

## **Background Document No. 71**

The attached schedules are updates to those in the Appendix of the “Benchmark Facility Cost Report,” dated September 2001, prepared by Raftelis Financial Consulting (Background Document No. 53).

Please note that the remainder of the “Benchmark Facility Cost Report” has not been updated to reflect the revised schedules. The “Benchmark Facility Preliminary Design Report,” dated August 2001, prepared by Greeley & Hansen (Background Document No. 49) is also not being updated to reflect the revised costs shown in the attached schedules.

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**City of Phoenix - Lake Pleasant Project**  
**Revised DBB Benchmark Analysis (9/30/02)**  
**Benchmark Summary**

**Schedule 1**

	<b>NPV (1)</b>
<b><u>Capital Costs</u></b>	
Design/Build Capital	
Construction/Design and Engineering	\$ 232,742,621
Administrative and Oversight (2)	890,741
Total - Design/Build Capital	<u>\$ 233,633,362</u>
Repair and Replacement	\$ 5,170,941
<b>Total Capital</b>	<b><u>\$ 238,804,303</u></b>
<b><u>O&amp;M Costs</u></b>	
Direct	\$ 94,294,455
Administrative and Oversight (3)	31,119,119
<b>Total O&amp;M</b>	<b><u>\$ 125,413,574</u></b>
<b>TOTAL</b>	<b><u><u>\$ 364,217,876</u></u></b>

- (1) The NPV was discounted to July 1, 2003 using a discount rate of 5.7%.
- (2) Includes City related costs for design, construction, and acceptance testing oversight.
- (3) Includes City related costs for City Departmental, Water Department, and Water Division oversight (overhead) costs.

	Construction Period		Projection Horizon							
	FY 2004-05	FY 2005-06	FY 2006-07 (4)	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	Annual Average 2012-13 to 2016-17	Annual FY Average 2017-18 to 2021-22

<b>CAPITAL COSTS</b>											
Fixed Design Build Price	\$ 246,008,229	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
City Overhead	941,510	-	-	-	-	-	-	-	-	-	-
<b>Total Capital</b>	<b>\$ 246,949,739</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>

**NPV of Capital Costs (1) \$ 233,633,362**

<b>O&amp;M</b>											
Direct O&M											
Personal Services											
Utilities											
Gas											
Other											
Commodities											
Make-up carbon	219,407	542,374	575,405	575,405	575,405	575,405	575,405	575,405	575,405	575,405	575,405
UV bulb replacements	14,926	36,896	39,143	39,143	39,143	39,143	39,143	39,143	39,143	39,143	39,143
Chemicals	625,385	1,545,951	1,640,100	1,592,330	1,640,100	1,640,100	1,689,303	1,739,982	2,464,864	3,405,025	
Professional and contract services	99,504	245,975	260,955	253,354	260,955	260,955	268,783	276,847	302,782	351,008	
Residuals management	34,329	84,861	90,029	87,407	90,029	90,029	92,730	95,512	135,973	188,849	
Maintenance and repair (non-capital)	199,009	491,950	521,909	506,708	521,909	521,909	537,567	553,694	697,307	896,122	
Sewer User Fees	75,623	186,941	192,549	192,549	192,549	192,549	198,326	204,275	230,115	266,766	
Miscellaneous Direct Charges	365,821	904,308	959,381	931,438	959,381	959,381	988,162	1,017,807	1,113,157	1,290,454	
Electricity	1,030,273	2,553,533	2,729,744	2,650,363	2,729,744	2,729,744	2,837,319	2,908,325	3,506,119	4,559,462	
<b>Total Direct O&amp;M</b>	<b>\$ -</b>	<b>\$ 3,463,297</b>	<b>\$ 8,567,967</b>	<b>\$ 8,845,230</b>	<b>\$ 9,110,457</b>	<b>\$ 9,409,454</b>	<b>\$ 9,409,454</b>	<b>\$ 9,677,624</b>	<b>\$ 11,969,161</b>	<b>\$ 15,389,269</b>	

<b>Administration &amp; Oversight</b>											
City Departmental											
Water Departmental											
Water Division											
<b>Total Administration &amp; Oversight</b>	<b>\$ -</b>	<b>\$ 303,012</b>	<b>\$ 749,046</b>	<b>\$ 771,517</b>	<b>\$ 794,663</b>	<b>\$ 818,503</b>	<b>\$ 843,058</b>	<b>\$ 843,058</b>	<b>\$ 922,037</b>	<b>\$ 1,068,894</b>	
		662,642	1,638,051	1,687,192	1,737,808	1,789,943	1,843,641	1,843,641	2,016,357	2,337,510	
		309,948	766,190	789,176	812,851	837,237	862,354	862,354	943,141	1,093,359	
<b>Total Administration &amp; Oversight</b>	<b>\$ -</b>	<b>\$ 1,275,602</b>	<b>\$ 3,153,287</b>	<b>\$ 3,247,886</b>	<b>\$ 3,345,323</b>	<b>\$ 3,445,682</b>	<b>\$ 3,549,053</b>	<b>\$ 3,549,053</b>	<b>\$ 3,881,535</b>	<b>\$ 4,499,763</b>	

**Total O&M \$ - \$ 4,738,898 \$ 11,721,254 \$ 12,093,116 \$ 12,455,780 \$ 12,855,136 \$ 13,226,676 \$ 15,850,696 \$ 19,889,032**

