

**Table B-1
City of Garden Grove - Water Division
Water Rate Study**

Water System Cost-of-Service Analysis, FY 17/18 - Functionalization Factors

Line No.	Functionalization Factors	Total	Pumping	Storage	T&D	Customer	Meter	Admin	Rate Tier Calculation	Fire Protection	Notes
1	Direct: Pumping	100.0%	100.0%								Direct: Pumping
2	Direct: Storage	100.0%		100.0%							Direct: Storage
3	Direct: T&D	100.0%			100.0%						Direct: T&D
4	Direct: Customer	100.0%				100.0%					Direct: Customer
5	Direct: Meter	100.0%					100.0%				Direct: Meter
6	Direct: Admin	100.0%						100.0%			Direct: Admin
7	Direct: Rate Tier Calculation	100.0%							100.0%		Direct: Rate Tier Calculation
8	Direct: Fire Protection	100.0%								100.0%	Direct: Fire Protection
9	Direct: Wells, Reservoirs	100.0%	50.0%		50.0%						Direct: Wells, Reservoirs
10	Direct: Water Master Plan	100.0%	25.0%	25.0%	50.0%					25.0%	Direct: Water Master Plan
11	Direct: T&D and Customer	100.0%			50.0%	50.0%					Direct: T&D and Customer
12	Debt Service: % (2)	100.0%	8.7%	41.7%	31.9%	0.0%	8.8%	0.0%	7.3%	1.6%	Debt Service
13	Recurring Capital After CA Year 5 (3)	100.0%	5.3%	46.2%	10.3%	0.0%	32.3%	0.0%	0.0%	6.0%	Recurring Capital After CA Year 5
14	Package 3700 Labor: (4)	100.0%	15.7%	3.8%	43.7%	15.3%	2.6%	0.0%	18.4%	0.5%	Package 3700 Labor
15	Package 3114 - Drainage/Misc Maintenance (5)	100.0%			50.0%	50.0%					Package 3114
16	Package 3700 Contractual Expense		12.3%	2.9%	34.2%	20.5%	2.1%	13.3%	14.4%	0.4%	Package 3700 Contractual Expense
17	Materials and Supplies, Amount	\$709,906	\$98,951	\$23,697	\$274,726	\$96,237	\$16,553	\$0	\$196,642	\$3,100	
18	Materials and Supplies, Percentage	100.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	Materials and Supplies
19	Rate Revenue Requirement	100.0%	5.3%	12.8%	14.5%	7.0%	7.0%	10.1%	42.0%	1.3%	Rate Revenue Requirement
20	Phase 1 CIP, Amount	\$37,857,916	\$2,001,692	\$17,478,382	\$3,881,972	\$0	\$12,209,386	\$0	\$0	\$2,286,483	
21	Phase 1 CIP, Percentage	100.0%	5.3%	46.2%	10.3%	0.0%	32.3%	0.0%	0.0%	6.0%	Phase 1 CIP
22	Water Production, Amount (6)	\$15,246,121	\$439,147						\$14,806,974		
23	Water Production, Percentage	100.0%	2.9%	0.0%	0.0%	0.0%	0.0%	0.0%	97.1%	0.0%	Water Production

Notes for Tables B-1 through B-5

- (1) Refer to Table B-2
- (2) Refer to Table B-3
- (3) Refer to Table B-3
- (4) Refer to Table B-10
- (5) Per City staff (7/11/17), this is miscellaneous maintenance performed by the Street Department repairing trenches and sidewalks following maintenance of water system facilities.
- (6) Per City staff (7/11/17), natural gas expenses are approximately 70% booster pumping and 30% source production, and electricity expenses are 70% source production and 30% pumping.

