3,783,172
Total Cost	\$0	\$0	\$0	\$0	\$0	\$4,402,291	\$4,523,085	\$4,628,466	\$4,734,749	\$4,888,938	\$5,094,448	\$5,518,380	\$5,977,931	\$6,379,001	\$6,699,977	\$8,751,172
Avg Water Sold (mgd)	0.00	0.00	0.00	0.00	0.00	0.76	0.92	1.08	1.23	1.39	1.55	1.87	2.19	2.52	2.84	3.16
Cost per 1,000 gal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$15.84	\$13.48	\$11.78	\$10.51	\$9.63	\$9.01	\$8.08	\$7.46	\$6.94	\$6.46	\$7.58
Both Plants																
Total Cost	\$6,802,240	\$6,897,611	\$6,992,982	\$7,088,353	\$7,320,871	\$17,474,369	\$17,818,698	\$18,155,097	\$16,802,295	\$17,203,177	\$18,364,589	\$19,093,899	\$19,869,656	\$20,598,112	\$21,258,013	\$24,109,046
Avg Water Sold (mgd)	10.81	11.02	11.22	11.42	11.63	12.59	12.89	13.19	13.49	13.79	14.09	14.63	15.17	15.70	16.24	16.78
Cost per 1,000 gal	\$1.72	\$1.72	\$1.71	\$1.70	\$1.73	\$3.80	\$3.79	\$3.77	\$3.41	\$3.42	\$3.57	\$3.58	\$3.59	\$3.59	\$3.59	\$3.94

Alternative 3 – Brackish: BWA WTP Expands/Brackish Groundwater RO Plant to Meet Current Customer Demands, New Plant in Manvel

Financial Evaluation

Financing Cost

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
Current Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$13,582,560
New Debt Service - Plant Upgrades, RO Initial, Tank Farm and Piping Initial	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	\$5,464,000	-	-	-	-	-	-	\$109,280,000
New Debt Service - Distribution Piping	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	-	\$14,020,000
New Debt Service - Tank Farm Expansion #1	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$7,184,000
New Debt Service - BWA Plant Expansion #1	-	-	-	-	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$15,191,000
New Debt Service - Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$2,694,000
O&M Costs (Inflated)	\$9,154,548	\$9,580,290	\$10,021,598	\$10,478,984	\$10,952,976	\$11,444,255	\$11,953,253	\$12,480,547	\$13,026,736	\$13,592,434	\$14,178,438	\$14,785,248	\$15,413,536	\$16,063,998	\$16,737,349	\$295,773,200
Total Cost	\$15,768,548	\$16,194,290	\$16,635,598	\$17,092,984	\$18,947,976	\$19,439,255	\$19,948,253	\$20,475,547	\$21,021,736	\$16,572,434	\$17,158,438	\$17,765,248	\$18,393,536	\$19,043,998	\$19,016,349	\$457,724,760
Avg Water Sold (mgd)	13.90	14.18	14.46	14.75	15.03	15.31	15.60	15.88	16.17	16.45	16.73	17.02	17.30	17.59	17.87	146,125.88
Cost per 1,000 gal	\$3.11	\$3.13	\$3.15	\$3.18	\$3.45	\$3.48	\$3.50	\$3.53	\$3.56	\$2.76	\$2.81	\$2.86	\$2.91	\$2.97	\$2.92	-
New Debt Service - Initial Construction	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	-	-	-	-	-	\$63,860,000
New Debt Service - Plant Expansion #1	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$28,400,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	\$986,000	\$986,000	\$986,000	\$986,000	\$986,000	\$986,000	\$5,916,000
O&M Costs (Inflated)	\$4,249,198	\$4,700,836	\$5,089,541	\$5,494,743	\$5,917,025	\$6,403,224	\$6,910,034	\$7,438,183	\$7,988,421	\$8,561,522	\$9,234,442	\$9,935,656	\$10,666,160	\$11,426,979	\$12,219,173	\$140,935,575
Total Cost	\$9,217,198	\$9,668,836	\$10,057,541	\$10,462,743	\$10,885,025	\$11,371,224	\$11,878,034	\$12,406,183	\$12,956,421	\$11,322,522	\$11,995,442	\$12,696,656	\$13,427,160	\$14,187,979	\$14,980,173	\$239,111,575
Avg Water Sold (mgd)	3.61	4.05	4.50	4.94	5.39	5.91	6.43	6.95	7.47	7.99	8.61	9.24	9.87	10.50	11.13	46,025.41
Cost per 1,000 gal	\$7.00	\$6.54	\$6.13	\$5.80	\$5.54	\$5.27	\$5.06	\$4.89	\$4.75	\$3.88	\$3.82	\$3.76	\$3.73	\$3.70	\$3.69	-
Both Plants																
Total Cost	\$24,985,745	\$25,863,126	\$26,693,139	\$27,555,728	\$29,833,001	\$30,810,479	\$31,826,287	\$32,881,731	\$33,978,157	\$27,894,956	\$29,153,880	\$30,461,904	\$31,820,696	\$33,231,977	\$33,996,522	-
Avg Water Sold (mgd)	17.51	18.23	18.96	19.69	20.42	21.22	22.02	22.83	23.63	24.44	25.35	26.26	27.17	28.09	29.00	-
Cost per 1,000 gal	\$3.91	\$3.89	\$3.86	\$3.83	\$4.00	\$3.98	\$3.96	\$3.95	\$3.94	\$3.13	\$3.15	\$3.18	\$3.21	\$3.24	\$3.21	-

Alternative 3 – Brackish: BWA WTP Expands/Brackish Groundwater RO Plant to Meet Current Customer Demands, New Plant in Manvel

O&M Costs

5-Year Avg O&M Costs for BWA WTP = \$1.08 per 1,000 gallon
 O&M Cost for GCWA WTP = \$0.88 per 1,000 gallon
 RO O&M Costs = \$1.22 per 1,000 gallon for 10 mgd Plant
 Beginning year = 2013
 Inflation rate = 0.0250
 Interest rate = 0.0350
 2012 current operations ADD = 8.0000 mgd
 Percentage of water purchased = 0.6667 % of Avg Day Demand
 Tank Farm Operations Cost = \$0.05 \$/1,000 gal
 Cost of HSPS operations = \$0.05 \$/1000 gal
 Well Operations Cost = \$0.05 \$/gpd
 RO Plant Capacity = 10 mgd

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total WTP (Avg day demand, MGD)	10.81	11.02	11.22	11.42	11.63	11.83	11.97	12.12	12.26	12.40	12.55	12.76	12.97	13.19	13.40	13.61
RO WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	3.40	3.44	3.48	3.52	3.56	3.61	3.67	3.73	3.79	3.85	3.91
BWA WTP (Avg day demand, MGD)	10.81	11.02	11.22	11.42	11.63	8.43	8.53	8.63	8.74	8.84	8.94	9.09	9.24	9.40	9.55	9.70
Annual O&M at RO Plant	\$0	\$0	\$0	\$0	\$0	\$1,515,952	\$1,534,317	\$1,552,682	\$1,571,047	\$1,589,412	\$1,607,777	\$1,635,134	\$1,662,491	\$1,689,849	\$1,717,206	\$1,744,564
Annual O&M at BWA WTP	\$4,261,291	\$4,341,345	\$4,421,399	\$4,501,453	\$4,581,507	\$3,322,032	\$3,362,277	\$3,402,521	\$3,442,766	\$3,483,011	\$3,523,255	\$3,583,206	\$3,643,157	\$3,703,107	\$3,763,058	\$3,823,009
Annual Quality Control Costs	\$55,066	\$56,101	\$57,135	\$58,170	\$59,204	\$42,929	\$43,449	\$43,969	\$44,489	\$45,009	\$45,529	\$46,304	\$47,079	\$47,853	\$48,628	\$49,403
Annual Maintenance Costs	\$347,248	\$353,772	\$360,295	\$366,819	\$373,342	\$270,709	\$273,988	\$277,268	\$280,547	\$283,827	\$287,106	\$291,992	\$296,877	\$301,762	\$306,648	\$311,533
Annual Admin Costs	\$215,671	\$219,723	\$223,774	\$227,826	\$231,878	\$168,134	\$170,170	\$172,207	\$174,244	\$176,281	\$178,318	\$181,352	\$184,386	\$187,420	\$190,455	\$193,489
Avg Demand to Tank Farm	1.52	1.52	1.52	1.52	1.52	1.52	1.66	1.80	1.94	2.08	2.22	2.43	2.64	2.85	3.06	3.27
Annual Tank Farm Operations Costs	\$27,801	\$27,801	\$27,801	\$27,801	\$27,801	\$27,801	\$30,356	\$32,911	\$35,466	\$38,021	\$40,576	\$44,408	\$48,241	\$52,073	\$55,906	\$59,738
Well Operations Cost	\$0	\$0	\$0	\$0	\$0	\$62,034	\$62,786	\$63,537	\$64,289	\$65,040	\$65,792	\$66,911	\$68,031	\$69,150	\$70,270	\$71,389
High Service Pump Station Costs	\$197,342	\$201,050	\$204,757	\$208,464	\$212,172	\$215,879	\$218,494	\$221,109	\$223,725	\$226,340	\$228,955	\$232,851	\$236,747	\$240,643	\$244,538	\$248,434
Total O&M Costs	\$5,104,420	\$5,199,791	\$5,295,162	\$5,390,533	\$5,485,904	\$5,625,469	\$5,695,837	\$5,766,205	\$5,836,572	\$5,906,940	\$5,977,308	\$6,082,158	\$6,187,008	\$6,291,858	\$6,396,709	\$6,501,559
Inflated Total O&M Costs	\$5,104,420	\$5,199,791	\$5,295,162	\$5,390,533	\$5,623,051	\$5,910,258	\$6,133,793	\$6,364,811	\$6,603,546	\$6,850,240	\$7,105,141	\$7,410,519	\$7,726,726	\$8,054,111	\$8,393,036	\$8,743,874
New WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	0.76	0.92	1.08	1.23	1.39	1.55	1.87	2.19	2.52	2.84	3.16
Raw Water Purchased (acre-ft)	0.00	0.00	0.00	0.00	0.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00
Avg Amt of Water Purchased, Shortage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00
Annual O&M at WTP	\$0	\$0	\$0	\$0	\$0	\$243,590	\$293,940	\$344,289	\$394,639	\$444,989	\$495,338	\$598,655	\$701,972	\$805,289	\$908,606	\$1,011,923
Annual Raw Water Costs	\$0	\$0	\$0	\$0	\$0	\$850,000	\$871,875	\$875,000	\$875,000	\$912,500	\$987,500	\$1,168,750	\$1,362,500	\$1,493,750	\$1,550,000	\$1,562,500
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Quality Control Costs	\$0	\$0	\$0	\$0	\$0	\$3,879	\$4,681	\$5,482	\$6,284	\$7,086	\$7,887	\$9,533	\$11,178	\$12,823	\$14,468	\$16,113
Annual Maintenance Costs	\$0	\$0	\$0	\$0	\$0	\$24,460	\$29,515	\$34,571	\$39,627	\$44,682	\$49,738	\$60,113	\$70,487	\$80,861	\$91,235	\$101,610
Annual Admin Costs	\$0	\$0	\$0	\$0	\$0	\$15,191	\$18,332	\$21,472	\$24,612	\$27,752	\$30,892	\$37,335	\$43,778	\$50,222	\$56,665	\$63,108
High Service Pump Station Costs	\$0	\$0	\$0	\$0	\$0	\$13,900	\$16,774	\$19,647	\$22,520	\$25,393	\$28,266	\$34,162	\$40,058	\$45,954	\$51,849	\$57,745
Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,151,020	\$1,235,116	\$1,300,461	\$1,362,681	\$1,462,402	\$1,599,622	\$1,908,548	\$2,229,973	\$2,488,899	\$2,672,824	\$2,813,000
New WTP Inflated Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,209,291	\$1,330,085	\$1,435,466	\$1,541,749	\$1,695,938	\$1,901,448	\$2,325,380	\$2,784,931	\$3,186,001	\$3,506,977	\$3,783,172

Alternative 3 – Brackish: BWA WTP Expands/Brackish Groundwater RO Plant to Meet Current Customer Demands, New Plant in Manvel

O&M Costs

2013 Present Worth of Annual O&M Costs

				2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BWA WTP				\$5,390,533	\$5,300,390	\$5,251,435	\$5,137,318	\$5,024,914	\$4,914,237	\$4,805,300	\$4,698,110	\$4,618,861	\$4,539,600	\$4,460,417	\$4,381,398	\$4,302,623
New WTP				\$0	\$0	\$1,074,490	\$1,114,004	\$1,133,277	\$1,147,341	\$1,189,665	\$1,257,288	\$1,449,373	\$1,636,200	\$1,764,427	\$1,830,740	\$1,861,596

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 3 – Brackish: BWA WTP Expands/Brackish Groundwater RO Plant to Meet Current Customer Demands, New Plant in Manvel

O&M Costs

Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Total WTP (Avg day demand, MGD)	13.90	14.18	14.46	14.75	15.03	15.31	15.60	15.88	16.17	16.45	16.73	17.02	17.30	17.59	17.87
RO WTP (Avg day demand, MGD)	3.99	4.07	4.16	4.24	4.32	4.40	4.48	4.56	4.65	4.73	4.81	4.89	4.97	5.05	5.14
BWA WTP (Avg day demand, MGD)	9.90	10.11	10.31	10.51	10.71	10.91	11.12	11.32	11.52	11.72	11.93	12.13	12.33	12.53	12.74
Annual O&M at RO Plant	\$1,780,915	\$1,817,266	\$1,853,617	\$1,889,968	\$1,926,319	\$1,962,694	\$1,999,069	\$2,035,444	\$2,071,818	\$2,108,193	\$2,144,593	\$2,180,993	\$2,217,393	\$2,253,793	\$2,290,193
Annual O&M at BWA WTP	\$3,902,668	\$3,982,327	\$4,061,986	\$4,141,645	\$4,221,304	\$4,301,015	\$4,380,727	\$4,460,438	\$4,540,149	\$4,619,860	\$4,699,627	\$4,779,393	\$4,859,159	\$4,938,925	\$5,018,692
Annual Quality Control Costs	\$50,432	\$51,461	\$52,491	\$53,520	\$54,550	\$55,580	\$56,610	\$57,640	\$58,670	\$59,700	\$60,731	\$61,761	\$62,792	\$63,823	\$64,854
Annual Maintenance Costs	\$318,024	\$324,516	\$331,007	\$337,498	\$343,990	\$350,485	\$356,981	\$363,476	\$369,972	\$376,468	\$382,968	\$389,468	\$395,968	\$402,468	\$408,968
Annual Admin Costs	\$197,521	\$201,552	\$205,584	\$209,616	\$213,647	\$217,682	\$221,716	\$225,750	\$229,785	\$233,819	\$237,856	\$241,893	\$245,930	\$249,967	\$254,004
Avg Demand to Tank Farm	3.55	3.83	4.11	4.39	4.67	4.95	5.23	5.51	5.79	6.07	6.35	6.63	6.91	7.19	7.47
Annual Tank Farm Operations Costs	\$64,848	\$69,958	\$75,068	\$80,178	\$85,288	\$90,398	\$95,508	\$100,618	\$105,728	\$110,838	\$115,948	\$121,058	\$126,168	\$131,278	\$136,388
Well Operations Cost	\$72,877	\$74,364	\$75,852	\$77,339	\$78,827	\$80,315	\$81,804	\$83,292	\$84,781	\$86,269	\$87,759	\$89,248	\$90,738	\$92,227	\$93,717
High Service Pump Station Costs	\$253,611	\$258,787	\$263,964	\$269,141	\$274,317	\$279,497	\$284,677	\$289,857	\$295,037	\$300,217	\$305,400	\$310,584	\$315,768	\$320,951	\$326,135
Total O&M Costs	\$6,640,895	\$6,780,232	\$6,919,568	\$7,058,905	\$7,198,242	\$7,337,666	\$7,477,091	\$7,616,515	\$7,755,940	\$7,895,365	\$8,034,882	\$8,174,399	\$8,313,916	\$8,453,433	\$8,592,950
Inflated Total O&M Costs	\$9,154,548	\$9,580,290	\$10,021,598	\$10,478,984	\$10,952,976	\$11,444,255	\$11,953,253	\$12,480,547	\$13,026,736	\$13,592,434	\$14,178,438	\$14,785,248	\$15,413,536	\$16,063,998	\$16,737,349
New WTP (Avg day demand, MGD)	3.61	4.05	4.50	4.94	5.39	5.91	6.43	6.95	7.47	7.99	8.61	9.24	9.87	10.50	11.13
Raw Water Purchased (acre-ft)	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00	12500.00
Avg Amt of Water Purchased, Shortage	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost/acre-ft purchased	\$132.50	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$1,154,106	\$1,296,289	\$1,438,472	\$1,580,655	\$1,722,838	\$1,889,011	\$2,055,184	\$2,221,357	\$2,387,530	\$2,553,703	\$2,754,800	\$2,955,896	\$3,156,993	\$3,358,090	\$3,559,187
Annual Raw Water Costs	\$1,656,250	\$1,725,000	\$1,736,538	\$1,748,077	\$1,759,615	\$1,771,154	\$1,782,692	\$1,794,231	\$1,805,769	\$1,817,308	\$1,828,846	\$1,840,385	\$1,851,923	\$1,863,462	\$1,875,000
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Quality Control Costs	\$18,377	\$20,641	\$22,905	\$25,169	\$27,433	\$30,079	\$32,725	\$35,371	\$38,017	\$40,663	\$43,866	\$47,068	\$50,270	\$53,472	\$56,674
Annual Maintenance Costs	\$115,887	\$130,164	\$144,441	\$158,718	\$172,995	\$189,680	\$206,366	\$223,052	\$239,738	\$256,424	\$276,616	\$296,809	\$317,002	\$337,194	\$357,387
Annual Admin Costs	\$71,976	\$80,843	\$89,710	\$98,577	\$107,445	\$117,808	\$128,171	\$138,535	\$148,898	\$159,261	\$171,803	\$184,344	\$196,885	\$209,427	\$221,968
High Service Pump Station Costs	\$65,859	\$73,972	\$82,086	\$90,200	\$98,313	\$107,796	\$117,279	\$126,761	\$136,244	\$145,726	\$157,202	\$168,678	\$180,153	\$191,629	\$203,104
Total O&M Costs	\$3,082,455	\$3,326,910	\$3,514,153	\$3,701,396	\$3,888,639	\$4,105,529	\$4,322,418	\$4,539,307	\$4,756,196	\$4,973,086	\$5,233,133	\$5,493,179	\$5,753,226	\$6,013,273	\$6,273,320
New WTP Inflated Total O&M Costs	\$4,249,198	\$4,700,836	\$5,089,541	\$5,494,743	\$5,917,025	\$6,403,224	\$6,910,034	\$7,438,183	\$7,988,421	\$8,561,522	\$9,234,442	\$9,935,656	\$10,666,160	\$11,426,979	\$12,219,173

Alternative 3 – Brackish: BWA WTP Expands/Brackish Groundwater RO Plant to Meet Current Customer Demands, New Plant in Manvel