**NPV of O&M Costs (2) \$ 125,413,574**

<b>Repair and Replacement</b>											
Estimated Replacement											
<b>Total Repair and Replacement</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ -</b>	<b>\$ 1,872,700</b>

**NPV of Replacement Costs (3) \$ 5,170,941**

**TOTAL NPV FOR BENCHMARK \$ 364,217,876**

1) The formula for determining the NPV for Capital Cost is  $\$246,949,739 * (1 / (1 + 0.004630)^{12})$ .  
 2) The NPV for O&M Cost is derived by taking the NPV of O&M cost for each year of the Operations Period.  
 3) The formula for determining the NPV for Replacements is  $\$11,236,198 * (1 / (1 + 0.057)^{14})$ .  
 4) The Lake Pleasant WTP will become operational on February 1, 2007.

City of Phoenix - Lake Pleasant Project  
 Revised DBB Benchmark Analysis (9/30/02)  
 Capital Costs

Schedule 3

	<u>Cost (1)</u>
<b>Design/Build Capital Costs</b>	
Design and Engineering Related Costs	
Design/Development	\$ 16,186,432
Construction Administration/Commissioning	17,945,767
<b>Total Design and Engineering Related Costs (2)</b>	<b><u>\$ 34,132,199</u></b>
Construction - RWF	
General Requirements/Site Work	\$ 5,674,151
Turnout Structure/Meter Vault	901,540
Raw Water Inlet Structure	5,101,990
Raw Water Pumping Station	4,686,900
Raw Water Pipeline	10,447,014
<i>Subtotal Construction - RWF</i>	<u>\$ 26,811,595</u>
Construction - WTP	
General Requirements/Site Work	\$ 26,190,275
Electrical	17,427,058
Rapid Mix Chambers	211,524
Raw Water Control Chamber	780,393
Flocculation/Sedimentation	17,502,954
Filter Building	14,428,448
Filter to Waste Equalization Basin	766,418
Finished Water Storage	15,584,255
Finished Water Pump Station	9,180,047
Residuals Thickening, Sludge Drying	2,234,662
Thickened Sludge Pump Station	441,553
Thickened Sludge Storage Basin	504,521
Dewatering Building	3,993,154
Back Wash Equalization Basin	2,201,217
Ops/Administration Building	3,087,046
Chlorine Building	1,937,468
Chemical Feed & Storage Building	2,337,723
Finished Water Pipeline 78"	1,951,630
Carbon Adsorption & Regeneration System	34,891,752
UV Disinfection System	2,479,446
<i>Subtotal Construction - WTP</i>	<u>\$ 158,131,544</u>
<b>Total Construction Costs</b>	<b><u>\$ 184,943,139</u></b>
<b>Total Construction/Design and Engineering</b>	<b><u>\$ 219,075,338</u></b>
<b>City Administrative and Oversight (2)</b>	<b>\$ 838,434</b>
<b>Total - Capital Costs (3)</b>	<b><u>\$ 219,913,772</u></b>

- (1) Costs are expressed as of December 31, 2000.  
 (2) Detailed in Schedule 4.  
 (3) The escalated costs are provided in Schedule 6.

City of Phoenix - Lake Pleasant Project  
 Revised DBB Benchmark Analysis (9/30/02)  
 Summary of Administrative and Oversight Cost Analysis

Schedule 4

	DBB			DBO		
	City Total FTE & Time (1)	Consults. Total # Hours	Costs (2)	City Total FTE & Time (1)	Consults. Total # Hours	Costs not Included in Price Proposals (2)
<b>CAPITAL</b>						
<b>DESIGN DEVELOPMENT PERIOD</b>						
Project administration (Engineering)	0.30		\$ 30,962	1.00		\$ 103,208
Construction oversight	-		-	1.00		103,208
Project administration (O&M)	1.00		105,184	1.00		105,184
Total City Costs			136,146	3.00		311,599
Design >30% / Dev Period Consultants	-	-	16,186,432		8,000	800,000
Total Consultants			16,186,432		8,000	800,000
<b>CONSTRUCTION/ACCEPTANCE TESTING/COMMISSIONING</b>						
Project administration (Engineering)	-		-	1.38		141,910
Construction oversight	0.83		85,146	1.38		141,910
Project administration (O&M)	0.65		68,370	0.65		68,370
Project administration (O&M)/Accept Test	3.50		203,964	3.50		203,964
Total City Costs			357,480	6.90		556,154
Construction Consultants & Specialized Inspectors	-	-	17,945,767	-	25,000	2,500,000
Total Consultants			17,945,767		25,000	2,500,000
<b>OTHER DEPARTMENT/CITY SUPPORT (3)</b>						
City Clerks Office			8,680			8,680
Finance Support			82,854			82,854
Development Services			106,830			-
Equipment Rental/Purchase			-			-
Personnel			16,362			16,362
Other			130,081			130,081
			344,808			237,977
<b>TOTAL CITY COSTS</b>			838,434			1,105,731
<b>TOTAL CONSULTANT COSTS</b>			34,132,199			3,300,000
<b>TOTAL CONSTRUCTION OVERSIGHT</b>	<b>6.28</b>	<b>-</b>	<b>\$ 34,970,632</b>	<b>9.90</b>	<b>33,000</b>	<b>\$ 4,405,731</b>
<b>ESCALATED CITY COSTS (4)</b>			<b>941,510</b>			<b>1,241,668</b>
<b>ESCALATED CONSULTANT COSTS (4)</b>			<b>38,328,375</b>			<b>3,705,699</b>
<b>TOTAL ESCALATED CONSTRUCTION OVERSIGHT (4)</b>			<b>\$ 39,269,885</b>			<b>\$ 4,947,367</b>
<b>ANNUAL O&amp;M</b>						
Project Administration				0.75		\$ 77,406
Production (system integration)				0.61		47,540
Billing/Service Fee Administration				0.80		58,723
Legal				0.35		42,609
Consultants (useful life analysis)						10,000
City Departmental (5)			\$ 609,043			609,043
Water Department (5)			1,331,885			1,331,885
Water Division (5)			622,983			622,983
<b>TOTAL O&amp;M ADMINISTRATIVE &amp; OVERSIGHT</b>			<b>\$ 2,563,911</b>	<b>2.51</b>	<b>-</b>	<b>\$ 2,800,188</b>
<b>TOTAL ESCALATED O&amp;M OVERSIGHT (6)</b>			<b>\$ 3,061,444</b>			<b>\$ 3,343,571</b>