**Table B-3
City of Garden Grove - Water Division
Water Rate Study**

Water System Cost-of-Service Analysis - Functionalization of Phase 1 CIP

Line	Project	Total Phase 1							Rate Tier Calculation	Fire Protection	Total
		Capital Spending	Pumping	Storage	T&D	Customer	Meter	Admin			
1	Replace Misc. Distribution System Appurtenances (BO,ARV, Vac)	\$286,232			100%						100%
2	Service Line Replacements	7,068,075					100%				100%
3	Fire Hydrant Replacements	1,866,270							100%		100%
4	Meter Replacements	5,141,311					100%				100%
5	Gate Valve Replacements	3,175,527			100%						100%
6	Site Modifications to Place Manually Operated Wells on SCADA	628,506	25%	25%	25%				25%		100%
7	Portable Back-up Power Units	1,047,510	100%								100%
8	Reservoir Rehabilitations _ Near Term West Haven Reservoir Projects	4,599,808		100%							100%
9	Reservoir Rehabilitations_Trask Reservoirs Medium and High Priorities	1,055,106		100%							100%
10	Reservoir Rehabilitations_Trask Reservoirs Low Priorities	1,943,366		100%							100%
11	Trast Reservoir Site Mechanical and Security - High and Medium Prio	183,763		100%							100%
12	Reservoir Rehabilitations - Magnolia Reservoir Medium and High Prio	549,598		100%							100%
13	Reservoir Rehabilitations Magnolia Reservoir Low Priorities	1,691,723		100%							100%
14	Magnolia Reservoir Site Mechanical and Security - High and Medium P	113,874		100%							100%
15	Magnolia Reservoir Site Mechanical and Security - Low Priority	3,383		100%							100%
16	Reservoir Rehabilitations West Garden Grove Reservoir Medium and H	988,389		100%							100%
17	Reservoir Rehabilitations West Garden Grove Reservoir Low Priorities	3,171,980		100%							100%
18	West Garden Grove Reservoir Site Mechanical and Security - High & M	64,708		100%							100%
19	Reservoir Rehabilitations Lampson Reservoir Medium and High Prio	1,513,246		100%							100%
20	Reservoir Rehabilitations _ Lampson Reservoir Low Priorities	338,345		100%							100%
21	Lampson Reservoir Site Mechanical and Security - High & Medium Prio	55,247		100%							100%
22	Exhaust Stack Corrections	22,129	100%								100%
23	West GG Sumps	511,840	100%								100%
24	Underground Vault Rehabilitation	785,633		100%							100%
25	Asset Management Study	327,347	25%	25%	25%				25%		100%
26	Masterplan Update	550,000	25%	25%	25%				25%		100%
27	Cyber Security	175,000	25%	25%	25%				25%		100%
	Total	\$37,857,916	\$2,001,692	\$17,478,382	\$3,881,972	\$0	\$12,209,386	\$0	\$0	\$2,286,483	\$37,857,916
	As Percent		5%	46%	10%	0%	32%	0%	0%	6%	100%

Note: functionalization percentages developed by FG Solutions based on project descriptions provided by West Yost and the City, and conversations with West Yost and the City.

**Table B-4
City of Garden Grove - Water Division
Water Rate Study**

Water System Cost-of-Service Analysis, FY 17/18 - Functionalization of Debt Service Payments

Line	Debt Issuance (1)	Five Year Total, \$	Pumping	Storage	T&D	Customer	Meter	Admin	Rate Tier Calculation	Fire Protection	Total
1	Existing Debt (1)										
2	Revenue Bond 2010A	\$4,554,263	10%	40%	40%				10%		100%
3	Revenue Bond 2010B	\$1,291,744	10%	40%	40%				10%		100%
4	Revenue Bond 2010C	\$1,020,643	10%	40%	40%				10%		100%
5	Revenue and Refunding Bonds 2015	\$5,019,850	10%	40%	40%				10%		100%
6	2010 Bonds Premium Amortization	\$24,263	10%	40%	40%				10%		100%
7	2015 Bonds Premium Amortization	\$74,236	10%	40%	40%				10%		100%
8											
9	Future Debt										
10	Revenue Bond	\$4,482,536	5.3%	46.2%	10.3%	0.0%	32.3%	0.0%	0.0%	6.0%	100%
11	Total	\$16,467,533	\$1,435,508	\$6,863,513	\$5,253,641	\$0	\$1,445,642	\$0	\$1,198,500	\$270,729	
12	As Percent	100%	8.7%	41.7%	31.9%	0.0%	8.8%	0.0%	7.3%	1.6%	

Notes:

(1) Refer to Table B-11 for a description of how functionalization percentages were developed.