O&M Costs

2013 Present Worth of Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
BWA WTP	\$4,246,216	\$4,188,704	\$4,130,225	\$4,070,912	\$4,010,887	\$3,950,314	\$3,889,251	\$3,827,801	\$3,766,059	\$3,704,115	\$3,642,097	\$3,580,036	\$3,518,009	\$3,456,082	\$3,394,321	\$120,200,166
New WTP	\$1,970,934	\$2,055,304	\$2,097,565	\$2,134,617	\$2,166,765	\$2,210,257	\$2,248,330	\$2,281,301	\$2,309,471	\$2,333,126	\$2,372,104	\$2,405,777	\$2,434,460	\$2,458,453	\$2,478,038	\$49,414,903

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 3 – Brackish: BWA WTP Expands/Brackish Groundwater RO Plant to Meet Current Customer Demands, New Plant in Manvel

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
R1	Well #4 Raw Water Pipeline	Well #4	Well #4 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R2	Raw Water Pipeline Segment #4	Well #4 Connection	Well #3 Connection	New	3.00	-	5	-	12	2,500	\$5.50	\$165,000
R3	Well #3 Raw Water Pipeline	Well #3	Well #3 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R4	Raw Water Pipeline Segment #3	Well #3 Connection	Well #2 Connection	New	6.00	-	5	-	20	2,500	\$5.50	\$275,000
R5	Well #2 Raw Water Pipeline	Well #2	Well #2 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R6	Raw Water Pipeline Segment #2	Well #2 Connection	Well #1 Connection	New	9.00	-	5	-	20	2,500	\$5.50	\$275,000
R7	Well #1 Raw Water Pipeline	Well #1	Well #1 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R8	Raw Water Pipeline Segment #1	Well #1 Connection	Plant Influent	New	12.00	-	5	-	24	1,000	\$5.50	\$132,000
1	Leaving BWA WTP to West/South Split	WTP	West/South Split	Existing	1.23	16.00	5.00	4.51	0	14,700	\$0.00	\$0
2	From West/South Split to Brazoria	West/South Split	Brazoria	Existing	0.78	10.00	5	1.76	0	25,300	\$0.00	\$0
5	From West/South Split to TDCJ Clemens	West/South Split	TDCJ Clemens	Existing	0.46	8.00	5	1.13	0	11,100	\$0.00	\$0
7	Leaving BWA WTP to the North	WTP	North/East Split	Existing	16.32	30	5.00	15.86	0	7,200	\$0.00	\$0
8	Main Line to Lake Jackson (Beechwood)	North/East Split	Lake Jackson (Beechwood) Take-Off	Existing	8.32	24.00	5	10.15	0	10,900	\$0.00	\$0
9	To Lake Jackson (Beechwood)	Lake Jackson (Beechwood) Take-Off	Lake Jackson	Existing	2.21	10.00	5	1.76	6	9,500	\$8.00	\$456,000
10	Main line to TDCJ Wayne Scott	Lake Jackson (Beechwood) Take-Off	TDCJ Wayne Scott Take-Off	Existing	6.11	20.00	5	7.05	0	10,300	\$0.00	\$0
11	To TDCJ Wayne Scott	TDCJ Wayne Scott Take-Off	TDCJ Wayne Scott	Existing	0.39	8.00	5	1.13	0	8,900	\$0.00	\$0
12	Main line to Angleton (Jamison)	TDCJ Wayne Scott Take-Off	Angleton (Jamison) Take-Off	Existing	5.72	20	5	7.05	0	26,000	\$0.00	\$0

Alternative 3 – Brackish: BWA WTP Expands/Brackish Groundwater RO Plant to Meet Current Customer Demands, New Plant in Manvel

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
13	To Angleton (Jamison)	Angleton (Jamison) Take-Off	Angleton	Existing	1.14	8	5.00	1.13	0	5,000	\$0.00	\$0
14	Main line to Angleton	Angleton (Jamison) Take-Off	Angleton	Existing	4.58	20	5.00	7.05	0	18,000	\$0.00	\$0
48	Leaving BWA WTP to Tank Farm	WTP	Tank Farm	New	11.40	-	5	-	24	39,900	\$5.50	\$5,267,000
49	Main line to TDCJ Ramsey, Stringfellow and Terell	Tank Farm	TDCJ Ramsey, Stringfellow and Terell Take-Off Point	New	11.40	-	5	-	24	29,900	\$5.50	\$3,947,000
33	To TDCJ Ramsey, Stringfellow and Terell	TDCJ Ramsey, Stringfellow and Terell Take-Off Point	TDCJ Ramsey, Stringfellow and Terell	New	1.52	-	5	-	10	19,200	\$6.70	\$1,287,000
34	To County Other Future Districts	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	County Other Future Districts	New	4.94	-	5	-	16	5,000	\$5.50	\$440,000
15	From North/East Split to Lake Jackson (Oak Drive)	North/East Split	Lake Jackson (Oak Drive) Take-Off Point	Existing	8.00	24	5.00	10.15	0	2,100	\$0.00	\$0
16	To Lake Jackson (Oak Drive)	Lake Jackson (Oak Drive) Take-Off Point	Lake Jackson (Oak Drive)	Existing	2.21	10	5.00	1.76	6	7,200	\$8.00	\$346,000
17	Main line to Clute/Richwood	Lake Jackson (Oak Drive) Take-Off Point	Clute/Richwood Take-Off Point	Existing	5.79	20	5.00	7.05	0	19,100	\$0.00	\$0
18	To Clute/Richwood	Clute/Richwood Take-Off Point	Clute	Existing	1.69	14	5.00	3.45	0	9,370	\$0.00	\$0
19	From Clute to Richwood	Clute	Richwood	Existing	0.69	14	5.00	3.45	0	6,300	\$0.00	\$0
20	Main line to Dow-B	Clute/Richwood Take-Off Point	Dow-B Take-Off Point	Existing	4.10	20	5.00	7.05	0	14,400	\$0.00	\$0
21	To Dow-B	Dow-B Take-Off Point	Dow-B	Existing	0.67	8	5.00	1.13	0	5,000	\$0.00	\$0
22	Main line to Proposed Dow	Dow-B Take-Off Point	Proposed Dow Take-Off Point	Existing	3.43	20	5.00	7.05	0	8,400	\$0.00	\$0
23	To Proposed Dow	Proposed Dow Take-Off Point	Proposed Dow	Proposed	0.67	-	5.00	-	6	5,000	\$8.00	\$240,000
24	Main line to Oyster Creek	Proposed Dow Take-Off Point	Oyster Creek/Freeport Take-Off Point	Existing	2.76	20	5.00	7.05	0	6,000	\$0.00	\$0
25	To Oyster Creek	Oyster Creek/Freeport Take-Off Point	Oyster Creek	Existing	0.00	8	5.00	1.13	0	10,800	\$0.00	\$0
26	Main line to Dow-A	Oyster Creek/Freeport Take-Off Point	Dow-A Take-Off Point	Existing	2.67	16	5.00	4.51	0	10,000	\$0.00	\$0
27	To Dow-A	Dow-A Take-Off Point	Dow-A	Existing	0.67	8	5.00	1.13	0	2,000	\$0.00	\$0
28	Main line to Freeport North	Dow-A Take-Off Point	Freeport North Take-Off Point	Existing	2.00	16	5.00	4.51	0	3,000	\$0.00	\$0

Alternative 3 – Brackish: BWA WTP Expands/Brackish Groundwater RO Plant to Meet Current Customer Demands, New Plant in Manvel

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
29	To Freeport North	Freeport North Take-Off Point	Freeport North	Existing	1.00	12	5.00	2.54	0	3,000	\$0.00	\$0
30	Main line to Freeport South	Freeport North Take-Off Point	Freeport South	Existing	1.00	16	5.00	4.51	0	6,000	\$0.00	\$0
51	Leaving New North Brazoria Regional WTP South to Manvel	New North Brazoria Regional WTP	Manvel	New	6.26	-	5.00	-	16	5,000	\$5.50	\$440,000
54	Leaving New North Brazoria Regional WTP South	New North Brazoria Regional WTP	County Other Future Districts #1 Take-Off	New	10.64	-	5.00	-	24	25,000	\$5.50	\$3,300,000
55	To County Other Future Districts #1	County Other Future Districts #1 Take-Off	County Other Future Districts	New	4.94	-	5.00	-	16	5,000	\$5.50	\$440,000
56	Main Line to TDCJ Darrington	County Other Future Districts #1 Take-Off	TDCJ Darrington/County Other Future Districts Take-Off Pt	New	5.70	-	5.00	-	16	13,000	\$5.50	\$1,144,000
50	To TDCJ Darrington	TDCJ Darrington/County Other Future Districts Take-Off Pt	TDCJ Darrington	New	0.76	-	5.00	-	6	12,200	\$8.00	\$586,000
57	To County Other Future Districts #2	TDCJ Darrington/County Other Future Districts	County Other Future Districts #2	New	4.94	-	5.00	-	16	5,000	\$5.50	\$440,000

Total BWA WTP Pipeline Costs for 2015: \$5,234,000
 Total BWA WTP Pipeline Costs for 2020: \$6,749,000
 Total New WTP Pipeline Costs: \$6,350,000
 Well Piping: \$903,000

Alternative 3 – Seawater: BWA WTP Expands/Seawater RO Plant to Meet Current Customer Demands, New Plant in Manvel

Financial Evaluation

Interest Rate = 4.5 %
 Payment Period = 20 years

Capital Costs	2010	2015	2020	2025	2030	2035	2040
BWA Phase Capital Cost	\$0	\$116,564,521	\$9,111,150	\$5,832,000	\$17,955,000	\$5,832,000	\$0
New WTP Phase Capital Cost	\$0	\$41,534,100	\$0	\$23,085,000	\$0	\$12,825,000	\$0

Financing Cost

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Alt 3 Seawater - BWA WTP & RO Plant																
Current Debt Service	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	-	-	-	-	-	-	-	-
New Debt Service - Plant Upgrades, RO Initial, Tank Farm and Piping Initial	-	-	-	-	-	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000
New Debt Service - Distribution Piping	-	-	-	-	-	-	-	-	-	-	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000
New Debt Service - Tank Farm Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$449,000
New Debt Service - BWA Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
New Debt Service - Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$5,104,420	\$5,199,791	\$5,295,162	\$5,390,533	\$5,623,051	\$6,849,173	\$7,107,840	\$7,375,159	\$7,651,402	\$7,936,847	\$8,231,783	\$8,584,977	\$8,950,686	\$9,329,315	\$9,721,281	\$10,127,014
Total Cost	\$6,802,240	\$6,897,611	\$6,992,982	\$7,088,353	\$7,320,871	\$17,508,993	\$17,767,660	\$18,034,979	\$16,613,402	\$16,898,847	\$17,894,783	\$18,247,977	\$18,613,686	\$18,992,315	\$19,384,281	\$20,239,014
Avg Water Sold (mgd)	10.81	11.02	11.22	11.42	11.63	11.83	11.97	12.12	12.26	12.40	12.55	12.76	12.97	13.19	13.40	13.61
Cost per 1,000 gal	\$1.72	\$1.72	\$1.71	\$1.70	\$1.73	\$4.06	\$4.07	\$4.08	\$3.71	\$3.73	\$3.91	\$3.92	\$3.93	\$3.95	\$3.96	\$4.07

Alt 3 Seawater - New North Brazoria Regional WTP

New Debt Service - Initial Construction	-	-	-	-	-	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000
New Debt Service - Plant Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$1,775,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$0	\$0	\$0	\$0	\$0	\$1,209,291	\$1,330,085	\$1,435,466	\$1,541,749	\$1,695,938	\$1,901,448	\$2,325,380	\$2,784,931	\$3,186,001	\$3,506,977	\$3,783,172
Total Cost	\$0	\$0	\$0	\$0	\$0	\$4,402,291	\$4,523,085	\$4,628,466	\$4,734,749	\$4,888,938	\$5,094,448	\$5,518,380	\$5,977,931	\$6,379,001	\$6,699,977	\$8,751,172
Avg Water Sold (mgd)	0.00	0.00	0.00	0.00	0.00	0.76	0.92	1.08	1.23	1.39	1.55	1.87	2.19	2.52	2.84	3.16
Cost per 1,000 gal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$15.84	\$13.48	\$11.78	\$10.51	\$9.63	\$9.01	\$8.08	\$7.46	\$6.94	\$6.46	\$7.58

Both Plants

Total Cost	\$6,802,240	\$6,897,611	\$6,992,982	\$7,088,353	\$7,320,871	\$21,911,284	\$22,290,744	\$22,663,445	\$21,348,151	\$21,787,785	\$22,989,231	\$23,766,357	\$24,591,617	\$25,371,315	\$26,084,258	\$28,990,186
Avg Water Sold (mgd)	10.81	11.02	11.22	11.42	11.63	12.59	12.89	13.19	13.49	13.79	14.09	14.63	15.17	15.70	16.24	16.78
Cost per 1,000 gal	\$1.72	\$1.72	\$1.71	\$1.70	\$1.73	\$4.77	\$4.74	\$4.71	\$4.33	\$4.33	\$4.47	\$4.45	\$4.44	\$4.43	\$4.40	\$4.73

Alternative 3 – Seawater: BWA WTP Expands/Seawater RO Plant to Meet Current Customer Demands, New Plant in Manvel

Financial Evaluation

Financing Cost

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
<i>Alt 3 Seawater - BWA WTP & RO Plant</i>																
Current Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$13,582,560
New Debt Service - Plant Upgrades, RO Initial, Tank Farm and Piping Initial	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	\$8,962,000	-	-	-	-	-	\$179,240,000
New Debt Service - Distribution Piping	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	\$701,000	-	\$14,020,000
New Debt Service - Tank Farm Expansion #1	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$7,184,000
New Debt Service - BWA Plant Expansion #1	-	-	-	-	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$1,381,000	\$15,191,000
New Debt Service - Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$449,000	\$2,694,000
O&M Costs (Inflated)	\$10,601,807	\$11,094,011	\$11,604,198	\$12,132,961	\$12,680,909	\$13,248,831	\$13,837,224	\$14,446,756	\$15,078,116	\$15,732,014	\$16,409,374	\$17,110,768	\$17,836,977	\$18,588,802	\$19,367,069	\$338,248,249
Total Cost	\$20,713,807	\$21,206,011	\$21,716,198	\$22,244,961	\$24,173,909	\$24,741,831	\$25,330,224	\$25,939,756	\$26,571,116	\$18,712,014	\$19,389,374	\$20,090,768	\$20,816,977	\$21,568,802	\$21,646,069	\$570,159,809
Avg Water Sold (mgd)	13.90	14.18	14.46	14.75	15.03	15.31	15.60	15.88	16.17	16.45	16.73	17.02	17.30	17.59	17.87	146,125.88
Cost per 1,000 gal	\$4.08	\$4.10	\$4.11	\$4.13	\$4.41	\$4.43	\$4.45	\$4.47	\$4.50	\$3.12	\$3.17	\$3.23	\$3.30	\$3.36	\$3.32	-
<i>Alt 3 Seawater - New North Brazoria</i>																
<i>Regional WTP</i>																
New Debt Service - Initial Construction	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	\$3,193,000	-	-	-	-	-	-	\$63,860,000
New Debt Service - Plant Expansion #1	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$1,775,000	\$28,400,000
New Debt Service - Plant Expansion #2	-	-	-	-	-	-	-	-	-	\$986,000	\$986,000	\$986,000	\$986,000	\$986,000	\$986,000	\$5,916,000
O&M Costs (Inflated)	\$4,249,198	\$4,700,836	\$5,089,541	\$5,494,743	\$5,917,025	\$6,403,224	\$6,910,034	\$7,438,183	\$7,988,421	\$8,561,522	\$9,234,442	\$9,935,656	\$10,666,160	\$11,426,979	\$12,219,173	\$140,935,575
Total Cost	\$9,217,198	\$9,668,836	\$10,057,541	\$10,462,743	\$10,885,025	\$11,371,224	\$11,878,034	\$12,406,183	\$12,956,421	\$11,322,522	\$11,995,442	\$12,696,656	\$13,427,160	\$14,187,979	\$14,980,173	\$239,111,575
Avg Water Sold (mgd)	3.61	4.05	4.50	4.94	5.39	5.91	6.43	6.95	7.47	7.99	8.61	9.24	9.87	10.50	11.13	46,025.41
Cost per 1,000 gal	\$7.00	\$6.54	\$6.13	\$5.80	\$5.54	\$5.27	\$5.06	\$4.89	\$4.75	\$3.88	\$3.82	\$3.76	\$3.73	\$3.70	\$3.69	-
<i>Both Plants</i>																
Total Cost	\$29,931,005	\$30,874,847	\$31,773,739	\$32,707,704	\$35,058,934	\$36,113,055	\$37,208,258	\$38,345,939	\$39,527,537	\$30,034,536	\$31,384,815	\$32,787,424	\$34,244,137	\$35,756,781	\$36,626,243	-
Avg Water Sold (mgd)	17.51	18.23	18.96	19.69	20.42	21.22	22.02	22.83	23.63	24.44	25.35	26.26	27.17	28.09	29.00	-
Cost per 1,000 gal	\$4.68	\$4.64	\$4.59	\$4.55	\$4.70	\$4.66	\$4.63	\$4.60	\$4.58	\$3.37	\$3.39	\$3.42	\$3.45	\$3.49	\$3.46	-

Alternative 3 – Seawater: BWA WTP Expands/Seawater RO Plant to Meet Current Customer Demands, New Plant in Manvel

O&M Costs

5-Year Avg O&M Costs for BWA WTP =	\$1.08 per 1,000 gallon
O&M Cost for New North Brazoria	
Regional WTP =	\$0.88 per 1,000 gallon
RO O&M Costs =	\$1.99 per 1,000 gallon for 10 mgd Plant
Beginning year =	2013
Inflation rate =	0.0250
Interest rate =	0.0350
2012 current operations ADD =	8.0000 mgd
Percentage of water purchased =	10.0000 % of Avg Day Demand
Tank Farm Operations Cost =	\$0.05 \$/1,000 gal
Cost of HSPS operations =	\$0.05 \$/1000 gal
RO Plant Capacity =	10 mgd