- (1) Total time is number of FTE multiplied by the number of years of phase.
- (2) Costs are expressed as of December 31, 2000.
- (3) The percentage of actual Other Dept/City Support cost from recent construction projects was used to estimate the amounts for LPWTP.
- (4) Escalated based on the drawdown schedule.
- (5) Departmental costs are allocated based on the percentage of LPWTP budget to the total City Budget. Savings for water customers will occur to the extent the price proposals for O&M are less than the City's Benchmark. In this analysis, the O&M price proposals and the City's Benchmark are assumed to be the same.
- (6) Escalated to FY 2006-07.

City of Phoenix - Lake Pleasant Project  
 Revised DBB Benchmark Analysis (9/30/02)  
 Monthly Drawdown Schedule

Schedule 5

<u>Month</u>	<u>Percentage of Project</u>	<u>Cumulative Percentage</u>	<u>Date</u>	<u>Cash Flow (1)</u>	<u>Fiscal Year Expenditures (Unescalated)</u>
1	0.60%	0.60%	July 03	\$ 1,312,885	
2	0.60%	1.19%	Aug 03	1,312,885	
3	0.60%	1.79%	Sept 03	1,312,885	
4	0.60%	2.39%	Oct 03	1,312,885	
5	0.60%	2.99%	Nov 03	1,312,885	
6	0.71%	3.70%	Dec 03	1,567,985	
7	0.71%	4.41%	Jan 04	1,567,985	
8	0.71%	5.12%	Feb 04	1,567,985	
9	0.71%	5.84%	March 04	1,567,985	
10	0.71%	6.55%	April 04	1,567,985	
11	0.71%	7.26%	May 04	1,567,985	
12	0.71%	7.98%	June 04	1,567,985	\$ 17,540,322
13	0.71%	8.69%	July 04	1,567,985	
14	2.32%	11.01%	Aug 04	5,096,282	
15	1.31%	12.31%	Sept 04	2,876,252	
16	1.56%	13.87%	Oct 04	3,426,696	
17	1.94%	15.81%	Nov 04	4,271,605	
18	2.92%	18.74%	Dec 04	6,424,341	
19	4.11%	22.85%	Jan 05	9,045,273	
20	4.88%	27.73%	Feb 05	10,739,269	
21	5.41%	33.14%	March 05	11,902,173	
22	5.08%	38.23%	April 05	11,178,657	
23	6.13%	44.36%	May 05	13,474,777	
24	7.09%	51.45%	June 05	15,594,965	95,598,276
25	6.60%	58.05%	July 05	14,521,346	
26	5.54%	63.59%	Aug 05	12,188,501	
27	5.23%	68.82%	Sept 05	11,503,689	
28	4.39%	73.21%	Oct 05	9,643,879	
29	4.03%	77.24%	Nov 05	8,856,147	
30	3.13%	80.37%	Dec 05	6,886,160	
31	2.67%	83.03%	Jan 06	5,861,582	
32	2.16%	85.19%	Feb 06	4,739,802	
33	1.36%	86.55%	March 06	2,995,445	
34	1.25%	87.80%	April 06	2,757,719	
35	0.98%	88.79%	May 06	2,162,852	
36	0.85%	89.64%	June 06	1,869,927	83,987,049
37	0.72%	90.36%	July 06	1,587,997	
38	1.27%	91.63%	Aug 06	2,790,926	
39	1.27%	92.90%	Sept 06	2,790,926	
40	0.63%	93.53%	Oct 06	1,383,697	
41	0.53%	94.06%	Nov 06	1,163,784	
42	0.44%	94.49%	Dec 06	961,903	
43	0.41%	94.91%	Jan 07	908,904	
44	0.02%	94.93%	Feb 07	51,020	
45	0.02%	94.95%	March 07	51,020	
46	0.02%	94.98%	April 07	51,020	
47	5.02%	100.00%	May 07	11,046,928	22,788,125
<b>Total</b>	<b>100.00%</b>			<b>\$ 219,913,772</b>	<b>\$ 219,913,772</b>

(1) Costs are expressed as of December 31, 2000.