Table B-5
City of Garden Grove - Water Division
Water Rate Study

Water System Cost-of-Service Analysis, FY 17/18 - Functionalization of O & M Expenses

Line No.	FY 17/18 Total	Table B-1								Line No. Reference	Functionalization Factor	
		Pumping	Storage	T&D	Customer	Meter	Admin	Rate Tier Calculations	Fire Protection			
1	Salaries and Wages											
2	0010 - CITY COUNCIL	\$12,059	\$0	\$0	\$0	\$0	\$0	\$12,059	\$0	\$0	6	Direct: Admin
3	0020 - MANAGEMENT	79,985	0	0	0	0	0	79,985	0	0	6	Direct: Admin
4	0023 - RESRCH/LEGISLATION	60,936	0	0	0	0	0	60,936	0	0	6	Direct: Admin
5	0030 - REAL PROPERTY	7,473	0	0	0	0	0	7,473	0	0	6	Direct: Admin
6	0053 - REPROGRAPHICS	0	0	0	0	0	0	0	0	0	6	Direct: Admin
7	0060 - PUBLIC INFORMATION	0	0	0	0	0	0	0	0	0	6	Direct: Admin
8	1020 - GENERAL ACCOUNTING	51,859	0	0	0	0	0	51,859	0	0	6	Direct: Admin
9	1021 - FINANCIAL PLANNING	171,724	0	0	0	0	0	171,724	0	0	6	Direct: Admin
10	1030 - UTILITY BILLING	481,387	0	0	0	0	0	481,387	0	0	6	Direct: Admin
11	2160 - PLAN CHECK/PERMITS	33,328	0	0	0	0	0	33,328	0	0	6	Direct: Admin
12	3000 - PUBL WORKS GEN ADMN	60,027	0	0	0	0	0	60,027	0	0	6	Direct: Admin
13	3010 - ENVIRONMENTAL MGMT	47,469	0	0	0	0	0	47,469	0	0	6	Direct: Admin
14	3043 - NPDES PROGRAM	23,769	0	0	0	0	0	23,769	0	0	6	Direct: Admin
15	3114 - DRAINAGE/MISC MAINT	297,940	0	0	148,970	148,970	0	0	0	0	15	Package 3114
16	3121 - TRAFFIC SIGN MAINT	0	0	0	0	0	0	0	0	0	14	Package 3700 Labor
17	3123 - TRAFFIC SIG MAINT	0	0	0	0	0	0	0	0	0	14	Package 3700 Labor
18	3220 - DEDICATED FAC/WTR	75,374	11,862	2,841	32,934	11,537	1,984	0	13,844	372	14	Package 3700 Labor
19	3510 - GROUNDS MAINTENANCE	316,624	0	316,624	0	0	0	0	0	0	2	Direct: Storage
20	3610 - EQ SERV OPERATIONS	0	0	0	0	0	0	0	0	0	14	Package 3700 Labor
21	3700 - WATER OPERATIONS	4,056,499	638,401	152,883	1,772,455	620,893	106,795	0	745,071	20,000	14	Package 3700 Labor
22	3710 - WATER PRODUCTION	0	0	0	0	0	0	0	0	0	14	Package 3700 Labor
23	6007 - EMPLOYEE TRAINING	0	0	0	0	0	0	0	0	0	6	Direct: Admin
24	9800 - GASB68 WATER FUND	0	0	0	0	0	0	0	0	0	14	Package 3700 Labor
25	9807 - OPEB WATER FUND	0	0	0	0	0	0	0	0	0	14	Package 3700 Labor
26	- OPEB ALLOC ADJ	0	0	0	0	0	0	0	0	0	14	Package 3700 Labor
27												
28	Contractual Services											
29	0030 - REAL PROPERTY	92	0	0	92	0	0	0	0	0	3	Direct: T&D
30	0042 - ELECT/VOTER ASSIST	0	0	0	0	0	0	0	0	0	4	Direct: Customer
31	0053 - REPROGRAPHICS	4,600	0	0	0	0	0	4,600	0	0	6	Direct: Admin
32	0060 - PUBLIC INFORMATION	11,500	0	0	0	11,500	0	0	0	0	4	Direct: Customer
33	1000 - FINANCE ADMN/ANAL	2,500	0	0	0	0	0	2,500	0	0	6	Direct: Admin
34	1020 - GENERAL ACCOUNTING	6,593	0	0	0	0	0	6,593	0	0	6	Direct: Admin
35	1021 - FINANCIAL PLANNING	11,116	0	0	0	0	0	11,116	0	0	6	Direct: Admin
36	1024 - ACCOUNTS PAYABLE	1,250	0	0	0	0	0	1,250	0	0	6	Direct: Admin
37	1030 - UTILITY BILLING	427,277	0	0	0	427,277	0	0	0	0	4	Direct: Customer
38	1034 - REVENUE OPERATIONS	0	0	0	0	0	0	0	0	0	6	Direct: Admin
39	2160 - PLAN CHECK/PERMITS	0	0	0	0	0	0	0	0	0	4	Direct: Customer
40	3000 - PUBL WORKS GEN ADMN	34,480	0	0	0	0	0	34,480	0	0	6	Direct: Admin
41	3010 - ENVIRONMENTAL MGMT	964	0	0	0	0	0	964	0	0	6	Direct: Admin
42	3043 - NPDES PROGRAM	314,475	0	0	0	0	0	314,475	0	0	6	Direct: Admin
43	3114 - DRAINAGE/MISC MAINT	91,822	0	0	45,911	45,911	0	0	0	0	15	Package 3114
44	3510 - GROUNDS MAINTENANCE	49,216	0	49,216	0	0	0	0	0	0	2	Direct: Storage
45	3610 - EQ SERV OPERATIONS	0	0	0	0	0	0	0	0	0	6	Direct: Admin