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total WTP (Avg day demand, MGD)	10.81	11.02	11.22	11.42	11.63	11.83	11.97	12.12	12.26	12.40	12.55	12.76	12.97	13.19	13.40	13.61
RO WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	3.40	3.44	3.48	3.52	3.56	3.61	3.67	3.73	3.79	3.85	3.91
BWA WTP (Avg day demand, MGD)	10.81	11.02	11.22	11.42	11.63	8.43	8.53	8.63	8.74	8.84	8.94	9.09	9.24	9.40	9.55	9.70
Annual O&M at RO Plant	\$0	\$0	\$0	\$0	\$0	\$2,471,659	\$2,501,602	\$2,531,544	\$2,561,487	\$2,591,430	\$2,621,373	\$2,665,977	\$2,710,582	\$2,755,186	\$2,799,791	\$2,844,395
Annual O&M at BWA WTP	\$4,261,291	\$4,341,345	\$4,421,399	\$4,501,453	\$4,581,507	\$3,322,032	\$3,362,277	\$3,402,521	\$3,442,766	\$3,483,011	\$3,523,255	\$3,583,206	\$3,643,157	\$3,703,107	\$3,763,058	\$3,823,009
Annual Quality Control Costs	\$55,066	\$56,101	\$57,135	\$58,170	\$59,204	\$42,929	\$43,449	\$43,969	\$44,489	\$45,009	\$45,529	\$46,304	\$47,079	\$47,853	\$48,628	\$49,403
Annual Maintenance Costs	\$347,248	\$353,772	\$360,295	\$366,819	\$373,342	\$270,709	\$273,988	\$277,268	\$280,547	\$283,827	\$287,106	\$291,992	\$296,877	\$301,762	\$306,648	\$311,533
Annual Admin Costs	\$215,671	\$219,723	\$223,774	\$227,826	\$231,878	\$168,134	\$170,170	\$172,207	\$174,244	\$176,281	\$178,318	\$181,352	\$184,386	\$187,420	\$190,455	\$193,489
Avg Demand to Tank Farm	1.52	1.52	1.52	1.52	1.52	1.52	1.66	1.80	1.94	2.08	2.22	2.43	2.64	2.85	3.06	3.27
Annual Tank Farm Operations Costs	\$27,801	\$27,801	\$27,801	\$27,801	\$27,801	\$27,801	\$30,356	\$32,911	\$35,466	\$38,021	\$40,576	\$44,408	\$48,241	\$52,073	\$55,906	\$59,738
High Service Pump Station Costs	\$197,342	\$201,050	\$204,757	\$208,464	\$212,172	\$215,879	\$218,494	\$221,109	\$223,725	\$226,340	\$228,955	\$232,851	\$236,747	\$240,643	\$244,538	\$248,434
Total O&M Costs	\$5,104,420	\$5,199,791	\$5,295,162	\$5,390,533	\$5,485,904	\$6,519,142	\$6,600,336	\$6,681,530	\$6,762,724	\$6,843,918	\$6,925,113	\$7,046,090	\$7,167,068	\$7,288,046	\$7,409,023	\$7,530,001
Inflated Total O&M Costs	\$5,104,420	\$5,199,791	\$5,295,162	\$5,390,533	\$5,623,051	\$6,849,173	\$7,107,840	\$7,375,159	\$7,651,402	\$7,936,847	\$8,231,783	\$8,584,977	\$8,950,686	\$9,329,315	\$9,721,281	\$10,127,014
New WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	0.76	0.92	1.08	1.23	1.39	1.55	1.87	2.19	2.52	2.84	3.16
Raw Water Purchased (acre-ft)	0	0	0	0	0	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
Avg Amt of Water Purchased, Shortage (acre-ft)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00
Annual O&M at WTP	\$0	\$0	\$0	\$0	\$0	\$243,590	\$293,940	\$344,289	\$394,639	\$444,989	\$495,338	\$598,655	\$701,972	\$805,289	\$908,606	\$1,011,923
Annual Raw Water Costs	\$0	\$0	\$0	\$0	\$0	\$850,000	\$871,875	\$875,000	\$875,000	\$912,500	\$987,500	\$1,168,750	\$1,362,500	\$1,493,750	\$1,550,000	\$1,562,500
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Quality Control Costs	\$0	\$0	\$0	\$0	\$0	\$3,879	\$4,681	\$5,482	\$6,284	\$7,086	\$7,887	\$9,533	\$11,178	\$12,823	\$14,468	\$16,113
Annual Maintenance Costs	\$0	\$0	\$0	\$0	\$0	\$24,460	\$29,515	\$34,571	\$39,627	\$44,682	\$49,738	\$60,113	\$70,487	\$80,861	\$91,235	\$101,610
Annual Admin Costs	\$0	\$0	\$0	\$0	\$0	\$15,191	\$18,332	\$21,472	\$24,612	\$27,752	\$30,892	\$37,335	\$43,778	\$50,222	\$56,665	\$63,108
High Service Pump Station Costs	\$0	\$0	\$0	\$0	\$0	\$13,900	\$16,774	\$19,647	\$22,520	\$25,393	\$28,266	\$34,162	\$40,058	\$45,954	\$51,849	\$57,745
Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,151,020	\$1,235,116	\$1,300,461	\$1,362,681	\$1,462,402	\$1,599,622	\$1,908,548	\$2,229,973	\$2,488,899	\$2,672,824	\$2,813,000
New WTP Inflated Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,209,291	\$1,330,085	\$1,435,466	\$1,541,749	\$1,695,938	\$1,901,448	\$2,325,380	\$2,784,931	\$3,186,001	\$3,506,977	\$3,783,172

2013 Present Worth of Annual O&M Costs

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BWA WTP	\$5,390,533	\$5,300,390	\$6,085,689	\$5,953,125	\$5,822,567	\$5,694,032	\$5,567,532	\$5,443,076	\$5,350,882	\$5,258,700	\$5,166,633	\$5,074,779	\$4,983,229
New WTP	\$0	\$0	\$1,074,490	\$1,114,004	\$1,133,277	\$1,147,341	\$1,189,665	\$1,257,288	\$1,449,373	\$1,636,200	\$1,764,427	\$1,830,740	\$1,861,596

Notes:

1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)

2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)

3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 3 – Seawater: BWA WTP Expands/Seawater RO Plant to Meet Current Customer Demands, New Plant in Manvel

O&M Costs

Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Total WTP (Avg day demand, MGD)	13.90	14.18	14.46	14.75	15.03	15.31	15.60	15.88	16.17	16.45	16.73	17.02	17.30	17.59	17.87
RO WTP (Avg day demand, MGD)	3.99	4.07	4.16	4.24	4.32	4.40	4.48	4.56	4.65	4.73	4.81	4.89	4.97	5.05	5.14
BWA WTP (Avg day demand, MGD)	9.90	10.11	10.31	10.51	10.71	10.91	11.12	11.32	11.52	11.72	11.93	12.13	12.33	12.53	12.74
Annual O&M at RO Plant	\$2,903,663	\$2,962,931	\$3,022,199	\$3,081,467	\$3,140,735	\$3,200,042	\$3,259,349	\$3,318,656	\$3,377,962	\$3,437,269	\$3,496,617	\$3,555,965	\$3,615,312	\$3,674,660	\$3,734,008
Annual O&M at BWA WTP	\$3,902,668	\$3,982,327	\$4,061,986	\$4,141,645	\$4,221,304	\$4,301,015	\$4,380,727	\$4,460,438	\$4,540,149	\$4,619,860	\$4,699,627	\$4,779,393	\$4,859,159	\$4,938,925	\$5,018,692
Annual Quality Control Costs	\$50,432	\$51,461	\$52,491	\$53,520	\$54,550	\$55,580	\$56,610	\$57,640	\$58,670	\$59,700	\$60,731	\$61,761	\$62,792	\$63,823	\$64,854
Annual Maintenance Costs	\$318,024	\$324,516	\$331,007	\$337,498	\$343,990	\$350,485	\$356,981	\$363,476	\$369,972	\$376,468	\$382,968	\$389,468	\$395,968	\$402,468	\$408,968
Annual Admin Costs	\$197,521	\$201,552	\$205,584	\$209,616	\$213,647	\$217,682	\$221,716	\$225,750	\$229,785	\$233,819	\$237,856	\$241,893	\$245,930	\$249,967	\$254,004
Avg Demand to Tank Farm	3.55	3.83	4.11	4.39	4.67	4.95	5.23	5.51	5.79	6.07	6.35	6.63	6.91	7.19	7.47
Annual Tank Farm Operations Costs	\$64,848	\$69,958	\$75,068	\$80,178	\$85,288	\$90,398	\$95,508	\$100,618	\$105,728	\$110,838	\$115,948	\$121,058	\$126,168	\$131,278	\$136,388
High Service Pump Station Costs	\$253,611	\$258,787	\$263,964	\$269,141	\$274,317	\$279,497	\$284,677	\$289,857	\$295,037	\$300,217	\$305,400	\$310,584	\$315,768	\$320,951	\$326,135
Total O&M Costs	\$7,690,767	\$7,851,533	\$8,012,299	\$8,173,065	\$8,333,831	\$8,494,699	\$8,655,567	\$8,816,435	\$8,977,303	\$9,138,171	\$9,299,147	\$9,460,122	\$9,621,097	\$9,782,073	\$9,943,048
Inflated Total O&M Costs	\$10,601,807	\$11,094,011	\$11,604,198	\$12,132,961	\$12,680,909	\$13,248,831	\$13,837,224	\$14,446,756	\$15,078,116	\$15,732,014	\$16,409,374	\$17,110,768	\$17,836,977	\$18,588,802	\$19,367,069
New WTP (Avg day demand, MGD)	3.61	4.05	4.50	4.94	5.39	5.91	6.43	6.95	7.47	7.99	8.61	9.24	9.87	10.50	11.13
Raw Water Purchased (acre-ft)	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500	12,500
Avg Amt of Water Purchased, Shortage (a)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cost/acre-ft purchased	\$132.50	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$1,154,106	\$1,296,289	\$1,438,472	\$1,580,655	\$1,722,838	\$1,889,011	\$2,055,184	\$2,221,357	\$2,387,530	\$2,553,703	\$2,754,800	\$2,955,896	\$3,156,993	\$3,358,090	\$3,559,187
Annual Raw Water Costs	\$1,656,250	\$1,725,000	\$1,736,538	\$1,748,077	\$1,759,615	\$1,771,154	\$1,782,692	\$1,794,231	\$1,805,769	\$1,817,308	\$1,828,846	\$1,840,385	\$1,851,923	\$1,863,462	\$1,875,000
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Annual Quality Control Costs	\$18,377	\$20,641	\$22,905	\$25,169	\$27,433	\$30,079	\$32,725	\$35,371	\$38,017	\$40,663	\$43,866	\$47,068	\$50,270	\$53,472	\$56,674
Annual Maintenance Costs	\$115,887	\$130,164	\$144,441	\$158,718	\$172,995	\$189,680	\$206,366	\$223,052	\$239,738	\$256,424	\$276,616	\$296,809	\$317,002	\$337,194	\$357,387
Annual Admin Costs	\$71,976	\$80,843	\$89,710	\$98,577	\$107,445	\$117,808	\$128,171	\$138,535	\$148,898	\$159,261	\$171,803	\$184,344	\$196,885	\$209,427	\$221,968
High Service Pump Station Costs	\$65,859	\$73,972	\$82,086	\$90,200	\$98,313	\$107,796	\$117,279	\$126,761	\$136,244	\$145,726	\$157,202	\$168,678	\$180,153	\$191,629	\$203,104
Total O&M Costs	\$3,082,455	\$3,326,910	\$3,514,153	\$3,701,396	\$3,888,639	\$4,105,529	\$4,322,418	\$4,539,307	\$4,756,196	\$4,973,086	\$5,233,133	\$5,493,179	\$5,753,226	\$6,013,273	\$6,273,320
New WTP Inflated Total O&M Costs	\$4,249,198	\$4,700,836	\$5,089,541	\$5,494,743	\$5,917,025	\$6,403,224	\$6,910,034	\$7,438,183	\$7,988,421	\$8,561,522	\$9,234,442	\$9,935,656	\$10,666,160	\$11,426,979	\$12,219,173

2013 Present Worth of Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
BWA WTP	\$4,917,508	\$4,850,534	\$4,782,466	\$4,713,455	\$4,643,642	\$4,573,216	\$4,502,242	\$4,430,840	\$4,359,117	\$4,287,179	\$4,215,170	\$4,143,128	\$4,071,138	\$3,999,280	\$3,927,626	\$137,507,708
New WTP	\$1,970,934	\$2,055,304	\$2,097,565	\$2,134,617	\$2,166,765	\$2,210,257	\$2,248,330	\$2,281,301	\$2,309,471	\$2,333,126	\$2,372,104	\$2,405,777	\$2,434,460	\$2,458,453	\$2,478,038	\$49,414,903

Notes:

1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)

2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)

3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 3 – Seawater: BWA WTP Expands/Seawater RO Plant to Meet Current Customer Demands, New Plant in Manvel

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
1	Leaving BWA WTP to West/South Split	WTP	West/South Split	Existing	1.23	16.00	5.00	4.51	0	14,700	\$0.00	\$0
2	From West/South Split to Brazoria	West/South Split	Brazoria	Existing	0.78	10.00	5	1.76	0	25,300	\$0.00	\$0
5	From West/South Split to TDCJ Clemens	West/South Split	TDCJ Clemens	Existing	0.46	8.00	5	1.13	0	11,100	\$0.00	\$0
7	Leaving BWA WTP to the North	WTP	North/East Split	Existing	16.32	30	5.00	15.86	0	7,200	\$0.00	\$0
8	Main Line to Lake Jackson (Beechwood)	North/East Split	Lake Jackson (Beechwood) Take-Off	Existing	8.32	24.00	5	10.15	0	10,900	\$0.00	\$0
9	To Lake Jackson (Beechwood)	Lake Jackson (Beechwood) Take-Off	Lake Jackson	Existing	2.21	10.00	5	1.76	6	9,500	\$8.00	\$456,000
10	Main line to TDCJ Wayne Scott	Lake Jackson (Beechwood) Take-Off	TDCJ Wayne Scott Take-Off	Existing	6.11	20.00	5	7.05	0	10,300	\$0.00	\$0
11	To TDCJ Wayne Scott	TDCJ Wayne Scott Take-Off	TDCJ Wayne Scott	Existing	0.39	8.00	5	1.13	0	8,900	\$0.00	\$0
12	Main line to Angleton (Jamison)	TDCJ Wayne Scott Take-Off	Angleton (Jamison) Take-Off	Existing	5.72	20	5	7.05	0	26,000	\$0.00	\$0
13	To Angleton (Jamison)	Angleton (Jamison) Take-Off	Angleton	Existing	1.14	8	5.00	1.13	0	5,000	\$0.00	\$0
14	Main line to Angleton	Angleton (Jamison) Take-Off	Angleton	Existing	4.58	20	5.00	7.05	0	18,000	\$0.00	\$0
48	Leaving BWA WTP to Tank Farm	WTP	Tank Farm	New	11.40	-	5	-	24	39,900	\$5.50	\$5,267,000
49	Main line to TDCJ Ramsey, Stringfellow and Terell	Tank Farm	TDCJ Ramsey, Stringfellow and Terell Take-Off Point	New	11.40	-	5	-	24	29,900	\$5.50	\$3,947,000
33	To TDCJ Ramsey, Stringfellow and Terell	TDCJ Ramsey, Stringfellow and Terell Take-Off Point	TDCJ Ramsey, Stringfellow and Terell	New	1.52	-	5	-	10	19,200	\$6.70	\$1,287,000
34	To County Other Future Districts	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	County Other Future Districts	New	4.94	-	5	-	16	5,000	\$5.50	\$440,000
15	From North/East Split to Lake Jackson (Oak Drive)	North/East Split	Lake Jackson (Oak Drive) Take-Off Point	Existing	8.00	24	5.00	10.15	0	2,100	\$0.00	\$0
16	To Lake Jackson (Oak Drive)	Lake Jackson (Oak Drive) Take-Off Point	Lake Jackson (Oak Drive)	Existing	2.21	10	5.00	1.76	6	7,200	\$8.00	\$346,000
17	Main line to Clute/Richwood	Lake Jackson (Oak Drive) Take-Off Point	Clute/Richwood Take-Off Point	Existing	5.79	20	5.00	7.05	0	19,100	\$0.00	\$0
18	To Clute/Richwood	Clute/Richwood Take-Off Point	Clute	Existing	1.69	14	5.00	3.45	0	9,370	\$0.00	\$0

Alternative 3 – Seawater: BWA WTP Expands/Seawater RO Plant to Meet Current Customer Demands, New Plant in Manvel

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
19	From Clute to Richwood	Clute	Richwood	Existing	0.69	14	5.00	3.45	0	6,300	\$0.00	\$0
20	Main line to Dow-B	Clute/Richwood Take-Off Point	Dow-B Take-Off Point	Existing	4.10	20	5.00	7.05	0	14,400	\$0.00	\$0
21	To Dow-B	Dow-B Take-Off Point	Dow-B	Existing	0.67	8	5.00	1.13	0	5,000	\$0.00	\$0
22	Main line to Proposed Dow	Dow-B Take-Off Point	Proposed Dow Take-Off Point	Existing	3.43	20	5.00	7.05	0	8,400	\$0.00	\$0
23	To Proposed Dow	Proposed Dow Take-Off Point	Proposed Dow	Proposed	0.67	-	5.00	-	6	5,000	\$8.00	\$240,000
24	Main line to Oyster Creek	Proposed Dow Take-Off Point	Oyster Creek/Freeport Take-Off Point	Existing	2.76	20	5.00	7.05	0	6,000	\$0.00	\$0
25	To Oyster Creek	Oyster Creek/Freeport Take-Off Point	Oyster Creek	Existing	0.00	8	5.00	1.13	0	10,800	\$0.00	\$0
26	Main line to Dow-A	Oyster Creek/Freeport Take-Off Point	Dow-A Take-Off Point	Existing	2.67	16	5.00	4.51	0	10,000	\$0.00	\$0
27	To Dow-A	Dow-A Take-Off Point	Dow-A	Existing	0.67	8	5.00	1.13	0	2,000	\$0.00	\$0
28	Main line to Freeport North	Dow-A Take-Off Point	Freeport North Take-Off Point	Existing	2.00	16	5.00	4.51	0	3,000	\$0.00	\$0
29	To Freeport North	Freeport North Take-Off Point	Freeport North	Existing	1.00	12	5.00	2.54	0	3,000	\$0.00	\$0
30	Main line to Freeport South	Freeport North Take-Off Point	Freeport South	Existing	1.00	16	5.00	4.51	0	6,000	\$0.00	\$0
51	Leaving New North Brazoria Regional WTP South to Manvel	New North Brazoria Regional WTP	Manvel	New	6.26	-	5.00	-	16	5,000	\$5.50	\$440,000
54	Leaving New North Brazoria Regional WTP South	New North Brazoria Regional WTP	County Other Future Districts #1 Take-Off	New	10.64	-	5.00	-	24	25,000	\$5.50	\$3,300,000
55	To County Other Future Districts #1	County Other Future Districts #1 Take-Off	County Other Future Districts	New	4.94	-	5.00	-	16	5,000	\$5.50	\$440,000
56	Main Line to TDCJ Darrington	County Other Future Districts #1 Take-Off	TDCJ Darrington/County Other Future Districts Take-Off Pt	New	5.70	-	5.00	-	16	13,000	\$5.50	\$1,144,000
50	To TDCJ Darrington	TDCJ Darrington/County Other Future Districts Take-Off Pt	TDCJ Darrington	New	0.76	-	5.00	-	6	12,200	\$8.00	\$586,000
57	To County Other Future Districts #2	TDCJ Darrington/County Other Future Districts	County Other Future Districts #2	New	4.94	-	5.00	-	16	5,000	\$5.50	\$440,000

Total BWA WTP Pipeline Costs for 2015: \$5,234,000
 Total BWA WTP Pipeline Costs for 2020: \$6,749,000
 Total New WTP Pipeline Costs: \$6,350,000