**City of Phoenix - Lake Pleasant Project  
 Revised DBB Benchmark Analysis (9/30/02)  
 Projected Design/Build Capital Costs**

**Schedule 6**

**Projected Capital Requirements**

**TOTAL CONSTRUCTION**

<b>Fiscal Year</b>	<b>Actual</b>	<b>Escalated (1)</b>
2002-03	\$ -	\$ -
2003-04	17,540,322	18,944,348
2004-05	95,598,276	105,935,008
2005-06	83,987,049	95,488,072
2006-07	22,788,125	26,582,312
<b>TOTAL</b>	<b>\$ 219,913,772</b>	<b>\$ 246,949,739</b>

**COMPONENTS**

**Construction-Related Costs**

RWF Construction	\$ 26,811,595	\$ 30,107,784
Plant Construction	158,131,544	177,572,070
Subtotal	<u>\$ 184,943,139</u>	<u>\$ 207,679,854</u>

**Design and Engineering Related Costs**

Design/Development	\$ 16,186,432	\$ 18,176,375
Construction/Commissioning	17,945,767	20,152,000
Subtotal	<u>\$ 34,132,199</u>	<u>\$ 38,328,375</u>

**Administrative and Oversight Costs**

Design/Development Period	\$ 136,146	\$ 152,884
Construction/Commissioning	357,480	401,428
Other City Support	344,808	387,198
Subtotal	<u>\$ 838,434</u>	<u>\$ 941,510</u>

**TOTAL**

<b>TOTAL</b>	<b><u>\$ 219,913,771</u></b>	<b><u>\$ 246,949,739</u></b>
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(1) Capital costs are escalated by 2.6% annually.

City of Phoenix - Lake Pleasant Project  
 Revised DBB Benchmark Analysis (9/30/02)  
 Capital Replacement Costs (1)

Schedule 7

Construction Component	Total Cost	Initial (Non-replaceable) Capital Costs	Capital Replacement Cost for Items with Service Life Shown			
			10 Years	20 Years	30 Years	More Than 30 Years
<b>Construction - WTP</b>						
General Requirements/Site Work	\$ 26,190,275	\$ 3,443,000	\$ 2,557,747	\$ 890,100	\$ 7,930,308	\$ 11,369,120
Electrical	17,427,058	1,200,000	-	15,216,018	11,040	1,000,000
Rapid Mix Chambers	211,524	-	16,560	93,498	24,840	76,626
Raw Water Control Chamber	780,393	-	21,804	2,760	164,220	591,609
Flocculation/Sedimentation	17,502,954	-	300,495	4,125,814	2,388,780	10,687,865
Filter Building	14,428,448	-	552,000	6,935,891	1,179,348	5,761,209
Filter to Waste Equalization Basin	766,418	-	37,260	64,929	131,100	533,129
Finished Water Pump Station	9,180,047	-	82,800	349,623	4,668,540	4,079,084
Finished Water Storage	15,584,255	-	26,220	505,805	1,850,000	13,202,230
Residuals Thickening, Splitter Box	2,234,662	-	93,702	869,400	307,050	964,510
Odor Control/Thickened Sludge Pump Station	441,553	-	190,758	114,130	2,660	134,005
Thickened Sludge Storage Basin	504,521	-	-	-	-	504,521
Dewatering Building	3,993,154	-	251,988	1,137,120	717,600	1,886,446
Back Wash Equalization Basin	2,201,217	-	140,898	-	122,820	1,937,499
Visitor's/Ops Building	3,087,046	-	379,500	932,880	276,000	1,498,666
Chlorine Building	1,937,468	-	361,836	733,788	251,160	590,684
Chemical Feed and Storage Building	2,337,723	-	744,510	627,489	298,080	667,644
78" Finished Water Pipeline	1,951,630	13,869	27,738	-	220,800	1,689,223
Carbon Adsorption & Regeneration System	34,891,752	5,799,420	1,014,300	12,804,192	184,920	15,088,920
UV Disinfection System	2,479,446	1,380,000	-	897,000	44,160	158,286
<b>Construction - RWF</b>						
General Requirements/Site Work	5,674,151	1,253,034	233,965	2,637,647	37,260	1,512,245
Turnout Structure/Meter Vault	901,540	289,800	84,318	3,795	19,044	504,583
Raw Water Inlet Structure	5,101,990	-	172,086	1,076,814	1,535,250	2,317,840
Raw Water Pumping Station	4,686,900	398,930	56,166	569,325	1,451,070	2,211,409
90" Raw Water Pipeline	10,447,014	52,578	105,156	207,000	151,800	9,930,480
<b>Total</b>	<b>\$ 184,943,139</b>	<b>\$ 13,830,631</b>	<b>\$ 7,451,807</b>	<b>\$ 50,795,018</b>	<b>\$ 23,967,850</b>	<b>\$ 88,897,833</b>

(1) Costs are expressed as of December 31, 2000.