46	3700 - WATER OPERATIONS	1,940,746	238,776	57,182	662,936	398,007	39,944	257,749	278,673	7,480	16	Package 3700 Contractual Expense
47	3710 - WATER PRODUCTION	0	0	0	0	0	0	0	0	0	7	Direct: Rate Tier Calculation
48	WTR LTD,DEPR,O/H											
49	CONTRACTUAL SERV	0	0	0	0	0	0	0	0	0	6	Direct: Admin
50	WATER REPAIR/MAINT	0	0	0	0	0	0	0	0	0	14	Package 3700 Labor
51	BANK FEES	0	0	0	0	0	0	0	0	0	6	Direct: Admin
52	Overhead Fee	2,439,100	0	0	0	0	0	2,439,100	0	0	6	Direct: Admin
53	City Street Damages (Intercity Loan Interest)	830,140	0	0	415,070	415,070	0	0	0	0	11	Direct: T&D and Customer
54	City Street Damages (Intercity Loan Principal)	663,013	0	0	331,506	331,506	0	0	0	0	11	Direct: T&D and Customer
55	City Street Damages	719,860	0	0	359,930	359,930	0	0	0	0	11	Direct: T&D and Customer
56												
57	WATER LTD-2010A											See Table B-4
58	WATER LTD-2010B											See Table B-4
59	WATER LTD-2010C											See Table B-4
60	2015 WTR REV BONDS											See Table B-4
61	LEGAL SERVICES	0	0	0	0	0	0	0	0	0	6	Direct: Admin
62	EMPLOYEE TRAINING	3,175	500	120	1,387	486	84	0	583	16	14	Package 3700 Labor
63	800MHZ P25 RDO DEP	1,614	254	61	705	247	42	0	296	8	14	Package 3700 Labor
64	800MHZ VEH FND DEBT	4,386	690	165	1,916	671	115	0	806	22	14	Package 3700 Labor
65	INFORMATION SYSTEMS	0	0	0	0	0	0	0	0	0	6	Direct: Admin
66	ALLOW FOR BAD DEBT ADJ	0	0	0	0	0	0	0	0	0	6	Direct: Admin
67												
68	Materials & Supplies	709,906	111,723	26,755	310,188	108,659	18,690	0	130,391	3,500	14	Package 3700 Labor
69												
70	Water Production Expenses	15,246,121	439,147	0	0	0	0	0	14,806,974	0	23	Water Production
71												
72	Total	\$29,290,399	\$1,441,353	\$605,847	\$4,084,000	\$2,880,664	\$167,654	\$4,102,843	\$15,976,638	\$31,398		
73	Math Check:	\$29,290,399	this is O&M expenses									
		\$0										