Alternative 3 BWA – Brackish: Brackish Groundwater RO Plant at BWA WTP Site

Financial Evaluation

Interest Rate = 4.5 %
 Payment Period = 20 years

Capital Costs	2010	2015	2020	2025	2030	2035	2040
BWA Phase Capital Costs	\$0	\$80,273,944	\$25,990,200	\$76,061,440	\$0	\$48,782,494	\$0

Financing Cost

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Alt 3 BWA - Brackish - BWA WTP																	
Current Debt Service	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	-	-	-	-	-	-	-	-	-
New Debt Service - Plant Upgrades, Tank Farm Initial Construction and Initial RO	-	-	-	-	-	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000
New Debt Service - Distribution Piping	-	-	-	-	-	-	-	-	-	-	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000
New Debt Service - Plant and Tank Farm Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$5,848,000	\$5,848,000
New Debt Service - Plant and Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$5,509,323	\$5,604,694	\$5,700,065	\$5,795,436	\$6,038,077	\$6,395,693	\$6,714,991	\$7,046,258	\$7,389,891	\$7,746,301	\$8,115,914	\$8,640,623	\$9,186,496	\$9,754,261	\$10,344,674	\$11,018,930	\$11,791,289
Total Cost	\$7,207,143	\$7,302,514	\$7,397,885	\$7,493,256	\$7,735,897	\$14,265,513	\$14,584,811	\$14,916,078	\$13,561,891	\$13,918,301	\$16,286,914	\$16,811,623	\$17,357,496	\$17,925,261	\$18,515,674	\$25,037,930	\$25,810,289
Avg Water Sold (mgd)	11.73	11.94	12.14	12.34	12.55	12.75	13.05	13.35	13.65	13.95	14.25	14.79	15.33	15.86	16.40	16.94	17.67
Cost per 1,000 gal	\$1.68	\$1.68	\$1.67	\$1.66	\$1.69	\$3.07	\$3.06	\$3.06	\$2.72	\$2.73	\$3.13	\$3.11	\$3.10	\$3.10	\$3.09	\$4.05	\$4.00

Alternative 3 BWA – Brackish: Brackish Groundwater RO Plant at BWA WTP Site

Financial Evaluation

Financing Cost

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
<i>Alt 3 BWA - Brackish - BWA WTP</i>															
Current Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$13,582,560
New Debt Service - Plant Upgrades, Tank Farm Initial Construction and Initial RO	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	\$6,172,000	-	-	-	-	-	-	\$123,440,000
New Debt Service - Distribution Piping	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	\$1,999,000	-	\$39,980,000
New Debt Service - Plant and Tank Farm Expansion #1	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$5,848,000	\$93,568,000
New Debt Service - Plant and Tank Farm Expansion #2	-	-	-	-	-	-	-	-	\$3,751,000	\$3,751,000	\$3,751,000	\$3,751,000	\$3,751,000	\$3,751,000	\$22,506,000
O&M Costs (Inflated)	\$12,595,379	\$13,432,304	\$14,303,203	\$15,209,251	\$16,209,721	\$17,250,707	\$18,333,612	\$19,459,881	\$20,678,284	\$21,994,343	\$23,363,281	\$24,786,920	\$26,267,138	\$27,805,876	\$404,482,816
Total Cost	\$26,614,379	\$27,451,304	\$28,322,203	\$29,228,251	\$30,228,721	\$31,269,707	\$32,352,612	\$33,478,881	\$32,276,284	\$33,592,343	\$34,961,281	\$36,384,920	\$37,865,138	\$37,404,876	\$697,559,376
Avg Water Sold (mgd)	18.39	19.12	19.85	20.58	21.38	22.18	22.99	23.79	24.60	25.51	26.42	27.33	28.25	29.16	194,342.50
Cost per 1,000 gal	\$3.96	\$3.93	\$3.91	\$3.89	\$3.87	\$3.86	\$3.86	\$3.86	\$3.60	\$3.61	\$3.63	\$3.65	\$3.67	\$3.51	-

Alternative 3 BWA – Brackish: Brackish Groundwater RO Plant at BWA WTP Site

O&M Costs

5-Year Avg O&M Costs for BWA WTP :	\$1.08 per 1,000 gallon		
RO O&M Costs =	\$1.22 per 1,000 gallon for 10 mgd Plant		
Beginning year =	2013		
Inflation rate =	0.0250	RO Plant Capacity =	10 mgd
Interest rate =	0.0350	RO Plant Expansion #1 =	13.00 mgd
2012 current operations ADD =	8.0000 mgd	RO Plant Expansion #2 =	10 mgd
Tank Farm Operations Cost =	\$0.05 \$/1000 gal		
Cost of HSPS operations =	\$0.05 \$/1000 gal		
Well Operations Cost =	\$0.05 \$/gpd		

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
Total WTP (Avg day demand, MGD)	11.73	11.94	12.14	12.34	12.55	12.75	13.05	13.35	13.65	13.95	14.25	14.79	15.33	15.86	16.40	16.94	17.67
RO WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	4.59	4.69	4.80	4.91	5.02	5.13	5.32	5.51	5.71	5.90	9.55	9.96
BWA WTP (Avg day demand, MGD)	11.73	11.94	12.14	12.34	12.55	8.16	8.36	8.55	8.74	8.93	9.13	9.47	9.81	10.16	10.50	7.39	7.71
Annual O&M at RO Plant	\$0	\$0	\$0	\$0	\$0	\$2,045,525	\$2,093,771	\$2,142,016	\$2,190,262	\$2,238,508	\$2,286,754	\$2,372,826	\$2,458,898	\$2,544,970	\$2,631,043	\$4,258,145	\$4,441,231
Annual O&M at BWA WTP	\$4,624,501	\$4,704,555	\$4,784,609	\$4,864,663	\$4,944,717	\$3,217,300	\$3,293,183	\$3,369,066	\$3,444,949	\$3,520,833	\$3,596,716	\$3,732,094	\$3,867,473	\$4,002,851	\$4,138,230	\$2,911,919	\$3,037,122
Annual Quality Control Costs	\$59,760	\$60,794	\$61,829	\$62,863	\$63,898	\$41,575	\$42,556	\$43,537	\$44,517	\$45,498	\$46,478	\$48,228	\$49,977	\$51,727	\$53,476	\$37,629	\$39,247
Annual Maintenance Costs	\$376,846	\$383,369	\$389,893	\$396,416	\$402,940	\$262,174	\$268,358	\$274,542	\$280,725	\$286,909	\$293,093	\$304,125	\$315,156	\$326,188	\$337,220	\$237,289	\$247,492
Annual Admin Costs	\$234,054	\$238,105	\$242,157	\$246,209	\$250,260	\$162,833	\$166,673	\$170,514	\$174,355	\$178,195	\$182,036	\$188,888	\$195,739	\$202,591	\$209,443	\$147,377	\$153,714
Avg Demand to Tank Farm	0.00	0.00	0.00	0.00	0.00	2.29	2.58	2.88	3.18	3.47	3.77	4.31	4.84	5.37	5.90	6.44	7.16
Annual Tank Farm Operations Costs	\$0	\$0	\$0	\$0	\$0	\$41,701	\$47,129	\$52,558	\$57,986	\$63,414	\$68,842	\$78,570	\$88,299	\$98,027	\$107,755	\$117,483	\$130,707
Well Operations Cost	\$0	\$0	\$0	\$0	\$0	\$83,705	\$85,679	\$87,653	\$89,628	\$91,602	\$93,576	\$97,098	\$100,620	\$104,143	\$107,665	\$174,247	\$181,739
High Service Pump Station Costs	\$214,163	\$217,870	\$221,577	\$225,285	\$228,992	\$232,699	\$238,188	\$243,676	\$249,165	\$254,653	\$260,142	\$269,933	\$279,725	\$289,516	\$299,308	\$309,099	\$322,390
Total O&M Costs	\$5,509,323	\$5,604,694	\$5,700,065	\$5,795,436	\$5,890,807	\$6,087,512	\$6,235,537	\$6,383,562	\$6,531,587	\$6,679,611	\$6,827,636	\$7,091,762	\$7,355,888	\$7,620,013	\$7,884,139	\$8,193,190	\$8,553,641
Inflated Total O&M Costs	\$5,509,323	\$5,604,694	\$5,700,065	\$5,795,436	\$6,038,077	\$6,395,693	\$6,714,991	\$7,046,258	\$7,389,891	\$7,746,301	\$8,115,914	\$8,640,623	\$9,186,496	\$9,754,261	\$10,344,674	\$11,018,930	\$11,791,289

2013 Present Worth of Annual O&M Costs

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
BWA WTP	\$5,795,436	\$5,691,601	\$5,682,758	\$5,624,097	\$5,562,905	\$5,499,421	\$5,433,868	\$5,366,460	\$5,385,566	\$5,397,243	\$5,401,971	\$5,400,207	\$5,422,117	\$5,469,234

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 3 BWA – Brackish: Brackish Groundwater RO Plant at BWA WTP Site

O&M Costs

Annual O&M Costs

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Total WTP (Avg day demand, MGD)	18.39	19.12	19.85	20.58	21.38	22.18	22.99	23.79	24.60	25.51	26.42	27.33	28.25	29.16
RO WTP (Avg day demand, MGD)	10.37	10.78	11.19	11.60	12.05	12.51	12.96	13.41	15.98	16.57	17.16	17.76	18.35	18.94
BWA WTP (Avg day demand, MGD)	8.02	8.34	8.66	8.98	9.33	9.68	10.03	10.38	8.62	8.94	9.26	9.58	9.90	10.22
Annual O&M at RO Plant	\$4,624,316	\$4,807,401	\$4,990,487	\$5,173,572	\$5,375,563	\$5,577,555	\$5,779,546	\$5,981,537	\$7,125,558	\$7,390,016	\$7,654,473	\$7,918,930	\$8,183,387	\$8,447,844
Annual O&M at BWA WTP	\$3,162,324	\$3,287,527	\$3,412,729	\$3,537,931	\$3,676,063	\$3,814,194	\$3,952,325	\$4,090,456	\$3,396,188	\$3,522,234	\$3,648,279	\$3,774,325	\$3,900,371	\$4,026,417
Annual Quality Control Costs	\$40,865	\$42,483	\$44,101	\$45,719	\$47,504	\$49,289	\$51,074	\$52,859	\$43,887	\$45,516	\$47,145	\$48,774	\$50,402	\$52,031
Annual Maintenance Costs	\$257,695	\$267,897	\$278,100	\$288,302	\$299,559	\$310,815	\$322,071	\$333,327	\$276,752	\$287,023	\$297,295	\$307,566	\$317,837	\$328,109
Annual Admin Costs	\$160,050	\$166,387	\$172,724	\$179,061	\$186,052	\$193,043	\$200,034	\$207,025	\$171,887	\$178,266	\$184,645	\$191,025	\$197,404	\$203,784
Avg Demand to Tank Farm	7.89	8.61	9.34	10.06	10.86	11.66	12.46	13.26	14.06	14.97	15.88	16.78	17.69	18.60
Annual Tank Farm Operations Costs	\$143,931	\$157,154	\$170,378	\$183,602	\$198,194	\$212,787	\$227,380	\$241,972	\$256,565	\$273,150	\$289,736	\$306,321	\$322,907	\$339,492
Well Operations Cost	\$189,231	\$196,723	\$204,215	\$211,707	\$219,973	\$228,239	\$236,504	\$244,770	\$291,584	\$302,406	\$313,228	\$324,050	\$334,872	\$345,694
High Service Pump Station Costs	\$335,680	\$348,970	\$362,260	\$375,550	\$390,213	\$404,876	\$419,538	\$434,201	\$448,863	\$465,522	\$482,182	\$498,841	\$515,500	\$532,159
Total O&M Costs	\$8,914,092	\$9,274,543	\$9,634,994	\$9,995,445	\$10,393,120	\$10,790,796	\$11,188,471	\$11,586,146	\$12,011,284	\$12,464,133	\$12,916,982	\$13,369,831	\$13,822,680	\$14,275,529
Inflated Total O&M Costs	\$12,595,379	\$13,432,304	\$14,303,203	\$15,209,251	\$16,209,721	\$17,250,707	\$18,333,612	\$19,459,881	\$20,678,284	\$21,994,343	\$23,363,281	\$24,786,920	\$26,267,138	\$27,805,876

2013 Present Worth of Annual O&M Costs

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
BWA WTP	\$5,506,964	\$5,535,888	\$5,556,558	\$5,569,500	\$5,595,252	\$5,612,894	\$5,622,944	\$5,625,895	\$5,635,102	\$5,649,813	\$5,657,085	\$5,657,404	\$5,651,232	\$5,639,009	\$155,648,422

Notes:

1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)

2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)

3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 3 BWA – Brackish: Brackish Groundwater RO Plant at BWA WTP Site

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/ New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
R1	Well #10 Raw Water Pipeline	Well #10	Well #10 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R2	Raw Water Pipeline Segment #10	Well #10 Connection	Well #9 Connection	New	3.00	-	5	-	12	2,500	\$5.50	\$165,000
R3	Well #9 Raw Water Pipeline	Well #9	Well #9 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R4	Raw Water Pipeline Segment #9	Well #9 Connection	Well #8 Connection	New	6.00	-	5	-	16	2,500	\$5.50	\$220,000
R5	Well #8 Raw Water Pipeline	Well #8	Well #8 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R6	Raw Water Pipeline Segment #8	Well #8 Connection	Well #7 Connection	New	9.00	-	5	-	24	2,500	\$5.50	\$330,000
R7	Well #7 Raw Water Pipeline	Well #7	Well #7 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R8	Raw Water Pipeline Segment #7	Well #7 Connection	Well #6 Connection	New	12.00	-	5	-	24	2,500	\$5.50	\$330,000
R9	Well #6 Raw Water Pipeline	Well #6	Well #6 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R10	Raw Water Pipeline Segment #6	Well #6 Connection	Well #5 Connection	New	15.00	-	5	-	30	2,500	\$5.85	\$439,000
R11	Well #5 Raw Water Pipeline	Well #5	Well #5 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R12	Raw Water Pipeline Segment #5	Well #5 Connection	Well #4 Connection	New	18.00	-	5	-	30	2,500	\$5.85	\$439,000
R13	Well #4 Raw Water Pipeline	Well #4	Well #4 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R14	Raw Water Pipeline Segment #4	Well #4 Connection	Well #3 Connection	New	21.00	-	5	-	36	2,500	\$6.15	\$554,000
R15	Well #3 Raw Water Pipeline	Well #3	Well #3 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R16	Raw Water Pipeline Segment #3	Well #3 Connection	Well #2 Connection	New	24.00	-	5	-	36	2,500	\$6.15	\$554,000
R17	Well #2 Raw Water Pipeline	Well #2	Well #2 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R18	Raw Water Pipeline Segment #2	Well #2 Connection	Well #1 Connection	New	27.00	-	5	-	42	2,500	\$6.50	\$683,000
R19	Well #1 Raw Water Pipeline	Well #1	Well #1 Connection	New	3.00	-	5	-	12	200	\$5.50	\$14,000
R20	Raw Water Pipeline Segment #1	Well #1 Connection	Plant Influent	New	30.00	-	5	-	42	1,000	\$6.50	\$273,000
1	Leaving BWA WTP to West/South Split	WTP	West/South Split	Existing	1.23	16.00	5.00	4.51	0	14,700	\$0.00	\$0
2	From West/South Split to Brazoria	West/South Split	Brazoria	Existing	0.78	10.00	5	1.76	0	25,300	\$0.00	\$0

Alternative 3 BWA – Brackish: Brackish Groundwater RO Plant at BWA WTP Site

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/ New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
5	From West/South Split to TDCJ Clemens	West/South Split	TDCJ Clemens	Existing	0.46	8.00	5	1.13	0	11,100	\$0.00	\$0
7	Leaving BWA WTP to the North	WTP	North/East Split	Existing	16.48	30	5.00	15.86	0	7,200	\$0.00	\$0
8	Main Line to Lake Jackson (Beechwood)	North/East Split	Lake Jackson (Beechwood) Take-Off	Existing	8.32	24.00	5	10.15	0	10,900	\$0.00	\$0
9	To Lake Jackson (Beechwood)	Lake Jackson (Beechwood) Take-Off	Lake Jackson	Existing	2.21	10.00	5	1.76	6	9,500	\$8.00	\$456,000
10	Main line to TDCJ Wayne Scott	Lake Jackson (Beechwood) Take-Off	TDCJ Wayne Scott Take-Off	Existing	6.11	20.00	5	7.05	0	10,300	\$0.00	\$0
11	To TDCJ Wayne Scott	TDCJ Wayne Scott Take-Off	TDCJ Wayne Scott	Existing	0.39	8.00	5	1.13	0	8,900	\$0.00	\$0
12	Main line to Angleton (Jamison)	TDCJ Wayne Scott Take-Off	Angleton (Jamison) Take-Off	Existing	5.72	20	5	7.05	0	26,000	\$0.00	\$0
13	To Angleton (Jamison)	Angleton (Jamison) Take-Off	Angleton	Existing	1.14	8	5.00	1.13	0	5,000	\$0.00	\$0
14	Main line to Angleton	Angleton (Jamison) Take-Off	Angleton	Existing	4.58	20	5.00	7.05	0	18,000	\$0.00	\$0
15	From North/East Split to Lake Jackson (Oak Drive)	North/East Split	Lake Jackson (Oak Drive) Take-Off Point	Existing	8.16	24	5.00	10.15	0	2,100	\$0.00	\$0
16	To Lake Jackson (Oak Drive)	Lake Jackson (Oak Drive) Take-Off Point	Lake Jackson (Oak Drive)	Existing	2.21	10	5.00	1.76	6	7,200	\$8.00	\$346,000
17	Main line to Clute/Richwood	Lake Jackson (Oak Drive) Take-Off Point	Clute/Richwood Take-Off Point	Existing	5.95	20	5.00	7.05	0	19,100	\$0.00	\$0
18	To Clute/Richwood	Clute/Richwood Take-Off Point	Clute	Existing	1.85	14	5.00	3.45	0	9,370	\$0.00	\$0
19	From Clute to Richwood	Clute	Richwood	Existing	0.69	14	5.00	3.45	0	6,300	\$0.00	\$0
20	Main line to Dow-B	Clute/Richwood Take-Off Point	Dow-B Take-Off Point	Existing	4.10	20	5.00	7.05	0	14,400	\$0.00	\$0
21	To Dow-B	Dow-B Take-Off Point	Dow-B	Existing	0.67	8	5.00	1.13	0	5,000	\$0.00	\$0
22	Main line to Proposed Dow	Dow-B Take-Off Point	Proposed Dow Take-Off Point	Existing	3.43	20	5.00	7.05	0	8,400	\$0.00	\$0
23	To Proposed Dow	Proposed Dow Take-Off Point	Proposed Dow	Proposed	0.67	-	5.00	-	6	5,000	\$8.00	\$240,000