**City of Phoenix - Lake Pleasant Project**  
**Revised DBB Benchmark Analysis (9/30/02)**  
**Annual Capital Replacement Costs**

**Schedule 8**

<u>Fiscal Year</u>	<u>Estimated Annual Replacement Costs (1)</u>
2006-07	\$ -
2007-08	-
2008-09	-
2009-10	-
2010-11	-
2011-12	-
2012-13	-
2013-14	-
2014-15	-
2015-16	-
2016-17	11,236,198
2017-18	-
2018-19	-
2019-20	-
2020-21	-
2021-22	-

(1) The annual replacement costs are based on replacing the 10-year assets from Schedule 7. It has been assumed that all replacement will take place in Year 10, so the total from Schedule 7 has been escalated by 2.6% accordingly.

City of Phoenix - Lake Pleasant Project  
 Revised DBB Benchmark Analysis (9/30/02)  
 Operation and Maintenance (O&M) Costs (1)

Schedule 9

Average Annual Production (in MGD) FY 2006-07 to FY 2011-12	Cost (2)			
	40	50	60	70
<b>Direct O&amp;M</b>				
Personal Services	\$ 1,155,000	\$ 1,155,000	\$ 1,155,000	\$ 1,155,000
Utilities				
Gas	300,000	375,000	450,000	525,000
Fuel (for generators)	151,000	151,000	151,000	151,000
Commodities				
Make-up carbon	441,000	557,000	677,000	809,000
UV bulb replacements	30,000	45,000	45,000	60,000
Chemicals (3)	1,257,000	1,571,000	1,886,000	2,200,000
Professional and contract services	200,000	200,000	200,000	200,000
Residuals management	69,000	86,000	104,000	121,000
Maintenance and repair (non-capital)	400,000	450,000	500,000	550,000
Sewer User Fees	152,000	152,000	152,000	152,000
Miscellaneous Direct Charges	735,286	735,286	735,286	735,286
<b>Total - Direct O&amp;M</b>	<b>\$ 4,890,286</b>	<b>\$ 5,477,286</b>	<b>\$ 6,055,286</b>	<b>\$ 6,658,286</b>
<b>Administrative &amp; Oversight</b>				
City Departmental	\$ 609,043	\$ 609,043	\$ 609,043	\$ 609,043
Water Department	1,331,885	1,331,885	1,331,885	1,331,885
Water Division	622,983	622,983	622,983	622,983
<b>Total - Administrative &amp; Oversight</b>	<b>\$ 2,563,911</b>	<b>\$ 2,563,911</b>	<b>\$ 2,563,911</b>	<b>\$ 2,563,911</b>
<b>Total O&amp;M</b>	<b>\$ 7,454,197</b>	<b>\$ 8,041,197</b>	<b>\$ 8,619,197</b>	<b>\$ 9,222,197</b>
<b>After FY 2011-12</b>				
<b>Direct O&amp;M</b>				
Personal Services	\$ 1,155,000	\$ 1,155,000	\$ 1,155,000	\$ 1,155,000
Utilities				
Gas	300,000	375,000	450,000	525,000
Fuel (for generators)	151,000	151,000	151,000	151,000
Commodities				
Make-up carbon	441,000	557,000	677,000	809,000
UV bulb replacements	30,000	45,000	45,000	60,000
Chemicals (3)	1,249,000	1,562,000	1,874,000	2,186,000
Professional and contract services	200,000	200,000	200,000	200,000
Residuals management	69,000	86,000	104,000	121,000
Maintenance and repair (non-capital)	400,000	450,000	500,000	550,000
Sewer User Fees	152,000	152,000	152,000	152,000
Miscellaneous Direct Charges	735,286	735,286	735,286	735,286
<b>Total - Direct O&amp;M</b>	<b>\$ 4,882,286</b>	<b>\$ 5,468,286</b>	<b>\$ 6,043,286</b>	<b>\$ 6,644,286</b>
<b>Administrative &amp; Oversight</b>				
City Departmental	\$ 609,043	\$ 609,043	\$ 609,043	\$ 609,043
Water Department	1,331,885	1,331,885	1,331,885	1,331,885
Water Division	622,983	622,983	622,983	622,983
<b>Total - Administrative &amp; Oversight</b>	<b>\$ 2,563,911</b>	<b>\$ 2,563,911</b>	<b>\$ 2,563,911</b>	<b>\$ 2,563,911</b>
<b>Total O&amp;M</b>	<b>\$ 7,446,197</b>	<b>\$ 8,032,197</b>	<b>\$ 8,607,197</b>	<b>\$ 9,208,197</b>

- (1) Electricity is not included in this schedule because it is developed individually for each year based on monthly demand.
- (2) Costs are expressed as of December 31, 2000.
- (3) Chemical dosages and costs are provided in Schedule 10.