Table B-6
City of Garden Grove - Water Division
Water Rate Study
Water System Cost-of-Service Analysis, FY 17/18 - Functionalization of Rate Revenue Requirement

Line No.	FY 17/18 Total	Table B-1								Line No. Reference	Functionalization Factor	
		Pumping	Storage	T&D	Customer	Meter	Admin	Rate Tier Calculations	Fire Protection			
1	O&M Expenses											
2	Water Production Expenses	\$15,246,121	\$439,147	\$0	\$0	\$0	\$0	\$14,806,974	\$0	N/A	Table B-5	
3	Other	\$14,044,278	\$1,002,206	\$605,847	\$4,084,000	\$2,880,664	\$167,654	\$4,102,843	\$1,169,664	\$31,398	N/A	Table B-5
4	Debt Service	\$2,407,164	\$209,837	\$1,003,283	\$767,958	\$0	\$211,319	\$0	\$175,192	\$39,574	N/A	Percentages from Table B-4
5	Capital Improvements	\$3,821,130	202,038	1,764,154	391,821	0	1,232,336	0	0	230,783	21	Phase 1 CIP
6	Replacement Expenditures	\$3,507,483	185,454	1,619,348	359,659	0	1,131,183	0	0	211,839	21	Phase 1 CIP
7	Less Other Revenues											
8	601 Fund											
9	32630 - WATER PROC FEE	0	0	0	0	0	0	0	0	0	6	Direct: Admin
10	32636 - LATE FEE (4)	(150,000)	0	0	0	(150,000)	0	0	0	0	4	Direct: Customer
11	32638 - AFTER HRS SERV CHG	(500)	0	0	0	0	0	(500)	0	0	6	Direct: Admin
12	32855 - NSF FEE	(4,000)	0	0	0	(4,000)	0	0	0	0	4	Direct: Customer
13	- OTHER	(25,000)	0	0	0	0	0	(25,000)	0	0	6	Direct: Admin
14	34501 - INTEREST	(56,385)	0	0	0	0	0	(56,385)	0	0	6	Direct: Admin
15	34330 - SALE OF SCRAP	(22,000)	0	0	0	0	0	(22,000)	0	0	6	Direct: Admin
16	34340 - SALE OF MATERIALS	(7,000)	0	0	0	0	0	(7,000)	0	0	6	Direct: Admin
17	38267 - 2010 FED SUBSIDY	(135,000)	(7,138)	(62,327)	(13,843)	0	(43,538)	0	0	(8,154)	21	Phase 1 CIP
18	602 Fund											
19	32650 - SERVICE INSTALL FEES	(39,000)	0	0	0	(39,000)	0	0	0	0	4	Direct: Customer
20	32652 - FRONTAGE ASSMT FEE	(6,000)	0	0	0	0	0	(6,000)	0	0	6	Direct: Admin
21	32655 - ACREAGE ASSMT FEE	(4,000)	0	0	0	0	0	(4,000)	0	0	6	Direct: Admin
22	34501 - INTEREST	(55,699)	0	0	0	0	0	(55,699)	0	0	6	Direct: Admin
23	603 Fund											
24	34501 - INTEREST	(31,900)	0	0	0	0	0	(31,900)	0	0	6	Direct: Admin
25	Change in Fund Balance	(7,007,051)	(370,489)	(3,235,041)	(718,507)	0	(2,259,812)	0	0	(423,201)	21	Phase 1 CIP
26												
27	Rate Revenue Requirement	\$31,482,642	\$1,661,055	\$1,695,264	\$4,871,088	\$2,687,664	\$439,142	\$3,894,359	\$16,151,830	\$82,239		
28												
29	Math Check Rate Revenue Requirement	31,482,642										
30	Difference	0										