Alternative 3 BWA – Brackish: Brackish Groundwater RO Plant at BWA WTP Site

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/ New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
24	Main line to Oyster Creek	Proposed Dow Take-Off Point	Oyster Creek/Freeport Take-Off Point	Existing	2.76	20	5.00	7.05	0	6,000	\$0.00	\$0
25	To Oyster Creek	Oyster Creek/Freeport Take-Off Point	Oyster Creek	Existing	0.10	8	5.00	1.13	0	10,800	\$0.00	\$0
26	Main line to Dow-A	Oyster Creek/Freeport Take-Off Point	Dow-A Take-Off Point	Existing	2.67	16	5.00	4.51	0	10,000	\$0.00	\$0
27	To Dow-A	Dow-A Take-Off Point	Dow-A	Existing	0.67	8	5.00	1.13	0	2,000	\$0.00	\$0
28	Main line to Freeport North	Dow-A Take-Off Point	Freeport North Take-Off Point	Existing	2.00	16	5.00	4.51	0	3,000	\$0.00	\$0
29	To Freeport North	Freeport North Take-Off Point	Freeport North	Existing	1.00	12	5.00	2.54	0	3,000	\$0.00	\$0
30	Main line to Freeport South	Freeport North Take-Off Point	Freeport South	Existing	1.00	16	5.00	4.51	0	6,000	\$0.00	\$0
48	Leaving BWA WTP to Tank Farm	WTP	Tank Farm	New	28.29	-	5	-	42	39,900	\$6.50	\$10,893,000
49	Main line to TDCJ Ramsey, Stringfellow and Terell	Tank Farm	TDCJ Ramsey, Stringfellow and Terell Take-Off Point	New	28.29	-	5	-	42	25,000	\$6.50	\$6,825,000
33	To TDCJ Ramsey, Stringfellow and Terell	TDCJ Ramsey, Stringfellow and Terell Take-Off Point	TDCJ Ramsey, Stringfellow and Terell	New	1.52	-	5	-	10	19,200	\$6.70	\$1,287,000
34	To County Other Future Districts	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	County Other Future Districts #1	New	6.58	-	5	-	20	5,000	\$5.50	\$550,000
56	Main Line to TDCJ Darrington	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	TDCJ Darrington Take-Off Pt	New	20.19	-	5.00	-	30	21,000	\$5.85	\$3,686,000
50	To TDCJ Darrington	TDCJ Darrington Take-Off Pt	TDCJ Darrington	New	0.76	-	5.00	-	6	12,200	\$8.00	\$586,000
57	To County Other Future Districts #2	TDCJ Darrington Take-Off Pt	County Other Future Districts #2	New	6.58	-	5.00	-	20	5,000	\$5.50	\$550,000
55	Main Line to County Other Future Districts #3	TDCJ Darrington/County Other Future Districts Take-Off Pt	County Other Future Districts #3	New	12.84	-	5.00	-	20	5,000	\$5.50	\$550,000
57	To County Other Future Districts #3	County Other Future Districts #3 Take-Off	County Other Future Districts #3	New	6.58	-	5.00	-	20	5,000	\$5.50	\$550,000
51	To Manvel	County Other Future Districts #3 Take-Off	Manvel	New	6.26	-	5.00	-	16	9,600	\$5.50	\$845,000

Alternative 3 BWA – Brackish: Brackish Groundwater RO Plant at BWA WTP Site

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/ New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
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Total BWA WTP Pipeline Costs for 2015: \$8,112,000

Total BWA WTP Pipeline Costs for 2020: \$19,252,000

Well Piping: \$4,127,000

Alternative 3 BWA – Seawater: Seawater RO Plant at BWA WTP Site

Financial Evaluation

Interest Rate = 4.5 %
 Payment Period = 20 years

Capital Costs	2010	2015	2020	2025	2030	2035	2040
BWA Phase Capital Costs	\$0	\$121,421,821	\$26,281,800	\$155,484,295	\$0	\$95,501,821	\$0

Financing Cost

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Alt 3 BWA - Seawater - BWA WTP and RO Plant																
Current Debt Service	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	-	-	-	-	-	-	-	-
New Debt Service - Plant Upgrades, Tank Farm Initial Construction and Initial RO	-	-	-	-	-	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000
New Debt Service - Distribution Piping	-	-	-	-	-	-	-	-	-	-	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000
New Debt Service - Plant and Tank Farm Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$11,954,000
New Debt Service - Plant and Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$5,509,323	\$5,604,694	\$5,700,065	\$5,795,436	\$6,038,077	\$7,750,545	\$8,136,469	\$8,536,846	\$8,952,156	\$9,382,896	\$9,829,578	\$10,463,243	\$11,122,448	\$11,808,074	\$12,521,029	\$14,629,254
Total Cost	\$7,207,143	\$7,302,514	\$7,397,885	\$7,493,256	\$7,735,897	\$18,783,365	\$19,169,289	\$19,569,666	\$18,287,156	\$18,717,896	\$21,185,578	\$21,819,243	\$22,478,448	\$23,164,074	\$23,877,029	\$37,939,254
Avg Water Sold (mgd)	11.73	11.94	12.14	12.34	12.55	12.75	13.05	13.35	13.65	13.95	14.25	14.79	15.33	15.86	16.40	16.94
Cost per 1,000 gal	\$1.68	\$1.68	\$1.67	\$1.66	\$1.69	\$4.04	\$4.02	\$4.02	\$3.67	\$3.68	\$4.07	\$4.04	\$4.02	\$4.00	\$3.99	\$6.14

Alternative 3 BWA – Seawater: Seawater RO Plant at BWA WTP Site

Financial Evaluation

Financing Cost

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
<i>Alt 3 BWA - Seawater - BWA WTP and RO Plant</i>																
Current Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$13,582,560
New Debt Service - Plant Upgrades, Tank Farm Initial Construction and Initial RO	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	\$9,335,000	-	-	-	-	-	-	\$186,700,000
New Debt Service - Distribution Piping	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	\$2,021,000	-	\$40,420,000
New Debt Service - Plant and Tank Farm Expansion #1	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$11,954,000	\$191,264,000
New Debt Service - Plant and Tank Farm Expansion #2	-	-	-	-	-	-	-	-	-	\$7,342,000	\$7,342,000	\$7,342,000	\$7,342,000	\$7,342,000	\$7,342,000	\$44,052,000
O&M Costs (Inflated)	\$15,650,983	\$16,714,655	\$17,821,729	\$18,973,710	\$20,172,152	\$21,495,303	\$22,872,005	\$24,304,107	\$25,793,520	\$28,411,911	\$30,215,512	\$32,091,535	\$34,042,475	\$36,070,904	\$38,179,478	\$524,590,114
Total Cost	\$38,960,983	\$40,024,655	\$41,131,729	\$42,283,710	\$43,482,152	\$44,805,303	\$46,182,005	\$47,614,107	\$49,103,520	\$49,728,911	\$51,532,512	\$53,408,535	\$55,359,475	\$57,387,904	\$57,475,478	\$1,000,608,674
Avg Water Sold (mgd)	17.67	18.39	19.12	19.85	20.58	21.38	22.18	22.99	23.79	24.60	25.51	26.42	27.33	28.25	29.16	194,342.50
Cost per 1,000 gal	\$6.04	\$5.96	\$5.89	\$5.84	\$5.79	\$5.74	\$5.70	\$5.67	\$5.65	\$5.54	\$5.53	\$5.54	\$5.55	\$5.57	\$5.40	-

Alternative 3 BWA – Seawater: Seawater RO Plant at BWA WTP Site

O&M Costs

5-Year Avg O&M Costs for BWA WTP	\$1.08 per 1,000 gallon		
RO O&M Costs =	\$1.99 per 1,000 gallon for 10 mgd Plant		
Beginning year =	2013		
Inflation rate =	0.0250	RO Plant Capacity =	10 mgd
Interest rate =	0.0350	RO Plant Expansion #1 =	13.00 mgd
2012 current operations ADD =	8.0000 mgd	RO Plant Expansion #2 =	10 mgd
Tank Farm Operations Cost =	\$0.05 \$/1000 gal		
HSPS Operations Cost =	\$0.05 \$/1000 gal		
RWPS Operations Cost =	\$0.05 \$/gpd		

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Total WTP (Avg day demand, MGD)	11.73	11.94	12.14	12.34	12.55	12.75	13.05	13.35	13.65	13.95	14.25	14.79	15.33	15.86	16.40	16.94
RO WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	4.59	4.69	4.80	4.91	5.02	5.13	5.32	5.51	5.71	5.90	9.55
BWA WTP (Avg day demand, MGD)	11.73	11.94	12.14	12.34	12.55	8.16	8.36	8.55	8.74	8.93	9.13	9.47	9.81	10.16	10.50	7.39
Annual O&M at RO Plant	\$0	\$0	\$0	\$0	\$0	\$3,335,092	\$3,413,754	\$3,492,415	\$3,571,077	\$3,649,738	\$3,728,400	\$3,868,735	\$4,009,070	\$4,149,405	\$4,289,740	\$6,942,623
Annual O&M at BWA WTP	\$4,624,501	\$4,704,555	\$4,784,609	\$4,864,663	\$4,944,717	\$3,217,300	\$3,293,183	\$3,369,066	\$3,444,949	\$3,520,833	\$3,596,716	\$3,732,094	\$3,867,473	\$4,002,851	\$4,138,230	\$2,911,919
Annual Quality Control Costs	\$59,760	\$60,794	\$61,829	\$62,863	\$63,898	\$41,575	\$42,556	\$43,537	\$44,517	\$45,498	\$46,478	\$48,228	\$49,977	\$51,727	\$53,476	\$37,629
Annual Maintenance Costs	\$376,846	\$383,369	\$389,893	\$396,416	\$402,940	\$262,174	\$268,358	\$274,542	\$280,725	\$286,909	\$293,093	\$304,125	\$315,156	\$326,188	\$337,220	\$237,289
Annual Admin Costs	\$234,054	\$238,105	\$242,157	\$246,209	\$250,260	\$162,833	\$166,673	\$170,514	\$174,355	\$178,195	\$182,036	\$188,888	\$195,739	\$202,591	\$209,443	\$147,377
Avg Demand to Tank Farm	0.00	0.00	0.00	0.00	0.00	2.29	2.58	2.88	3.18	3.47	3.77	4.31	4.84	5.37	5.90	6.44
Annual Tank Farm Operations Costs	\$0	\$0	\$0	\$0	\$0	\$41,701	\$47,129	\$52,558	\$57,986	\$63,414	\$68,842	\$78,570	\$88,299	\$98,027	\$107,755	\$117,483
RWPS Operations Cost	\$0	\$0	\$0	\$0	\$0	\$83,705	\$85,679	\$87,653	\$89,628	\$91,602	\$93,576	\$97,098	\$100,620	\$104,143	\$107,665	\$174,247
High Service Pump Station Costs	\$214,163	\$217,870	\$221,577	\$225,285	\$228,992	\$232,699	\$238,188	\$243,676	\$249,165	\$254,653	\$260,142	\$269,933	\$279,725	\$289,516	\$299,308	\$309,099
Total O&M Costs	\$5,509,323	\$5,604,694	\$5,700,065	\$5,795,436	\$5,890,807	\$7,377,080	\$7,555,520	\$7,733,961	\$7,912,401	\$8,090,842	\$8,269,282	\$8,587,671	\$8,906,060	\$9,224,448	\$9,542,837	\$10,877,668
Inflated Total O&M Costs	\$5,509,323	\$5,604,694	\$5,700,065	\$5,795,436	\$6,038,077	\$7,750,545	\$8,136,469	\$8,536,846	\$8,952,156	\$9,382,896	\$9,829,578	\$10,463,243	\$11,122,448	\$11,808,074	\$12,521,029	\$14,629,254

2013 Present Worth of Annual O&M Costs

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BWA WTP	\$5,795,436	\$5,691,601	\$6,886,583	\$6,814,647	\$6,739,700	\$6,662,030	\$6,581,905	\$6,499,581	\$6,521,577	\$6,534,652	\$6,539,385	\$6,536,325	\$7,198,659

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 3 BWA – Seawater: Seawater RO Plant at BWA WTP Site

O&M Costs

Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
Total WTP (Avg day demand, MGD)	17.67	18.39	19.12	19.85	20.58	21.38	22.18	22.99	23.79	24.60	25.51	26.42	27.33	28.25	29.16
RO WTP (Avg day demand, MGD)	9.96	10.37	10.78	11.19	11.60	12.05	12.51	12.96	13.41	15.98	16.57	17.16	17.76	18.35	18.94
BWA WTP (Avg day demand, MGD)	7.71	8.02	8.34	8.66	8.98	9.33	9.68	10.03	10.38	8.62	8.94	9.26	9.58	9.90	10.22
Annual O&M at RO Plant	\$7,241,131	\$7,539,640	\$7,838,149	\$8,136,657	\$8,435,166	\$8,764,499	\$9,093,832	\$9,423,165	\$9,752,499	\$11,617,749	\$12,048,929	\$12,480,109	\$12,911,289	\$13,342,469	\$13,773,649
Annual O&M at BWA WTP	\$3,037,122	\$3,162,324	\$3,287,527	\$3,412,729	\$3,537,931	\$3,676,063	\$3,814,194	\$3,952,325	\$4,090,456	\$3,396,188	\$3,522,234	\$3,648,279	\$3,774,325	\$3,900,371	\$4,026,417
Annual Quality Control Costs	\$39,247	\$40,865	\$42,483	\$44,101	\$45,719	\$47,504	\$49,289	\$51,074	\$52,859	\$43,887	\$45,516	\$47,145	\$48,774	\$50,402	\$52,031
Annual Maintenance Costs	\$247,492	\$257,695	\$267,897	\$278,100	\$288,302	\$299,559	\$310,815	\$322,071	\$333,327	\$276,752	\$287,023	\$297,295	\$307,566	\$317,837	\$328,109
Annual Admin Costs	\$153,714	\$160,050	\$166,387	\$172,724	\$179,061	\$186,052	\$193,043	\$200,034	\$207,025	\$171,887	\$178,266	\$184,645	\$191,025	\$197,404	\$203,784
Avg Demand to Tank Farm	7.16	7.89	8.61	9.34	10.06	10.86	11.66	12.46	13.26	14.06	14.97	15.88	16.78	17.69	18.60
Annual Tank Farm Operations Costs	\$130,707	\$143,931	\$157,154	\$170,378	\$183,602	\$198,194	\$212,787	\$227,380	\$241,972	\$256,565	\$273,150	\$289,736	\$306,321	\$322,907	\$339,492
RWPS Operations Cost	\$181,739	\$189,231	\$196,723	\$204,215	\$211,707	\$219,973	\$228,239	\$236,504	\$244,770	\$291,584	\$302,406	\$313,228	\$324,050	\$334,872	\$345,694
High Service Pump Station Costs	\$322,390	\$335,680	\$348,970	\$362,260	\$375,550	\$390,213	\$404,876	\$419,538	\$434,201	\$448,863	\$465,522	\$482,182	\$498,841	\$515,500	\$532,159
Total O&M Costs	\$11,353,542	\$11,829,416	\$12,305,290	\$12,781,164	\$13,257,038	\$13,782,056	\$14,307,073	\$14,832,090	\$15,357,108	\$16,503,475	\$17,123,047	\$17,742,619	\$18,362,190	\$18,981,762	\$19,601,334
Inflated Total O&M Costs	\$15,650,983	\$16,714,655	\$17,821,729	\$18,973,710	\$20,172,152	\$21,495,303	\$22,872,005	\$24,304,107	\$25,793,520	\$28,411,911	\$30,215,512	\$32,091,535	\$34,042,475	\$36,070,904	\$38,179,478

2013 Present Worth of Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
BWA WTP	\$7,259,502	\$7,307,998	\$7,344,912	\$7,370,973	\$7,386,872	\$7,419,723	\$7,441,906	\$7,454,103	\$7,456,965	\$7,742,616	\$7,761,631	\$7,770,506	\$7,769,906	\$7,760,459	\$7,742,767	\$197,992,919

Notes:

1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)

2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)

3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 3 BWA – Seawater: Seawater RO Plant at BWA WTP Site

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/ New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
1	Leaving BWA WTP to West/South Split	WTP	West/South Split	Existing	1.23	16.00	5.00	4.51	0	14,700	\$0.00	\$0
2	From West/South Split to Brazoria	West/South Split	Brazoria	Existing	0.78	10.00	5	1.76	0	25,300	\$0.00	\$0
5	From West/South Split to TDCJ Clemens	West/South Split	TDCJ Clemens	Existing	0.46	8.00	5	1.13	0	11,100	\$0.00	\$0
7	Leaving BWA WTP to the North	WTP	North/East Split	Existing	16.48	30	5.00	15.86	0	7,200	\$0.00	\$0
8	Main Line to Lake Jackson (Beechwood)	North/East Split	Lake Jackson (Beechwood) Take-Off	Existing	8.32	24.00	5	10.15	0	10,900	\$0.00	\$0
9	To Lake Jackson (Beechwood)	Lake Jackson (Beechwood) Take-Off	Lake Jackson	Existing	2.21	10.00	5	1.76	6	9,500	\$8.00	\$456,000
10	Main line to TDCJ Wayne Scott	Lake Jackson (Beechwood) Take-Off	TDCJ Wayne Scott Take-Off	Existing	6.11	20.00	5	7.05	0	10,300	\$0.00	\$0
11	To TDCJ Wayne Scott	TDCJ Wayne Scott Take-Off	TDCJ Wayne Scott	Existing	0.39	8.00	5	1.13	0	8,900	\$0.00	\$0
12	Main line to Angleton (Jamison)	TDCJ Wayne Scott Take-Off	Angleton (Jamison) Take-Off	Existing	5.72	20	5	7.05	0	26,000	\$0.00	\$0
13	To Angleton (Jamison)	Angleton (Jamison) Take-Off	Angleton	Existing	1.14	8	5.00	1.13	0	5,000	\$0.00	\$0
14	Main line to Angleton	Angleton (Jamison) Take-Off	Angleton	Existing	4.58	20	5.00	7.05	0	18,000	\$0.00	\$0
15	From North/East Split to Lake Jackson (Oak Drive)	North/East Split	Lake Jackson (Oak Drive) Take-Off Point	Existing	8.16	24	5.00	10.15	0	2,100	\$0.00	\$0
16	To Lake Jackson (Oak Drive)	Lake Jackson (Oak Drive) Take-Off Point	Lake Jackson (Oak Drive)	Existing	2.21	10	5.00	1.76	6	7,200	\$8.00	\$346,000
17	Main line to Clute/Richwood	Lake Jackson (Oak Drive) Take-Off Point	Clute/Richwood Take-Off Point	Existing	5.95	20	5.00	7.05	0	19,100	\$0.00	\$0
18	To Clute/Richwood	Clute/Richwood Take-Off Point	Clute	Existing	1.85	14	5.00	3.45	0	9,370	\$0.00	\$0
19	From Clute to Richwood	Clute	Richwood	Existing	0.69	14	5.00	3.45	0	6,300	\$0.00	\$0
20	Main line to Dow-B	Clute/Richwood Take-Off Point	Dow-B Take-Off Point	Existing	4.10	20	5.00	7.05	0	14,400	\$0.00	\$0
21	To Dow-B	Dow-B Take-Off Point	Dow-B	Existing	0.67	8	5.00	1.13	0	5,000	\$0.00	\$0
22	Main line to Proposed Dow	Dow-B Take-Off Point	Proposed Dow Take-Off Point	Existing	3.43	20	5.00	7.05	0	8,400	\$0.00	\$0
23	To Proposed Dow	Proposed Dow Take-Off Point	Proposed Dow	Proposed	0.67	-	5.00	-	6	5,000	\$8.00	\$240,000