**City of Phoenix - Lake Pleasant Project**  
**Revised DBB Benchmark Analysis (9/30/02)**  
**Chemical Dosage and Cost**

**Schedule 10**

<u>Chemicals</u>	<u>Dosage</u> <u>(mg/L) (1)</u>	<u>Material</u> <u>Unit Cost</u>	<u>Daily Cost</u>			
			<u>40 MGD</u>	<u>50 MGD</u>	<u>60 MGD</u>	<u>70 MGD</u>
<b>FY 2006-07 to FY 2011-12</b>						
Chlorine (bulk)	2.50	\$ 0.063	\$ 74	\$ 92	\$ 110	\$ 129
25% Sodium Hydroxide	2.00	0.050	133	167	200	234
40% Ferric Chloride	10.00	0.169	1,409	1,762	2,114	2,467
93% Sulfuric Acid	2.00	0.017	12	15	18	21
Coagulant Aid Polymer	0.50	0.254	42	53	64	74
25% Hydrofluosilicic Acid	0.70	0.457	427	534	640	747
Filter Aid Polymer	0.05	0.690	12	14	17	20
25% Sodium chlorite	2.00	0.500	1,334	1,668	2,002	2,335
<i>Daily Total</i>			\$ 3,444	\$ 4,305	\$ 5,166	\$ 6,027
<b>Annual Total</b>			<b>\$ 1,257,000</b>	<b>\$ 1,571,000</b>	<b>\$ 1,886,000</b>	<b>\$ 2,200,000</b>
<b>After FY 2011-12</b>						
Chlorine (bulk)	2.50	\$ 0.063	\$ 53	\$ 66	\$ 79	\$ 92
25% Sodium Hydroxide	2.00	0.050	133	167	200	234
40% Ferric Chloride	10.00	0.169	1,409	1,762	2,114	2,467
93% Sulfuric Acid	2.00	0.017	12	15	18	21
Coagulant Aid Polymer	0.50	0.254	42	53	64	74
25% Hydrofluosilicic Acid	0.70	0.457	427	534	640	747
Filter Aid Polymer	0.05	0.690	12	14	17	20
25% Sodium chlorite	2.00	0.500	1,334	1,668	2,002	2,335
<i>Daily Total</i>			\$ 3,423	\$ 4,278	\$ 5,134	\$ 5,990
<b>Annual Total</b>			<b>\$ 1,249,000</b>	<b>\$ 1,562,000</b>	<b>\$ 1,874,000</b>	<b>\$ 2,186,000</b>

(1) Dosage can be converted to pounds per day by multiplying by volume and conversion factor of 8.34.

**City of Phoenix - Lake Pleasant Project  
Revised DBB Benchmark Analysis (9/30/02)**

**Schedule 11**

**Calculation of Weighted Average Anticipated Electricity Demands (AEDs)**

**RWPS**

Equation:  $AED_{RWPS\ WA} = 0.05 \times AED_{RWPS60} + 0.10 \times AED_{RWPS70} + 0.75 \times AED_{RWPS80}$

Assumed AEDs	Formula		
		Coefficient	Factor
60 mgd	2,150	0.05	108
70 mgd	2,459	0.10	246
80 mgd	2,767	0.75	2,075
<b>Weighted Average AED</b>			<b>2,429</b>

**Plant Site**

Equation:  $0.95 \times AED_{Plant} + AED_{LP} + 0.10 \times AED_{HP30} + 0.10 \times AED_{HP40} + 0.50 \times AED_{HP50} + 0.05 \times AED_{HP60} + 0.05 \times AED_{HP70} + 0.10 \times AED_{HP80}$

Assumed AEDs	Formula		
		Coefficient	Factor
Plant	1,805	0.95	1,715
Low Pressure Pump	359	1.00	359
High Pressure Pump			
30 mgd	1,261	0.10	126
40 mgd	1,681	0.10	168
50 mgd	2,101	0.50	1,051
60 mgd	2,521	0.05	126
70 mgd	2,942	0.05	147
80 mgd	3,362	0.10	336
<b>Weighted Average AED</b>			<b>4,028</b>