**City of Garden Grove - Water Division
Water Rate Study
Table B-7
Water Cost-of-Service Analysis - Classification Factors**

Line No.	Classification Method	Base	Extra Capacity		Customer		Rate Tier Calculation	Fire Protection	
			Max Day	Max Hour	Customer	Meter			
1	Direct: Base	100%							Direct: Base
2	Direct: Max Day		100%						Direct: Max Day
3	Direct: Max Hour			100%					Direct: Max Hour
4	Direct: Customer				100%				Direct: Customer
5	Direct: Meters & Services					100%			Direct: Meters & Services
6	Direct: Rate Tier Calculation						100%		Direct: Rate Tier Calculation
7	Direct: Fire Protection							100%	Direct: Fire Protection
8	Direct: Purchased Source (1)	50%					50%		Direct: Purchased Source
9	Base and Max Day (gpm) (1)	14,258	6,416						
10	Base and Max Day: %	68.97%	31.03%						Base and Max Day
11	Weighted Average: %	32.96%	14.69%	7.79%	23.50%	3.84%	0.00%	17.22%	Weighted Average ex Rate Tier Calc
12	Base, Max Day, Max Hour (gpm) (1)	14,258	6,416	8,270					
13	Base, Max Day, Max Hour: %	49.26%	22.17%	28.57%					Base, Max Day, Max Hour
14	Storage (2)	64.20%	27.93%					7.88%	Storage
15	Administration (3)	32.96%	14.69%	7.79%	23.50%	3.84%	0.00%	17.22%	
16	Transmission and Distribution (4)	31.53%	14.19%	18.29%				36.00%	Transmission and Distribution

Notes:

- (1) Refer to Table B-11 for further details. Based on actual production data from FY 15/16 provided by RWS to FG Solutions in December 2016
- (2) Refer to Table B-11 for further details
- (3) Based on a Weighted Average of other items in Table B-7 below excluding Rate Tier Calculations
- (4) 36% allocated to fire protection, remainder is allocated based on the Base, Max Day, and Max Hour classification factor. See Table B-11 for calculation

City of Garden Grove - Water Division
Water Rate Study
Table B-8
Water Cost-of-Service Analysis - Allocation of Rate Revenue Requirement

Line No.	FY 17/18 Projection	Extra Capacity			Customer		Rate Tier	Private	Table B-6
		Base	Max Day (2)	Max Hour(2)	Customer	Meter	Calculations (1)	Fire Protection	Line No. Reference
1	Water System Expenses								
2	Pumping	\$1,661,055	\$1,145,555	\$515,500	\$0	\$0	\$0	\$0	10
3	Storage	\$1,695,264	\$1,088,287	\$473,405	\$0	\$0	\$0	\$133,573	14
4	T&D	\$4,871,088	\$1,535,713	\$691,071	\$890,713	\$0	\$0	\$1,753,592	16
5	Customer	\$2,687,664	\$0	\$0	\$0	\$2,687,664	\$0	\$0	4
6	Meter	\$439,142	\$0	\$0	\$0	\$0	\$439,142	\$0	5
7	Administration (3)	\$3,894,359	\$1,283,615	\$572,068	\$303,307	\$915,208	\$149,537	\$0	\$670,625
8	Rate Tier Calculations	\$16,151,830	\$0	\$0	\$0	\$0	\$16,151,830	\$0	6
9	Fire Protection	\$82,239	\$0	\$0	\$0	\$0	\$0	\$82,239	7
10	Reallocate Public FP (4)	\$0	\$0	\$0	\$0	\$2,230,825	\$0	(\$2,230,825)	Not Applicable
11	Total	\$31,482,642	\$5,053,170	\$2,252,044	\$1,194,020	\$3,602,872	\$2,819,504	\$16,151,830	\$409,204
12	Percent of Total	100%	16%	7%	4%	11%	9%	51%	1%
13	Check, OS	\$31,482,642							