Alternative 3 BWA – Seawater: Seawater RO Plant at BWA WTP Site

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/ New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Max Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/in-ft	Construction Cost
24	Main line to Oyster Creek	Proposed Dow Take-Off Point	Oyster Creek/Freeport Take-Off Point	Existing	2.76	20	5.00	7.05	0	6,000	\$0.00	\$0
25	To Oyster Creek	Oyster Creek/Freeport Take-Off Point	Oyster Creek	Existing	0.10	8	5.00	1.13	0	10,800	\$0.00	\$0
26	Main line to Dow-A	Oyster Creek/Freeport Take-Off Point	Dow-A Take-Off Point	Existing	2.67	16	5.00	4.51	0	10,000	\$0.00	\$0
27	To Dow-A	Dow-A Take-Off Point	Dow-A	Existing	0.67	8	5.00	1.13	0	2,000	\$0.00	\$0
28	Main line to Freeport North	Dow-A Take-Off Point	Freeport North Take-Off Point	Existing	2.00	16	5.00	4.51	0	3,000	\$0.00	\$0
29	To Freeport North	Freeport North Take-Off Point	Freeport North	Existing	1.00	12	5.00	2.54	0	3,000	\$0.00	\$0
30	Main line to Freeport South	Freeport North Take-Off Point	Freeport South	Existing	1.00	16	5.00	4.51	0	6,000	\$0.00	\$0
48	Leaving BWA WTP to Tank Farm	WTP	Tank Farm	New	28.29	-	5	-	42	39,900	\$6.50	\$10,893,000
49	Main line to TDCJ Ramsey, Stringfellow and Terell	Tank Farm	TDCJ Ramsey, Stringfellow and Terell Take-Off Point	New	28.29	-	5	-	42	25,000	\$6.50	\$6,825,000
33	To TDCJ Ramsey, Stringfellow and Terell	TDCJ Ramsey, Stringfellow and Terell Take-Off Point	TDCJ Ramsey, Stringfellow and Terell	New	1.52	-	5	-	10	19,200	\$6.70	\$1,287,000
34	To County Other Future Districts	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	County Other Future Districts #1	New	6.58	-	5	-	20	5,000	\$5.50	\$550,000
56	Main Line to TDCJ Darrington	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	TDCJ Darrington Take-Off Pt	New	20.19	-	5.00	-	30	21,000	\$5.85	\$3,686,000
50	To TDCJ Darrington	TDCJ Darrington Take-Off Pt	TDCJ Darrington	New	0.76	-	5.00	-	6	12,200	\$8.00	\$586,000
57	To County Other Future Districts #2	TDCJ Darrington Take-Off Pt	County Other Future Districts #2	New	6.58	-	5.00	-	20	5,000	\$5.50	\$550,000
55	Main Line to County Other Future Districts #3	TDCJ Darrington/County Other Future Districts Take-Off Pt	County Other Future Districts #3	New	12.84	-	5.00	-	24	5,000	\$5.50	\$660,000
57	To County Other Future Districts #3	County Other Future Districts #3 Take-Off	County Other Future Districts #3	New	6.58	-	5.00	-	20	5,000	\$5.50	\$550,000
51	To Manvel	County Other Future Districts #3 Take-Off	Manvel	New	6.26	-	5.00	-	18	9,600	\$5.50	\$951,000

Total BWA WTP Pipeline Costs for 2015: \$8,112,000

Total BWA WTP Pipeline Costs for 2020: \$19,468,000

Alternative 6: BWA WTP Expands to Meet Existing plus New Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

Financial Evaluation

Interest Rate = 4.5 %
 Payment Period = 20 years

Capital Costs	2010	2015	2020	2025	2030	2035	2040
BWA Phase Capital Costs	\$0	\$13,996,800	\$0	\$0	\$27,924,750	\$0	\$0
New Plant Phase Capital Costs	\$0	\$87,475,950	\$0	\$35,910,000	\$0	\$20,520,000	\$0

Financing Cost

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Alt 6 - BWA WTP																
Current Debt Service	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	-	-	-	-	-	-	-	-
New Debt Service - Plant Upgrades	-	-	-	-	-	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000
New Debt Service - Plant Expansion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$4,908,120	\$5,005,429	\$5,102,739	\$5,280,092	\$5,515,300	\$5,759,789	\$5,909,989	\$6,061,891	\$6,217,408	\$6,381,404	\$6,554,329	\$6,745,243	\$6,943,122	\$7,138,556	\$7,329,256	\$7,518,940
Total Cost	\$6,605,940	\$6,703,249	\$6,800,559	\$6,977,912	\$7,213,120	\$8,534,609	\$8,684,809	\$8,836,711	\$7,294,408	\$7,458,404	\$7,631,329	\$7,822,243	\$8,020,122	\$8,215,556	\$8,406,256	\$8,595,940
Avg Water Sold (mgd)	10.45	10.66	10.87	11.08	11.28	11.49	11.50	11.51	11.51	11.52	11.53	11.53	11.54	11.55	11.56	11.56
Cost per 1,000 gal	\$1.73	\$1.72	\$1.71	\$1.73	\$1.75	\$2.03	\$2.07	\$2.10	\$1.74	\$1.77	\$1.81	\$1.86	\$1.90	\$1.95	\$1.99	\$2.04
Alt 6 - New WTP																
New Debt Service - Initial Construction	-	-	-	-	-	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000
New Debt Service - Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$2,761,000
New Debt Service - Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$0	\$0	\$0	\$0	\$0	\$1,511,409	\$1,703,884	\$1,904,419	\$2,113,890	\$2,334,291	\$2,566,346	\$2,951,150	\$3,356,544	\$3,778,201	\$4,214,775	\$4,667,752
Total Cost	\$0	\$0	\$0	\$0	\$0	\$8,236,409	\$8,428,884	\$8,629,419	\$8,838,890	\$9,059,291	\$9,291,346	\$9,676,150	\$10,081,544	\$10,503,201	\$10,939,775	\$14,153,752
Avg Water Sold (mgd)	0.00	0.00	0	0	0	3.02	3.31	3.61	3.91	4.21	4.51	5.05	5.58	6.11	6.65	7.18
Cost per 1,000 gal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$7.48	\$6.97	\$6.54	\$6.19	\$5.89	\$5.64	\$5.25	\$4.95	\$4.71	\$4.51	\$5.40
Both Plants																
Total Cost	\$6,605,940	\$6,703,249	\$6,800,559	\$6,977,912	\$7,213,120	\$16,771,018	\$17,113,693	\$17,466,130	\$16,133,299	\$16,517,695	\$16,922,675	\$17,498,393	\$18,101,666	\$18,718,758	\$19,346,030	\$22,749,693
Avg Water Sold (mgd)	10.45	10.66	10.87	11.08	11.28	14.51	14.81	15.12	15.43	15.73	16.04	16.58	17.12	17.66	18.20	18.74
Cost per 1,000 gal	\$1.73	\$1.72	\$1.71	\$1.73	\$1.75	\$3.17	\$3.17	\$3.16	\$2.87	\$2.88	\$2.89	\$2.89	\$2.90	\$2.90	\$2.91	\$3.33

Alternative 6: BWA WTP Expands to Meet Existing plus New Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

Financial Evaluation

Financing Cost

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
Alt 6 - BWA WTP																
Current Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$13,582,560
New Debt Service - Plant Upgrades	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	-	-	-	-	-	-	\$21,540,000
New Debt Service - Plant Expansion	-	-	-	-	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$23,617,000
O&M Costs (Inflated)	\$7,725,202	\$7,933,235	\$8,138,446	\$8,348,961	\$8,564,919	\$8,786,972	\$9,014,777	\$9,248,484	\$9,488,003	\$9,733,968	\$9,986,466	\$10,245,508	\$10,511,265	\$10,783,909	\$11,063,620	\$237,945,342
Total Cost	\$8,802,202	\$9,010,235	\$9,215,446	\$9,425,961	\$11,788,919	\$12,010,972	\$12,238,777	\$12,472,484	\$12,712,003	\$11,880,968	\$12,133,466	\$12,392,508	\$12,658,265	\$12,930,909	\$13,210,620	\$296,684,902
Avg Water Sold (mgd)	11.57	11.58	11.59	11.59	11.60	11.61	11.62	11.62	11.63	11.64	11.65	11.66	11.66	11.67	11.68	129,760
Cost per 1,000 gal	\$2.08	\$2.13	\$2.18	\$2.23	\$2.78	\$2.83	\$2.89	\$2.94	\$2.99	\$2.80	\$2.85	\$2.91	\$2.97	\$3.04	\$3.10	-
Alt 6 - New WTP																
New Debt Service - Initial Construction	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	-	-	-	-	-	-	\$134,500,000
New Debt Service - Expansion #1	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$44,176,000
New Debt Service - Expansion #2	-	-	-	-	-	-	-	-	-	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$9,468,000
O&M Costs (Inflated)	\$5,276,450	\$5,911,649	\$6,569,654	\$7,257,086	\$7,975,012	\$8,781,532	\$9,623,658	\$10,502,440	\$11,419,665	\$12,376,223	\$13,467,585	\$14,606,121	\$15,793,515	\$17,031,509	\$18,321,605	\$196,016,367
Total Cost	\$14,762,450	\$15,397,649	\$16,055,654	\$16,743,086	\$17,461,012	\$18,267,532	\$19,109,658	\$19,988,440	\$20,905,665	\$16,715,223	\$17,806,585	\$18,945,121	\$20,132,515	\$21,370,509	\$22,660,605	\$384,160,367
Avg Water Sold (mgd)	7.90	8.63	9.35	10.08	10.80	11.60	12.40	13.20	14.00	14.80	15.71	16.62	17.53	18.43	19.34	92,540
Cost per 1,000 gal	\$5.12	\$4.89	\$4.70	\$4.55	\$4.43	\$4.31	\$4.22	\$4.15	\$4.09	\$3.09	\$3.11	\$3.12	\$3.15	\$3.18	\$3.21	-
Both Plants																
Total Cost	\$23,564,652	\$24,407,884	\$25,271,100	\$26,169,048	\$29,249,931	\$30,278,503	\$31,348,436	\$32,460,925	\$33,617,668	\$28,596,190	\$29,940,051	\$31,337,629	\$32,790,780	\$34,301,418	\$35,871,225	-
Avg Water Sold (mgd)	19.47	20.21	20.94	21.67	22.40	23.21	24.02	24.82	25.63	26.44	27.36	28.27	29.19	30.11	31.02	-
Cost per 1,000 gal	\$3.32	\$3.31	\$3.31	\$3.31	\$3.58	\$3.57	\$3.58	\$3.58	\$3.59	\$2.96	\$3.00	\$3.04	\$3.08	\$3.12	\$3.17	-

Alternative 6: BWA WTP Expands to Meet Existing plus New Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

O&M Costs

5-Year Avg O&M Costs for BWA \$1.08 per 1,000 gallon
 Beginning year = 2013
 Inflation rate = 0.0250
 Interest rate = 0.0350
 2012 current operations ADD = 8.0000 mgd
 Percentage of water purchased = 10.0000 % of Avg Day Demand
 Cost of HSPS operations = \$0.05 \$/1000 gal

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
BWA WTP (Avg day demand, MGD)	10.45	10.66	10.87	11.08	11.28	11.49	11.50	11.51	11.51	11.52	11.53	11.53	11.54	11.55	11.56	11.56	11.57
Avg Amt of Water Purchased (acre-ft)	0	0	0	1,241	1,264	1,288	1,289	1,289	1,290	1,291	1,292	1,293	1,293	1,294	1,295	1,296	1,297
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00	\$132.50
Annual O&M at WTP	\$4,119,854	\$4,201,535	\$4,283,216	\$4,364,897	\$4,446,577	\$4,528,258	\$4,531,145	\$4,534,032	\$4,536,918	\$4,539,805	\$4,542,692	\$4,545,528	\$4,548,363	\$4,551,199	\$4,554,035	\$4,556,870	\$4,559,736
Annual Water Purchase Cost	\$0	\$0	\$0	\$80,045	\$83,424	\$87,584	\$89,908	\$90,230	\$90,300	\$94,243	\$102,068	\$120,896	\$140,937	\$154,633	\$160,580	\$162,000	\$171,853
Annual Quality Control Costs	\$53,239	\$54,294	\$55,350	\$56,405	\$57,461	\$58,516	\$58,553	\$58,591	\$58,628	\$58,665	\$58,703	\$58,739	\$58,776	\$58,813	\$58,849	\$58,886	\$58,923
Annual Maintenance Costs	\$335,723	\$342,379	\$349,035	\$355,691	\$362,347	\$369,003	\$369,238	\$369,474	\$369,709	\$369,944	\$370,179	\$370,410	\$370,641	\$370,872	\$371,104	\$371,335	\$371,568
Annual Admin Costs	\$208,513	\$212,647	\$216,781	\$220,915	\$225,049	\$229,183	\$229,329	\$229,475	\$229,621	\$229,767	\$229,913	\$230,057	\$230,200	\$230,344	\$230,487	\$230,631	\$230,776
High Service Pump Station Costs	\$190,792	\$194,575	\$198,358	\$202,140	\$205,923	\$209,706	\$209,839	\$209,973	\$210,107	\$210,240	\$210,374	\$210,505	\$210,637	\$210,768	\$210,899	\$211,031	\$211,163
Total O&M Costs	\$4,908,120	\$5,005,429	\$5,102,739	\$5,280,092	\$5,380,781	\$5,482,250	\$5,488,013	\$5,491,774	\$5,495,283	\$5,502,665	\$5,513,929	\$5,536,135	\$5,559,555	\$5,576,629	\$5,585,954	\$5,590,752	\$5,604,019
Inflated Total O&M Costs	\$4,908,120	\$5,005,429	\$5,102,739	\$5,280,092	\$5,515,300	\$5,759,789	\$5,909,989	\$6,061,891	\$6,217,408	\$6,381,404	\$6,554,329	\$6,745,243	\$6,943,122	\$7,138,556	\$7,329,256	\$7,518,940	\$7,725,202
New WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	3.02	3.31	3.61	3.91	4.21	4.51	5.05	5.58	6.11	6.65	7.18	7.90
Avg Amt of Water Purchased (acre-ft)	0	0	0	0	0	338	372	405	439	473	506	566	626	685	745	805	886
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00	\$132.50
Annual O&M at WTP	\$0	\$0	\$0	\$0	\$0	\$1,188,246	\$1,306,333	\$1,424,420	\$1,542,508	\$1,660,595	\$1,778,682	\$1,988,717	\$2,198,751	\$2,408,786	\$2,618,820	\$2,828,855	\$3,114,367
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$22,984	\$25,947	\$28,350	\$30,730	\$34,529	\$39,974	\$52,921	\$68,234	\$81,858	\$92,380	\$100,625	\$117,395
Annual Quality Control Costs	\$0	\$0	\$0	\$0	\$0	\$15,355	\$16,881	\$18,407	\$19,933	\$21,459	\$22,985	\$25,699	\$28,413	\$31,127	\$33,842	\$36,556	\$40,245
Annual Maintenance Costs	\$0	\$0	\$0	\$0	\$0	\$96,829	\$106,452	\$116,075	\$125,697	\$135,320	\$144,943	\$162,058	\$179,174	\$196,289	\$213,405	\$230,520	\$253,787
Annual Admin Costs	\$0	\$0	\$0	\$0	\$0	\$60,139	\$66,116	\$72,092	\$78,069	\$84,045	\$90,022	\$100,652	\$111,282	\$121,913	\$132,543	\$143,173	\$157,623
High Service Pump Station Costs	\$0	\$0	\$0	\$0	\$0	\$55,028	\$60,497	\$65,966	\$71,434	\$76,903	\$82,372	\$92,098	\$101,825	\$111,552	\$121,279	\$131,005	\$144,228
Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,438,581	\$1,582,225	\$1,725,310	\$1,868,371	\$2,012,852	\$2,158,978	\$2,422,146	\$2,687,680	\$2,951,525	\$3,212,269	\$3,470,735	\$3,827,644
New WTP Inflated Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$1,511,409	\$1,703,884	\$1,904,419	\$2,113,890	\$2,334,291	\$2,566,346	\$2,951,150	\$3,356,544	\$3,778,201	\$4,214,775	\$4,667,752	\$5,276,450

2013 Present Worth of Annual O&M Costs

				2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
BWA WTP				\$5,280,092	\$5,198,822	\$5,117,739	\$4,949,873	\$4,785,764	\$4,626,881	\$4,476,422	\$4,333,898	\$4,204,205	\$4,079,217	\$3,953,377	\$3,826,075	\$3,699,866	\$3,583,233
New Harris Reservoir WTP				\$0	\$0	\$1,342,931	\$1,427,076	\$1,503,508	\$1,573,118	\$1,637,456	\$1,696,937	\$1,839,406	\$1,972,034	\$2,092,392	\$2,200,230	\$2,296,874	\$2,447,412

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 6: BWA WTP Expands to Meet Existing plus New Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