**City of Phoenix - Lake Pleasant Project  
Revised DBB Benchmark Analysis (9/30/02)  
Projected Electricity Costs (1)**

**Schedule 12**

	FY 2006-07 (2)	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14	FY 2014-15
	40	40	40	40	40	40	50	50	50
<b>Average Production (in MGD)</b>									
<b>RWPS</b>									
<b>Demand</b>									
Charge per kW	\$ 12.93	\$ 13.32	\$ 13.72	\$ 14.13	\$ 14.55	\$ 14.99	\$ 15.44	\$ 15.90	\$ 16.38
kW per month (3)	2,429	2,429	2,429	2,429	2,429	2,429	2,429	2,429	2,429
Monthly charge	\$ 31,402	\$ 32,350	\$ 33,321	\$ 34,317	\$ 35,337	\$ 36,405	\$ 37,498	\$ 38,616	\$ 39,781
Subtotal - Annual Charge	\$ 157,012	\$ 388,195	\$ 399,853	\$ 411,802	\$ 424,042	\$ 436,866	\$ 449,980	\$ 463,386	\$ 477,375
<b>Consumption</b>									
Charge per kWh	\$ 0.0381	\$ 0.0392	\$ 0.0404	\$ 0.0416	\$ 0.0429	\$ 0.0442	\$ 0.0455	\$ 0.0468	\$ 0.0483
Annual kWh	5,547,956	13,435,341	13,457,561	13,464,968	13,464,968	13,464,968	16,153,642	16,161,049	16,183,269
Subtotal - Annual Charge	\$ 211,377	\$ 526,665	\$ 543,685	\$ 560,143	\$ 577,647	\$ 593,152	\$ 734,991	\$ 756,337	\$ 781,652
<b>Service</b>									
Charge per Service Month	\$ 2,902	\$ 2,989	\$ 3,078	\$ 3,171	\$ 3,266	\$ 3,364	\$ 3,465	\$ 3,569	\$ 3,676
Service Months	5	12	12	12	12	12	12	12	12
Subtotal - Annual Charge	\$ 14,510	\$ 35,868	\$ 36,936	\$ 38,052	\$ 39,192	\$ 40,368	\$ 41,580	\$ 42,828	\$ 44,112
Total Annual Charge - RWPS	\$ 382,899	\$ 950,729	\$ 980,474	\$ 1,009,997	\$ 1,040,881	\$ 1,072,385	\$ 1,226,551	\$ 1,262,551	\$ 1,303,139
<b>Plant Site</b>									
<b>Demand</b>									
Charge per kW	\$ 12.93	\$ 13.32	\$ 13.72	\$ 14.13	\$ 14.55	\$ 14.99	\$ 15.44	\$ 15.90	\$ 16.38
kW per month (3)	4,028	4,028	4,028	4,028	4,028	4,028	4,028	4,028	4,028
Monthly charge	\$ 52,079	\$ 53,650	\$ 55,261	\$ 56,913	\$ 58,604	\$ 60,377	\$ 62,189	\$ 64,042	\$ 65,975
Subtotal - Annual Charge	\$ 260,397	\$ 643,804	\$ 663,137	\$ 682,954	\$ 703,254	\$ 724,521	\$ 746,271	\$ 768,504	\$ 791,704
<b>Consumption</b>									
Charge per kWh	\$ 0.0381	\$ 0.0392	\$ 0.0404	\$ 0.0416	\$ 0.0429	\$ 0.0442	\$ 0.0455	\$ 0.0468	\$ 0.0483
Annual kWh	9,776,020	23,549,293	24,005,338	24,008,207	24,568,565	24,231,927	26,765,961	26,837,099	27,354,197
Subtotal - Annual Charge	\$ 372,466	\$ 923,132	\$ 969,816	\$ 998,741	\$ 1,053,991	\$ 1,071,051	\$ 1,217,851	\$ 1,255,976	\$ 1,321,208
<b>Service</b>									
Charge per Service Month	\$ 2,902	\$ 2,989	\$ 3,078	\$ 3,171	\$ 3,266	\$ 3,364	\$ 3,465	\$ 3,569	\$ 3,676
Service Months	5	12	12	12	12	12	12	12	12
Subtotal - Annual Charge	\$ 14,510	\$ 35,868	\$ 36,936	\$ 38,052	\$ 39,192	\$ 40,368	\$ 41,580	\$ 42,828	\$ 44,112
Total Annual Charge - Plant Site	\$ 647,374	\$ 1,602,804	\$ 1,669,889	\$ 1,719,747	\$ 1,796,437	\$ 1,835,940	\$ 2,005,702	\$ 2,067,308	\$ 2,157,024
<b>TOTAL</b>	<b>\$ 1,030,273</b>	<b>\$ 2,553,533</b>	<b>\$ 2,650,363</b>	<b>\$ 2,729,744</b>	<b>\$ 2,837,319</b>	<b>\$ 2,908,325</b>	<b>\$ 3,232,253</b>	<b>\$ 3,329,860</b>	<b>\$ 3,460,163</b>

(1) The costs are projected through FY 2021-22, however, only the years through FY 2014-15 are displayed.  
(2) The values for FY 2006-07 are for 5 months of operations since the plant is expected to come on line in February.  
(3) See Schedule 11.

**City of Phoenix - Lake Pleasant Project  
Revised DBB Benchmark Analysis (9/30/02)  
Projected O&M Costs**

**Schedule 13**

	FY 2006-07 (1)	FY 2007-08	FY 2008-09	FY 2009-10	FY 2010-11	FY 2011-12	FY 2012-13	FY 2013-14
	40	40	40	40	40	40	50	50
<b>Average Production (in MGD)</b>								
<b>Direct</b>								
Personal Services	\$ 574,638	\$ 1,420,504	\$ 1,463,119	\$ 1,507,013	\$ 1,552,223	\$ 1,598,790	\$ 1,646,754	\$ 1,696,156
Utilities								
Gas	149,257	368,962	380,031	391,432	403,175	415,270	534,660	550,700
Other	75,126	185,711	191,282	197,021	202,931	209,019	215,290	221,749
Commodities								
Make-up carbon	219,407	542,374	558,646	575,405	592,667	610,447	794,149	817,973
UV bulb replacements	14,926	36,896	38,003	39,143	40,317	41,527	64,159	66,084
Chemicals	625,385	1,545,951	1,592,330	1,640,100	1,689,303	1,739,982	2,227,039	2,293,850
Professional and contract services	99,504	245,975	253,354	260,955	268,783	276,847	285,152	293,707
Residuals management	34,329	84,861	87,407	90,029	92,730	95,512	122,615	126,294
Maintenance and repair (non-capital)	199,009	491,950	506,708	521,909	537,567	553,694	641,592	660,840
Sewer User Fees	75,623	186,941	192,549	198,326	204,275	210,404	216,716	223,217
Miscellaneous Direct Charges	365,821	904,308	931,438	959,381	988,162	1,017,807	1,048,341	1,079,792
Electricity (2)	1,030,273	2,553,533	2,650,363	2,729,744	2,837,319	2,908,325	3,232,253	3,329,860
<b>Total - Direct O&amp;M</b>	<b>\$ 3,463,297</b>	<b>\$ 8,567,967</b>	<b>\$ 8,845,230</b>	<b>\$ 9,110,457</b>	<b>\$ 9,409,454</b>	<b>\$ 9,677,624</b>	<b>\$ 11,028,721</b>	<b>\$ 11,360,222</b>
<b>Administrative &amp; Oversight</b>								
City Departmental	303,012	749,046	771,517	794,663	818,503	843,058	868,350	894,400
Water Department	662,642	1,638,051	1,687,192	1,737,808	1,789,943	1,843,641	1,898,950	1,955,919
Water Division	309,948	766,190	789,176	812,851	837,237	862,354	888,225	914,871
<b>Total - Administrative &amp; Oversight</b>	<b>\$ 1,275,602</b>	<b>\$ 3,153,287</b>	<b>\$ 3,247,886</b>	<b>\$ 3,345,323</b>	<b>\$ 3,445,682</b>	<b>\$ 3,549,053</b>	<b>\$ 3,655,524</b>	<b>\$ 3,765,190</b>
<b>Total O&amp;M</b>	<b>\$ 4,738,898</b>	<b>\$ 11,721,254</b>	<b>\$ 12,093,116</b>	<b>\$ 12,455,780</b>	<b>\$ 12,855,136</b>	<b>\$ 13,226,676</b>	<b>\$ 14,684,245</b>	<b>\$ 15,125,412</b>