Notes:

- (1) Refer to Table COS-5 for Functionalization totals. In particular, purchase source refers only to source costs that are not part of the Rate Tier calculations
- (2) Peaking costs associated with Max-Day and Max-Hour extra capacity are also included in the Rate Tier Calculation in Table C1
- (3) Administrative costs are based on a weighted average of other items in this table except those allocated to the Rate Tier Calculations. They are not allocated to the Rate Tier Calculation to improve the transparency of the Rate Tier Calculation
- (4) See Table B-8

City of Garden Grove
Water Division - Water Rate Study
Table B-9
Water Cost-of-Service Analysis - Re-Allocate Public Fire Protection Costs

Line			
1	Fire Protection Revenue Requirement	\$2,640,029	See Table B- 7, rows 1 through 9
2	Number of Fire Protection Equivalent Connections:	526,652	See Table B-11, Section 3
3	Annual Cost per Fire Protection Equivalent Connection	\$5.01	
4			
5	Number of Private Fire Protection Equivalent Connections:	81,631	See Table B-11, Section 3
6	Annual Revenue Requirement from Private Fire Protection Equivalent Connection:	\$409,204	
7			
8	Number of Public Fire Protection Equivalent Connection:	445,021	See Table B-11, Section 3
9	Annual Revenue Requirement from Public Fire Protection Equivalent Connection:	\$2,230,825	
10	This Revenue Will Be Recovered from Customers on a per-Meter Equivalent Basis:		
11			
12	Cost recovery by meter equivalent is proposed in this Rate Study because customers with larger meters typically have		
13	larger fire flow requirements. Cost recovery by meter equivalent is one method that is listed as possible in the		
14	AWWA M1 Manual, 7th Edition, pages 165 and 166 (Table IV.8-5.		

**City of Garden Grove - Water Division
Water Rate Study
Table B-10
Identification of Costs to be Included in Rate Tier Calculations**

Step 1. Calculate Unit Cost of Production/Purchase from Each Water Source (FY 17/18)

Line	Water Source	Production FY 17/18 AF (1)	Production FY 17/18 CCF (1,2,3)	Consumption FY 17/18 CCF (4)	FY 17/18 \$/ccf (2)	Source Water Allocated Costs
1	MWD Imported Water	5,750	2,504,700	2,226,661	\$2.97	\$6,602,908
2	Pumped Water	17,250	7,514,100	6,679,984	\$1.43	\$9,548,922
3						
4	Total	23,000	10,018,800	8,906,646		\$16,151,830

6 Notes:

- 7 (1) Refer to Table A-7 for acre-feet by source and total Water Production Cost for FY 17/18. Water production volume in ccf is calculated from the value in acre-feet.
- 8 The Source Water Production Cost equals the total water production cost less 30% of electricity costs and 70% of natural gas costs
- 9 (2) The cost for MWD Imported Water is shown in Table A-7.
- 10 (3) The cost for water pumped from the City's wells equals the total costs allocated to Rate Tier Calculations in Table B-5 minus MWD Imported Water costs.
- 11 All costs associated with the Rate Tier Calculations that are not for the purchase of MWD Imported Water are associated with production of water from local wells.
- 12 (4) The volume of metered consumption is less than the volume of source production due to non-revenue water which includes leaks. The ratio of metered consumption to
- 13 production shown in this table is calculated from the ratio of metered consumption to production observed in FY 15/16

Step 2. Define Allocation of Water Production/Purchase Costs Among Tiers (Budget-Based Rate Alternative Only)