O&M Costs

Annual O&M Costs

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
BWA WTP (Avg day demand, MGD)	11.58	11.59	11.59	11.60	11.61	11.62	11.62	11.63	11.64	11.65	11.66	11.66	11.67	11.68
Avg Amt of Water Purchased (acre-ft)	1,297	1,298	1,299	1,300	1,301	1,302	1,303	1,303	1,304	1,305	1,306	1,307	1,308	1,309
Cost/acre-ft purchased	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$4,562,602	\$4,565,467	\$4,568,333	\$4,571,199	\$4,574,340	\$4,577,482	\$4,580,624	\$4,583,766	\$4,586,907	\$4,590,126	\$4,593,345	\$4,596,564	\$4,599,782	\$4,603,001
Annual Water Purchase Cost	\$178,986	\$180,322	\$181,660	\$183,000	\$184,342	\$185,685	\$187,031	\$188,233	\$189,582	\$190,932	\$192,283	\$193,637	\$194,993	\$196,350
Annual Quality Control Costs	\$58,960	\$58,997	\$59,034	\$59,071	\$59,112	\$59,152	\$59,193	\$59,233	\$59,274	\$59,316	\$59,357	\$59,399	\$59,440	\$59,482
Annual Maintenance Costs	\$371,802	\$372,035	\$372,269	\$372,502	\$372,758	\$373,014	\$373,270	\$373,526	\$373,782	\$374,045	\$374,307	\$374,569	\$374,831	\$375,094
Annual Admin Costs	\$230,921	\$231,066	\$231,211	\$231,356	\$231,515	\$231,674	\$231,833	\$231,992	\$232,151	\$232,314	\$232,477	\$232,640	\$232,803	\$232,966
High Service Pump Station Costs	\$211,296	\$211,429	\$211,561	\$211,694	\$211,840	\$211,985	\$212,131	\$212,276	\$212,422	\$212,571	\$212,720	\$212,869	\$213,018	\$213,167
Total O&M Costs	\$5,614,566	\$5,619,316	\$5,624,068	\$5,628,822	\$5,633,907	\$5,638,993	\$5,644,081	\$5,649,027	\$5,654,118	\$5,659,302	\$5,664,489	\$5,669,677	\$5,674,867	\$5,680,059
Inflated Total O&M Costs	\$7,933,235	\$8,138,446	\$8,348,961	\$8,564,919	\$8,786,972	\$9,014,777	\$9,248,484	\$9,488,003	\$9,733,968	\$9,986,466	\$10,245,508	\$10,511,265	\$10,783,909	\$11,063,620
New WTP (Avg day demand, MGD)	8.63	9.35	10.08	10.80	11.60	12.40	13.20	14.00	14.80	15.71	16.62	17.53	18.43	19.34
Avg Amt of Water Purchased (acre-ft)	967	1,048	1,129	1,210	1,300	1,390	1,479	1,569	1,658	1,760	1,862	1,964	2,066	2,167
Cost/acre-ft purchased	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$3,399,878	\$3,685,390	\$3,970,902	\$4,256,413	\$4,571,532	\$4,886,650	\$5,201,768	\$5,516,887	\$5,832,005	\$6,190,157	\$6,548,310	\$6,906,462	\$7,264,614	\$7,622,767
Annual Water Purchase Cost	\$133,446	\$145,591	\$157,886	\$170,331	\$184,200	\$198,235	\$212,293	\$226,660	\$241,048	\$257,502	\$274,144	\$290,974	\$307,993	\$325,050
Annual Quality Control Costs	\$43,935	\$47,624	\$51,314	\$55,003	\$59,075	\$63,147	\$67,220	\$71,292	\$75,364	\$79,992	\$84,620	\$89,248	\$93,877	\$98,505
Annual Maintenance Costs	\$277,053	\$300,319	\$323,585	\$346,851	\$372,529	\$398,208	\$423,887	\$449,565	\$475,244	\$504,430	\$533,615	\$562,800	\$591,986	\$621,171
Annual Admin Costs	\$172,074	\$186,524	\$200,974	\$215,424	\$231,373	\$247,321	\$263,270	\$279,219	\$295,167	\$313,294	\$331,421	\$349,548	\$367,674	\$385,801
High Service Pump Station Costs	\$157,450	\$170,672	\$183,894	\$197,116	\$211,710	\$226,303	\$240,896	\$255,489	\$270,083	\$286,669	\$303,255	\$319,841	\$336,427	\$353,014
Total O&M Costs	\$4,183,835	\$4,536,120	\$4,888,554	\$5,241,138	\$5,630,419	\$6,019,865	\$6,409,334	\$6,799,112	\$7,188,910	\$7,632,043	\$8,075,364	\$8,518,874	\$8,962,571	\$9,406,307
New WTP Inflated Total O&M Costs	\$5,911,649	\$6,569,654	\$7,257,086	\$7,975,012	\$8,781,532	\$9,623,658	\$10,502,440	\$11,419,665	\$12,376,223	\$13,467,585	\$14,606,121	\$15,793,515	\$17,031,509	\$18,321,605

2013 Present Worth of Annual O&M Costs

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
BWA WTP	\$3,468,577	\$3,354,117	\$3,243,434	\$3,136,401	\$3,033,076	\$2,933,154	\$2,836,523	\$2,743,003	\$2,652,633	\$2,565,281	\$2,480,803	\$2,399,107	\$2,320,100	\$2,243,693	\$101,525,366
New Harris Reservoir WTP	\$2,584,697	\$2,707,567	\$2,819,258	\$2,920,382	\$3,031,199	\$3,131,267	\$3,221,113	\$3,301,451	\$3,372,682	\$3,459,496	\$3,536,663	\$3,604,736	\$3,664,237	\$3,715,606	\$67,099,727

Notes:

1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)

2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)

3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

Alternative 6: BWA WTP Expands to Meet Existing plus New Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/ New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Design Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/ in-ft	Construction Cost
1	Leaving BWA WTP to West/South Split	WTP	West/South Split	Existing	8.06	16	5.00	4.51	12	14,700	\$5.50	\$971,000
2	From West/South Split to Brazoria	West/South Split	Brazoria	Existing	2.39	10	5.00	1.76	6	25,300	\$8.00	\$1,215,000
3	From Brazoria to Sweeney	Brazoria	Sweeney	New	1.61	-	5.00	-	10	65,700	\$6.70	\$4,402,000
4	From Sweeney to Phillips 66	Sweeney	Phillips 66	New	0.72	-	5.00	-	6	12,700	\$8.00	\$610,000
5	From West/South Split to TDCJ Clemens	West/South Split	TDCJ Clemens	Existing	0.84	8	5.00	1.13	0	11,100	\$0.00	\$0
6	From TDCJ Clemens to Jones Creek	TDCJ Clemens	Jones Creek	New	0.38	-	5.00	-	4	11,600	\$8.15	\$379,000
7	Leaving BWA WTP to the North	WTP	North/East Split	Existing	16.66	30	5.00	15.86	0	7,200	\$0.00	\$0
8	Main Line to Lake Jackson (Beechwood)	North/East Split	Lake Jackson (Beechwood) Take-Off	Existing	8.32	24	5.00	10.15	0	10,900	\$0.00	\$0
9	To Lake Jackson (Beechwood)	Lake Jackson (Beechwood) Take-Off	Lake Jackson	Existing	2.21	10	5.00	1.76	6	9,500	\$8.00	\$456,000
10	Main line to TDCJ Wayne Scott	Lake Jackson (Beechwood) Take-Off	TDCJ Wayne Scott Take-Off	Existing	6.11	20	5.00	7.05	0	10,300	\$0.00	\$0
11	To TDCJ Wayne Scott	TDCJ Wayne Scott Take-Off	TDCJ Wayne Scott	Existing	0.39	8	5.00	1.13	0	8,900	\$0.00	\$0
12	Main line to Angleton (Jamison)	TDCJ Wayne Scott Take-Off	Angleton (Jamison) Take-Off	Existing	5.72	20	5.00	7.05	0	26,000	\$0.00	\$0
13	To Angleton (Jamison)	Angleton (Jamison) Take-Off	Angleton	Existing	1.14	8	5.00	1.13	0	5,000	\$0.00	\$0
14	Main line to Angleton	Angleton (Jamison) Take-Off	Angleton	Existing	4.58	20	5.00	7.05	0	18,000	\$0.00	\$0
15	From North/East Split to Lake Jackson (Oak Drive)	North/East Split	Lake Jackson (Oak Drive) Take-Off Point	Existing	8.33	24	5.00	10.15	0	2,100	\$0.00	\$0
16	To Lake Jackson (Oak Drive)	Lake Jackson (Oak Drive) Take-Off Point	Lake Jackson (Oak Drive)	Existing	2.21	10	5.00	1.76	6	7,200	\$8.00	\$346,000
17	Main line to Clute/Richwood	Lake Jackson (Oak Drive) Take-Off Point	Clute/Richwood Take-Off Point	Existing	6.12	20	5.00	7.05	0	19,100	\$0.00	\$0
18	To Clute/Richwood	Clute/Richwood Take-Off Point	Clute	Existing	1.69	14	5.00	3.45	0	9,370	\$0.00	\$0
19	From Clute to Richwood	Clute	Richwood	Existing	0.69	14	5.00	3.45	0	6,300	\$0.00	\$0
20	Main line to Dow-B	Clute/Richwood Take-Off Point	Dow-B Take-Off Point	Existing	4.43	20	5.00	7.05	0	14,400	\$0.00	\$0
21	To Dow-B	Dow-B Take-Off Point	Dow-B	Existing	0.67	8	5.00	1.13	0	5,000	\$0.00	\$0
22	Main line to Proposed Dow	Dow-B Take-Off Point	Proposed Dow Take-Off Point	Existing	3.76	20	5.00	7.05	0	8,400	\$0.00	\$0
23	To Proposed Dow	Proposed Dow Take-Off Point	Proposed Dow Take-Off Point	Proposed	0.67	8	5.00	1.13	6	5,000	\$8.00	\$240,000
24	Main line to Oyster Creek	Proposed DOW Take-Off Point	Oyster Creek/Freeport Take-Off Point	Existing	3.09	20	5.00	7.05	0	6,000	\$0.00	\$0
25	To Oyster Creek	Oyster Creek/Freeport Take-Off Point	Oyster Creek	Existing	0.10	8	5.00	1.13	0	10,800	\$0.00	\$0

Alternative 6: BWA WTP Expands to Meet Existing plus New Customer Demands (10% Water Shortage Purchase), New WTP on Harris Reservoir

Water Distribution System Pipelines

Section ID Number	ID Description	Starting Point	Ending Point	Existing/ New	2040 Flow thru Pipe (mgd)	Existing Pipeline Size (in)	Design Velocity thru Pipe (fps)	Max Flow thru Existing Piping (mgd)	Diameter of Pipe Chosen (in)	Length (ft)	Cost/ in-ft	Construction Cost
26	Main line to Dow-A	Oyster Creek/Freeport Take-Off Point	Dow-A Take-Off Point	Existing	2.67	16	5.00	4.51	0	10,000	\$0.00	\$0
27	To Dow-A	Dow-A Take-Off Point	Dow-A	Existing	0.67	8	5.00	1.13	0	2,000	\$0.00	\$0
28	Main line to Freeport North	Dow-A Take-Off Point	Freeport North Take-Off Point	Existing	2.00	16	5.00	4.51	0	3,000	\$0.00	\$0
29	To Freeport North	Freeport North Take-Off Point	Freeport North	Existing	1.00	12	5.00	2.54	0	3,000	\$0.00	\$0
30	Main line to Freeport South	Freeport North Take-Off Point	Freeport South	Existing	1.00	16	5.00	4.51	0	6,000	\$0.00	\$0
31	Main line to Surfside Beach	Oyster Creek Take-Off Point	Surfside Beach	New	0.33	-	5	-	4	20,400	\$8.15	\$666,000
32	Leaving New Harris Reservoir Plant to East	New Harris Reservoir WTP	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	New	28.29	-	5	-	36	45,700	\$6.15	\$10,118,000
33	To TDCJ Ramsey, Stringfellow, and Terell	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	TDCJ Ramsey, Stringfellow, and Terell	New	1.52	-	5	-	10	18,000	\$6.70	\$1,206,000
34	To County Other Future Districts #1	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	County Other Future Districts #1	New	6.58	-	5	-	20	5,000	\$5.50	\$550,000
35	Main line to Alvin Take-Off Point	TDCJ Ramsey, Stringfellow, and Terell Take-Off Point	Alvin Take-Off Point	New	20.19	-	5	-	30	17,100	\$5.85	\$3,002,000
38	Main line to TDCJ Darrington	Alvin Take-Off	TDCJ Darrington Take-Off Point	New	20.19	-	5	-	30	20,100	\$5.85	\$3,528,000
39	To TDCJ Darrington	TDCJ Darrington Take-Off Point	TDCJ Darrington	New	0.76	-	5	-	6	12,200	\$8.00	\$586,000
40	To County Other Future Districts #2	TDCJ Darrington Take-Off Point	County Other Future Districts #2	New	6.58	-	5	-	20	5,000	\$5.50	\$550,000
41	Main line to County Other Future Districts #3	TDCJ Darrington Take-Off Point	County Other Future Districts #3 Take-Off Point	New	12.84	-	5	-	24	12,000	\$5.50	\$1,584,000
42	To County Other Future Districts #3	County Other Future Districts #3 Take-Off Point	County Other Future Districts #3 Take-Off Point	New	6.58	-	5	-	20	5,000	\$5.50	\$550,000
43	Main line to Manvel	County Other Future Districts #3 Take-Off Point	Manvel	New	6.26	-	5	-	16	10,000	\$5.50	\$880,000
44	Leaving New Harris Reservoir Plant south to Holiday Lakes	New Harris Reservoir WTP	Holiday Lake	New	1.39	-	5	-	8	14,400	\$7.15	\$824,000
45	Main line to Bailey's Prairie	Holiday Lake	Bailey's Prairie	New	1.25	-	5	-	8	30,200	\$7.15	\$1,728,000
46	Main line to Varner Creek	Bailey's Prairie	Varner Creek Take-Off	New	1.06	-	5	-	8	26,900	\$7.15	\$1,539,000
47	Main line to West Columbia	Varner Creek Take-Off	West Columbia	New	0.68	-	5	-	6	9,400	\$8.00	\$452,000

Total BWA WTP Pipeline Costs: \$9,285,000
 Total New Harris Reservoir WTP Pipeline Costs: \$27,097,000

Alternative 6: BWA WTP Expands to Meet Existing plus New Customer Demands (67% Water Shortage Purchase), New WTP on Harris Reservoir

Financial Evaluation

Interest Rate = 4.5 %
 Payment Period = 20 years

Capital Costs	2010	2015	2020	2025	2030	2035	2040
BWA Phase Capital Costs	\$0	\$13,996,800	\$0	\$0	\$27,924,750	\$0	\$0
New Plant Phase Capital Costs	\$0	\$87,475,950	\$0	\$35,910,000	\$0	\$20,520,000	\$0

Financing Cost

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BWA WTP																
Current Debt Service	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	\$1,697,820	-	-	-	-	-	-	-	-
New Debt Service - Plant Upgrades	-	-	-	-	-	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000
New Debt Service - Plant Expansion	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$4,908,120	\$5,005,429	\$5,102,739	\$5,762,746	\$6,019,969	\$6,291,035	\$6,468,455	\$6,636,370	\$6,806,171	\$7,010,665	\$7,252,240	\$7,591,787	\$7,954,675	\$8,275,124	\$8,537,945	\$8,767,669
Total Cost	\$6,605,940	\$6,703,249	\$6,800,559	\$7,460,566	\$7,717,789	\$9,065,855	\$9,243,275	\$9,411,190	\$7,883,171	\$8,087,665	\$8,329,240	\$8,668,787	\$9,031,675	\$9,352,124	\$9,614,945	\$9,844,669
Avg Water Sold (mgd)	10.45	10.66	10.87	11.08	11.28	11.49	11.50	11.51	11.51	11.52	11.53	11.53	11.54	11.55	11.56	11.56
Cost per 1,000 gal	\$1.73	\$1.72	\$1.71	\$1.85	\$1.87	\$2.16	\$2.20	\$2.24	\$1.88	\$1.92	\$1.98	\$2.06	\$2.14	\$2.22	\$2.28	\$2.33
New WTP																
New Debt Service - Initial Construction	-	-	-	-	-	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000
New Debt Service - Expansion #1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$2,761,000
New Debt Service - Expansion #2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
O&M Costs (Inflated)	\$0	\$0	\$0	\$0	\$0	\$2,519,320	\$2,761,026	\$2,989,324	\$3,223,225	\$3,517,212	\$3,875,398	\$4,532,369	\$5,237,807	\$5,883,223	\$6,443,910	\$6,960,956
Total Cost	\$0	\$0	\$0	\$0	\$0	\$9,244,320	\$9,486,026	\$9,714,324	\$9,948,225	\$10,242,212	\$10,600,398	\$11,257,369	\$11,962,807	\$12,608,223	\$13,168,910	\$16,446,956
Avg Water Sold (mgd)	0.00	0.00	0.00	0.00	0.00	3.02	3.31	3.61	3.91	4.21	4.51	5.05	5.58	6.11	6.65	7.18
Cost per 1,000 gal	\$0.00	\$0.00	\$0.00	\$0.00	\$0.00	\$8.40	\$7.84	\$7.36	\$6.96	\$6.66	\$6.43	\$6.11	\$5.87	\$5.65	\$5.43	\$6.28
Both Plants																
Total Cost	\$6,605,940	\$6,703,249	\$6,800,559	\$7,460,566	\$7,717,789	\$18,310,175	\$18,729,301	\$19,125,514	\$17,831,395	\$18,329,876	\$18,929,638	\$19,926,156	\$20,994,481	\$21,960,347	\$22,783,855	\$26,291,625
Avg Water Sold (mgd)	10.45	10.66	10.87	11.08	11.28	14.51	14.81	15.12	15.43	15.73	16.04	16.58	17.12	17.66	18.20	18.74
Cost per 1,000 gal	\$1.73	\$1.72	\$1.71	\$1.85	\$1.87	\$3.46	\$3.46	\$3.47	\$3.17	\$3.19	\$3.23	\$3.29	\$3.36	\$3.41	\$3.43	\$3.84

Alternative 6: BWA WTP Expands to Meet Existing plus New Customer Demands (67% Water Shortage Purchase), New WTP on Harris Reservoir

Financial Evaluation

Financing Cost

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
Alt #6A - BWA WTP																
Current Debt Service	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	\$13,582,560
New Debt Service - Plant Upgrades	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	\$1,077,000	-	-	-	-	-	-	\$21,540,000
New Debt Service - Plant Expansion	-	-	-	-	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$2,147,000	\$23,617,000
O&M Costs (Inflated)	\$9,081,763	\$9,381,429	\$9,632,572	\$9,890,409	\$10,155,118	\$10,427,393	\$10,706,935	\$10,993,937	\$11,288,597	\$11,591,119	\$11,901,874	\$12,220,922	\$12,548,484	\$12,884,786	\$13,230,060	\$274,326,538
Total Cost	\$10,158,763	\$10,458,429	\$10,709,572	\$10,967,409	\$13,379,118	\$13,651,393	\$13,930,935	\$14,217,937	\$14,512,597	\$13,738,119	\$14,048,874	\$14,367,922	\$14,695,484	\$15,031,786	\$15,377,060	\$333,066,098
Avg Water Sold (mgd)	11.57	11.58	11.59	11.59	11.60	11.61	11.62	11.62	11.63	11.64	11.65	11.66	11.66	11.67	11.68	129,760
Cost per 1,000 gal	\$2.41	\$2.47	\$2.53	\$2.59	\$3.16	\$3.22	\$3.29	\$3.35	\$3.42	\$3.23	\$3.30	\$3.38	\$3.45	\$3.53	\$3.61	-
Alt #6A - New WTP																
New Debt Service - Initial Construction	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	\$6,725,000	-	-	-	-	-	-	\$134,500,000
New Debt Service - Expansion #1	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$2,761,000	\$44,176,000
New Debt Service - Expansion #2	-	-	-	-	-	-	-	-	-	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$1,578,000	\$9,468,000
O&M Costs (Inflated)	\$7,753,221	\$8,539,925	\$9,265,359	\$10,021,728	\$10,810,124	\$11,686,688	\$12,600,323	\$13,552,337	\$14,544,076	\$15,576,931	\$16,742,807	\$17,957,241	\$19,221,933	\$20,538,636	\$21,909,161	\$258,664,258
Total Cost	\$17,239,221	\$18,025,925	\$18,751,359	\$19,507,728	\$20,296,124	\$21,172,688	\$22,086,323	\$23,038,337	\$24,030,076	\$19,915,931	\$21,081,807	\$22,296,241	\$23,560,933	\$24,877,636	\$26,248,161	\$446,808,258
Avg Water Sold (mgd)	7.90	8.63	9.35	10.08	10.80	11.60	12.40	13.20	14.00	14.80	15.71	16.62	17.53	18.43	19.34	92,540
Cost per 1,000 gal	\$5.98	\$5.72	\$5.49	\$5.30	\$5.15	\$5.00	\$4.88	\$4.78	\$4.70	\$3.69	\$3.68	\$3.68	\$3.68	\$3.70	\$3.72	-
Both Plants																
Total Cost	\$27,397,984	\$28,484,353	\$29,460,931	\$30,475,137	\$33,675,241	\$34,824,081	\$36,017,258	\$37,256,274	\$38,542,673	\$33,654,050	\$35,130,681	\$36,664,164	\$38,256,417	\$39,909,422	\$41,625,221	-
Avg Water Sold (mgd)	19.47	20.21	20.94	21.67	22.40	23.21	24.02	24.82	25.63	26.44	27.36	28.27	29.19	30.11	31.02	-
Cost per 1,000 gal	\$3.85	\$3.86	\$3.86	\$3.85	\$4.12	\$4.11	\$4.11	\$4.11	\$4.12	\$3.49	\$3.52	\$3.55	\$3.59	\$3.63	\$3.68	-