(1) The values for FY 2006-07 are the escalated values from Schedule 9. The annual costs have been multiplied by 5/12 since the plant is expected to come on line in February.  
(2) Electricity costs are further detailed in Schedule 12.

**City of Phoenix - Lake Pleasant Project  
Revised DBB Benchmark Analysis (9/30/02)  
Projected O&M Costs - Continued**

**Schedule 13**

	FY 2014-15	FY 2015-16	FY 2016-17	FY 2017-18	FY 2018-19	FY 2019-20	FY 2020-21	FY 2021-22
	50	50	60	60	60	60	60	70
<b>Average Production (in MGD)</b>								
<b>Direct</b>								
Personal Services	\$ 1,747,041	\$ 1,799,452	\$ 1,853,436	\$ 1,909,039	\$ 1,966,310	\$ 2,025,299	\$ 2,086,058	\$ 2,148,640
Utilities								
Gas	567,221	584,238	722,118	743,781	766,095	789,078	812,750	976,655
Other	228,401	235,253	242,311	249,580	257,067	264,779	272,723	280,904
Commodities								
Make-up carbon	842,512	867,788	1,086,386	1,118,978	1,152,547	1,187,124	1,222,737	1,504,978
UV bulb replacements	68,067	70,109	72,212	74,378	76,609	78,908	81,275	111,618
Chemicals	2,362,665	2,433,545	3,007,220	3,097,436	3,190,360	3,286,070	3,384,652	4,066,604
Professional and contract services	302,518	311,593	320,941	330,570	340,487	350,701	361,222	372,059
Residuals management	130,083	133,985	166,889	171,896	177,053	182,365	187,836	225,096
Maintenance and repair (non-capital)	680,665	701,085	802,353	826,424	851,217	876,753	903,056	1,023,162
Sewer User Fees	229,914	236,811	243,915	251,233	258,770	266,533	274,529	282,765
Miscellaneous Direct Charges	1,112,185	1,145,551	1,179,917	1,215,315	1,251,774	1,289,328	1,328,007	1,367,848
Electricity (2)	3,460,163	3,546,545	3,961,773	4,066,815	4,172,912	4,301,407	4,859,995	5,396,183
<b>Total - Direct O&amp;M</b>	<b>\$ 11,731,436</b>	<b>\$ 12,065,956</b>	<b>\$ 13,659,472</b>	<b>\$ 14,055,445</b>	<b>\$ 14,461,201</b>	<b>\$ 14,898,345</b>	<b>\$ 15,774,841</b>	<b>\$ 17,756,511</b>
<b>Administrative &amp; Oversight</b>								
City Departmental	921,232	948,869	977,335	1,006,655	1,036,855	1,067,960	1,099,999	1,132,999
Water Department	2,014,596	2,075,034	2,137,285	2,201,404	2,267,446	2,335,469	2,405,533	2,477,699
Water Division	942,318	970,587	999,705	1,029,696	1,060,587	1,092,404	1,125,176	1,158,932
<b>Total - Administrative &amp; Oversight</b>	<b>\$ 3,878,146</b>	<b>\$ 3,994,490</b>	<b>\$ 4,114,325</b>	<b>\$ 4,237,755</b>	<b>\$ 4,364,887</b>	<b>\$ 4,495,834</b>	<b>\$ 4,630,709</b>	<b>\$ 4,769,630</b>
<b>Total O&amp;M</b>	<b>\$ 15,609,582</b>	<b>\$ 16,060,446</b>	<b>\$ 17,773,797</b>	<b>\$ 18,293,200</b>	<b>\$ 18,826,088</b>	<b>\$ 19,394,179</b>	<b>\$ 20,405,549</b>	<b>\$ 22,526,141</b>

(1) The values for FY 2006-07 are the escalated values from Schedule 9. The annual costs have been multiplied by 5/12 since the plant is expect to come on line in February.  
(2) Electricity costs are further detailed in Schedule 12.