Alternative 6: BWA WTP Expands to Meet Existing plus New Customer Demands (67% Water Shortage Purchase), New WTP on Harris Reservoir

O&M Costs

5-Year Avg O&M Costs = \$1.08 per 1,000 gallon Based on current expenses; See Tab C - Cost per gallon; Includes raw water costs
 Beginning year = 2013
 Inflation rate = 0.0250
 Interest rate = 0.0350
 2012 current operations ADD = 8.0000 mgd
 Percentage of water purchased = 67% % of 2040 Avg Day (based on 8 months of water purchased)
 Cost of HSPS operations = \$0.05 \$/1000 gal

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BWA WTP (Avg day demand, MGD)	10.45	10.66	10.87	11.08	11.28	11.49	11.50	11.51	11.51	11.52	11.53	11.53	11.54	11.55	11.56	11.56
Avg Amt of Water Purchased (acre-ft)	0	0	0	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00
Annual O&M at WTP	\$4,119,854	\$4,201,535	\$4,283,216	\$4,364,897	\$4,446,577	\$4,528,258	\$4,531,145	\$4,534,032	\$4,536,918	\$4,539,805	\$4,542,692	\$4,545,528	\$4,548,363	\$4,551,199	\$4,554,035	\$4,556,870
Annual Water Purchase Cost	\$0	\$0	\$0	\$562,698	\$575,784	\$593,232	\$608,499	\$610,680	\$610,680	\$636,852	\$689,196	\$815,694	\$950,916	\$1,042,518	\$1,081,776	\$1,090,500
Annual Quality Control Costs	\$53,239	\$54,294	\$55,350	\$56,405	\$57,461	\$58,516	\$58,553	\$58,591	\$58,628	\$58,665	\$58,703	\$58,739	\$58,776	\$58,813	\$58,849	\$58,886
Annual Maintenance Costs	\$335,723	\$342,379	\$349,035	\$355,691	\$362,347	\$369,003	\$369,238	\$369,474	\$369,709	\$369,944	\$370,179	\$370,410	\$370,641	\$370,872	\$371,104	\$371,335
Annual Admin Costs	\$208,513	\$212,647	\$216,781	\$220,915	\$225,049	\$229,183	\$229,329	\$229,475	\$229,621	\$229,767	\$229,913	\$230,057	\$230,200	\$230,344	\$230,487	\$230,631
High Service Pump Station Costs	\$190,792	\$194,575	\$198,358	\$202,140	\$205,923	\$209,706	\$209,839	\$209,973	\$210,107	\$210,240	\$210,374	\$210,505	\$210,637	\$210,768	\$210,899	\$211,031
Total O&M Costs	\$4,908,120	\$5,005,429	\$5,102,739	\$5,762,746	\$5,873,141	\$5,987,898	\$6,006,604	\$6,012,224	\$6,015,663	\$6,045,274	\$6,101,057	\$6,230,933	\$6,369,534	\$6,464,514	\$6,507,150	\$6,519,252
Inflated Total O&M Costs	\$4,908,120	\$5,005,429	\$5,102,739	\$5,762,746	\$6,019,969	\$6,291,035	\$6,468,455	\$6,636,370	\$6,806,171	\$7,010,665	\$7,252,240	\$7,591,787	\$7,954,675	\$8,275,124	\$8,537,945	\$8,767,669
New WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	3.02	3.31	3.61	3.91	4.21	4.51	5.05	5.58	6.11	6.65	7.18
Avg Amt of Water Purchased (acre-ft)	0	0	0	0	0	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00
Annual O&M at WTP	\$0	\$0	\$0	\$0	\$0	\$1,188,246	\$1,306,333	\$1,424,420	\$1,542,508	\$1,660,595	\$1,778,682	\$1,988,717	\$2,198,751	\$2,408,786	\$2,618,820	\$2,828,855
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$982,328	\$1,007,609	\$1,011,220	\$1,011,220	\$1,054,558	\$1,141,234	\$1,350,701	\$1,574,614	\$1,726,297	\$1,791,304	\$1,805,750
Annual Quality Control Costs	\$0	\$0	\$0	\$0	\$0	\$15,355	\$16,881	\$18,407	\$19,933	\$21,459	\$22,985	\$25,699	\$28,413	\$31,127	\$33,842	\$36,556
Annual Maintenance Costs	\$0	\$0	\$0	\$0	\$0	\$96,829	\$106,452	\$116,075	\$125,697	\$135,320	\$144,943	\$162,058	\$179,174	\$196,289	\$213,405	\$230,520
Annual Admin Costs	\$0	\$0	\$0	\$0	\$0	\$60,139	\$66,116	\$72,092	\$78,069	\$84,045	\$90,022	\$100,652	\$111,282	\$121,913	\$132,543	\$143,173
High Service Pump Station Costs	\$0	\$0	\$0	\$0	\$0	\$55,028	\$60,497	\$65,966	\$71,434	\$76,903	\$82,372	\$92,098	\$101,825	\$111,552	\$121,279	\$131,005
Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$2,397,925	\$2,563,887	\$2,708,180	\$2,848,861	\$3,032,881	\$3,260,238	\$3,719,926	\$4,194,060	\$4,595,964	\$4,911,193	\$5,175,860
New WTP Inflated Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$2,519,320	\$2,761,026	\$2,989,324	\$3,223,225	\$3,517,212	\$3,875,398	\$4,532,369	\$5,237,807	\$5,883,223	\$6,443,910	\$6,960,956

2013 Present Worth of Annual O&M Costs

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
BWA WTP	\$5,762,746	\$5,674,532	\$5,589,767	\$5,417,613	\$5,239,306	\$5,065,027	\$4,917,834	\$4,795,376	\$4,731,843	\$4,673,524	\$4,582,815	\$4,457,045	\$4,314,332
New Harris Reservoir WTP	\$0	\$0	\$2,238,488	\$2,312,479	\$2,360,022	\$2,398,665	\$2,467,250	\$2,562,518	\$2,824,955	\$3,077,312	\$3,258,166	\$3,363,900	\$3,425,298

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control, Maintenance and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.
- 4) Average Amount of Water purchased based on Enterra study that 8 months out of the year there could be water shortages. The annual water purchase is for 8 months of 2040 ADD.
- 5) Water purchases begin in 2020.

Alternative 6: BWA WTP Expands to Meet Existing plus New Customer Demands (67% Water Shortage Purchase), New WTP on Harris Reservoir

O&M Costs

Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
BWA WTP (Avg day demand, MGD)	11.57	11.58	11.59	11.59	11.60	11.61	11.62	11.62	11.63	11.64	11.65	11.66	11.66	11.67	11.68
Avg Amt of Water Purchased (acre-ft)	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724	8,724
Cost/acre-ft purchased	\$132.50	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$4,559,736	\$4,562,602	\$4,565,467	\$4,568,333	\$4,571,199	\$4,574,340	\$4,577,482	\$4,580,624	\$4,583,766	\$4,586,907	\$4,590,126	\$4,593,345	\$4,596,564	\$4,599,782	\$4,603,001
Annual Water Purchase Cost	\$1,155,930	\$1,203,912	\$1,211,965	\$1,220,018	\$1,228,071	\$1,236,124	\$1,244,177	\$1,252,230	\$1,260,282	\$1,268,335	\$1,276,388	\$1,284,441	\$1,292,494	\$1,300,547	\$1,308,600
Annual Quality Control Costs	\$58,923	\$58,960	\$58,997	\$59,034	\$59,071	\$59,112	\$59,152	\$59,193	\$59,233	\$59,274	\$59,316	\$59,357	\$59,399	\$59,440	\$59,482
Annual Maintenance Costs	\$371,568	\$371,802	\$372,035	\$372,269	\$372,502	\$372,758	\$373,014	\$373,270	\$373,526	\$373,782	\$374,045	\$374,307	\$374,569	\$374,831	\$375,094
Annual Admin Costs	\$230,776	\$230,921	\$231,066	\$231,211	\$231,356	\$231,515	\$231,674	\$231,833	\$231,992	\$232,151	\$232,314	\$232,477	\$232,640	\$232,803	\$232,966
High Service Pump Station Costs	\$211,163	\$211,296	\$211,429	\$211,561	\$211,694	\$211,840	\$211,985	\$212,131	\$212,276	\$212,422	\$212,571	\$212,720	\$212,869	\$213,018	\$213,167
Total O&M Costs	\$6,588,096	\$6,639,492	\$6,650,959	\$6,662,426	\$6,673,893	\$6,685,689	\$6,697,485	\$6,709,280	\$6,721,076	\$6,732,872	\$6,744,759	\$6,756,647	\$6,768,534	\$6,780,422	\$6,792,309
Inflated Total O&M Costs	\$9,081,763	\$9,381,429	\$9,632,572	\$9,890,409	\$10,155,118	\$10,427,393	\$10,706,935	\$10,993,937	\$11,288,597	\$11,591,119	\$11,901,874	\$12,220,922	\$12,548,484	\$12,884,786	\$13,230,060
New WTP (Avg day demand, MGD)	7.90	8.63	9.35	10.08	10.80	11.60	12.40	13.20	14.00	14.80	15.71	16.62	17.53	18.43	19.34
Avg Amt of Water Purchased (acre-ft)	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446	14,446
Cost/acre-ft purchased	\$132.50	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$3,114,367	\$3,399,878	\$3,685,390	\$3,970,902	\$4,256,413	\$4,571,532	\$4,886,650	\$5,201,768	\$5,516,887	\$5,832,005	\$6,190,157	\$6,548,310	\$6,906,462	\$7,264,614	\$7,622,767
Annual Water Purchase Cost	\$1,914,095	\$1,993,548	\$2,006,883	\$2,020,218	\$2,033,552	\$2,046,887	\$2,060,222	\$2,073,557	\$2,086,891	\$2,100,226	\$2,113,561	\$2,126,896	\$2,140,230	\$2,153,565	\$2,166,900
Annual Quality Control Costs	\$40,245	\$43,935	\$47,624	\$51,314	\$55,003	\$59,075	\$63,147	\$67,220	\$71,292	\$75,364	\$79,992	\$84,620	\$89,248	\$93,877	\$98,505
Annual Maintenance Costs	\$253,787	\$277,053	\$300,319	\$323,585	\$346,851	\$372,529	\$398,208	\$423,887	\$449,565	\$475,244	\$504,430	\$533,615	\$562,800	\$591,986	\$621,171
Annual Admin Costs	\$157,623	\$172,074	\$186,524	\$200,974	\$215,424	\$231,373	\$247,321	\$263,270	\$279,219	\$295,167	\$313,294	\$331,421	\$349,548	\$367,674	\$385,801
High Service Pump Station Costs	\$144,228	\$157,450	\$170,672	\$183,894	\$197,116	\$211,710	\$226,303	\$240,896	\$255,489	\$270,083	\$286,669	\$303,255	\$319,841	\$336,427	\$353,014
Total O&M Costs	\$5,624,344	\$6,043,937	\$6,397,411	\$6,750,886	\$7,104,360	\$7,493,106	\$7,881,852	\$8,270,597	\$8,659,343	\$9,048,089	\$9,488,103	\$9,928,116	\$10,368,130	\$10,808,144	\$11,248,157
New WTP Inflated Total O&M Costs	\$7,753,221	\$8,539,925	\$9,265,359	\$10,021,728	\$10,810,124	\$11,686,688	\$12,600,323	\$13,552,337	\$14,544,076	\$15,576,931	\$16,742,807	\$17,957,241	\$19,221,933	\$20,538,636	\$21,909,161

2013 Present Worth of Annual O&M Costs

	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
BWA WTP	\$4,212,456	\$4,101,757	\$3,969,895	\$3,842,261	\$3,718,718	\$3,599,315	\$3,483,735	\$3,371,855	\$3,263,559	\$3,158,731	\$3,057,302	\$2,959,122	\$2,864,085	\$2,772,092	\$2,683,045	\$116,279,688
New Harris Reservoir WTP	\$3,596,229	\$3,733,834	\$3,818,555	\$3,893,276	\$3,958,576	\$4,033,997	\$4,099,790	\$4,156,520	\$4,204,725	\$4,244,917	\$4,300,821	\$4,348,089	\$4,387,243	\$4,418,776	\$4,443,160	\$91,927,560

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control, Maintenance and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.
- 4) Average Amount of Water purchased based on Enterra study that 8 months out of the year there could be water shortages. The annual water purchase is for 8 months of 2040 ADD.
- 5) Water purchases begin in 2020.

New Pearland WTP

O&M Costs

5-Year Avg O&M Costs \$0.88 per 1,000 gallon
 Beginning year = 2013
 Inflation rate = 0.0250
 Interest rate = 0.0350
 2012 current operations ADD = 8.0000 mgd
 Cost of Raw Water = 32.5000 % of Avg Day Demand
 Cost of HSPS operations = \$0.05 \$/1000 gal

Annual O&M Costs

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
New Pearland WTP (Avg day demand, MGD)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	4.95	5.26	5.57	5.88	6.19	6.50	6.74
Avg Amt of Water Purchased (acre-ft)	0	0	0	0	0	0	0	0	0	0	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Cost/Acre-Ft Purchased	\$62.50	\$63.00	\$63.50	\$64.50	\$66.00	\$68.00	\$69.75	\$70.00	\$70.00	\$73.00	\$79.00	\$93.50	\$109.00	\$119.50	\$124.00	\$125.00	\$132.50
Annual O&M at WTP	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$1,583,586	\$1,682,624	\$1,781,663	\$1,880,701	\$1,979,740	\$2,078,779	\$2,155,121
Annual Water Purchase Cost	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$790,000	\$935,000	\$1,090,000	\$1,195,000	\$1,240,000	\$1,250,000	\$1,325,000
Annual Quality Control Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$25,216	\$26,793	\$28,370	\$29,947	\$31,524	\$33,101	\$34,317
Annual Maintenance Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$159,012	\$168,957	\$178,901	\$188,846	\$198,791	\$208,735	\$216,401
Annual Admin Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$98,760	\$104,937	\$111,113	\$117,290	\$123,466	\$129,643	\$134,404
High Service Pump Station Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$90,367	\$96,019	\$101,670	\$107,322	\$112,973	\$118,625	\$122,981
Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,746,941	\$3,014,329	\$3,291,717	\$3,519,106	\$3,686,494	\$3,818,883	\$3,988,224
Inflated Total O&M Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,265,249	\$3,672,667	\$4,110,904	\$4,504,753	\$4,837,000	\$5,135,973	\$5,497,811

2013 Present Worth of Annual O&M Costs

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
New Pearland WTP	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$2,159,070	\$2,289,116	\$2,415,235	\$2,494,760	\$2,525,049	\$2,527,273	\$2,550,087

Notes:

- 1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)
- 2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)
- 3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

New Pearland WTP

O&M Costs

Annual O&M Costs

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
New Pearland WTP (Avg day demand, MGD)	6.98	7.22	7.45	7.69	7.85	8.00	8.16	8.31	8.47	8.65	8.83	9.01	9.19	9.37
Avg Amt of Water Purchased (acre-ft)	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Cost/acre-ft purchased	\$138.00	\$138.92	\$139.85	\$140.77	\$141.69	\$142.62	\$143.54	\$144.46	\$145.38	\$146.31	\$147.23	\$148.15	\$149.08	\$150.00
Annual O&M at WTP	\$2,231,463	\$2,307,805	\$2,384,148	\$2,460,490	\$2,510,009	\$2,559,528	\$2,609,048	\$2,658,567	\$2,708,086	\$2,765,859	\$2,823,631	\$2,881,404	\$2,939,176	\$2,996,949
Annual Water Purchase Cost	\$1,380,000	\$1,389,231	\$1,398,462	\$1,407,692	\$1,416,923	\$1,426,154	\$1,435,385	\$1,444,615	\$1,453,846	\$1,463,077	\$1,472,308	\$1,481,538	\$1,490,769	\$1,500,000
Annual Quality Control Costs	\$35,532	\$36,748	\$37,964	\$39,179	\$39,968	\$40,756	\$41,545	\$42,333	\$43,122	\$44,042	\$44,962	\$45,882	\$46,801	\$47,721
Annual Maintenance Costs	\$224,067	\$231,733	\$239,398	\$247,064	\$252,036	\$257,009	\$261,981	\$266,954	\$271,926	\$277,727	\$283,528	\$289,329	\$295,130	\$300,931
Annual Admin Costs	\$139,165	\$143,926	\$148,687	\$153,448	\$156,536	\$159,625	\$162,713	\$165,801	\$168,889	\$172,492	\$176,095	\$179,698	\$183,301	\$186,904
High Service Pump Station Costs	\$127,338	\$131,694	\$136,051	\$140,407	\$143,233	\$146,059	\$148,885	\$151,710	\$154,536	\$157,833	\$161,130	\$164,427	\$167,723	\$171,020
Total O&M Costs	\$4,137,565	\$4,241,137	\$4,344,709	\$4,448,281	\$4,518,706	\$4,589,131	\$4,659,556	\$4,729,981	\$4,800,406	\$4,881,030	\$4,961,654	\$5,042,278	\$5,122,902	\$5,203,526
Inflated Total O&M Costs	\$5,846,271	\$6,142,431	\$6,449,745	\$6,768,585	\$7,047,639	\$7,336,415	\$7,635,225	\$7,944,390	\$8,264,241	\$8,613,117	\$8,974,272	\$9,348,101	\$9,735,013	\$10,135,428

2013 Present Worth of Annual O&M Costs

	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	Total
New Pearland WTP	\$2,556,112	\$2,531,495	\$2,505,619	\$2,478,599	\$2,432,696	\$2,387,062	\$2,341,734	\$2,296,741	\$2,252,113	\$2,212,501	\$2,172,992	\$2,133,625	\$2,094,435	\$2,055,456	\$49,411,770

Notes:

1) 5-Year Avg O&M Costs calculated based on wages and water production expenses provided by BWA (see tab C - Cost per gallon)

2) Cost/acre-ft purchased is based on current cost of \$62.50 and estimate 2040 cost of \$150. Costs are interpolated between these years. (See tab B - Cost Lookup)

3) Annual Quality Control Costs, Maintenance Costs and Admin Costs are based on current BWA costs, which are proportioned based on the size of the proposed Plant vs current operations. Ratio is proposed annual avg to current BWA WTP operations 2012 ADD demand.