Source	FY 17/18 \$/ccf	FY 17/18 ccf (2)	Indoor Tier ccf (2,3)	Outdoor Tier ccf (2)	Excessive Tier ccf (2)	Indoor Tier \$	Outdoor Tier \$	Excessive Tier \$	Total \$
MWD Imported Water	\$2.97	2,226,661	0	1,262,971	963,690	\$0	\$3,745,195	\$2,857,713	\$6,602,908
Recharge Assessment Pumped Water	\$1.43	6,679,984	6,026,591	653,393	0	8,614,908	934,014	0	9,548,922
Total			6,026,591	1,916,364	963,690	\$8,614,908	\$4,679,209	\$2,857,713	\$16,151,830

- 24 (1) This column represents production data. Subsequent columns showing ccf in each tier are metered consumption
- 25 (2) See Table C-1 for amounts of water estimated to be sold in each tier.
- 26 (3) Indoor tier ccf adjusted downward so that total water sold in three tiers equals recorded metered water sales.

**City of Garden Grove - Water Division
Water Rate Study
Table B-11
Supporting Calculations for Cost-of-Service Analysis**

1. Package 3700 - Labor Functionalization

Line	Position	Pumping	Storage	T&D	Customer	Meter	Admin	Rate Tier Calculation	Fire Protection	FTE Weighting	Note
1	Water Production Group	50%						50%		12.00	1
2	Water Engineering Group, Capital	5.3%	46.2%	10.3%	0.0%	32.3%	0.0%	0.0%	6.0%	3.20	2
3	Water Engineering Group, Operations	15.74%	3.77%	43.69%	15.31%	2.63%	0.00%	18.37%	0.49%	3.20	2
4	Customer Service Workers				100%					3.00	
5	Meter Readers				100%					3.00	
6	Remainder of Water Distribution Group			100%						14.00	3
7	Water Quality Group			70%				30%		4.00	4
8	Management	15.74%	3.77%	43.69%	15.31%	2.63%	0.00%	18.37%	0.49%	4.00	5
9	Total	15.74%	3.77%	43.69%	15.31%	2.63%	0.00%	18.37%	0.49%	46.40	

10

11 Notes:

- 12 (1) This group operates wells and booster stations. There are 13 wells and 15 booster pump stations. City staff said the appropriate allocation would be 50% source and 50% pumping.
 13 FTE weighting is the number of positions in the group. Source: City staff, 7/11/17
 14 (2) 8 FTEs in this group. 80% water and 80% sewer, corresponding to the ratio of water/sewer revenues (\$36M water, \$9.5M sewer) (per City staff, 7/11/17). All salaries paid from
 15 Package 3700. FTE weighting is $8 \times 80\% = 6.4$. Staff split their time between capital projects and operations projects, approximately 50/50. As an approximation, allocate the CIP portion
 16 of the group per the allocation of the Phase 1 CIP shown in Table B-1. Allocate the operations portion of the group per the FTE-weighted average of other Water Services Division employees.
 17 (3) The Water Distribution group includes the three customer service workers, the three meter readers, eight FTEs who work on replacement projects and charge their time to Fund 603,
 18 and the remaining 14 FTEs that work in the water distribution system.
 19 (4) The four employees in the Water Quality group are responsible for the City's water quality sampling and testing, and the City's backflow prevention program.
 20 Per City staff (7/11/17), approximately 70% of their time is spent in the distribution system and 30% is associated with source production.
 21 (5) The four employees are the Water Services Manager, the Principal Office Assistant, the Senior Administrative Analyst, and the Administrative Intern. Labor costs for these employees
 22 are allocated based on the FTE-weighted average of other employees in the Water Services Division that charge to the 601 Fund.
 23

24

2. Package 3700 - Contractual Expense Functionalization

25

Account	Amount	Pumping	Storage	T&D	Customer	Meter	Admin	Rate Tier Calculation	Fire Protection	Note
27 44020 - Equipment Pool Rentals	\$944,073	15.74%	3.77%	43.69%	15.31%	2.63%	0.00%	18.37%	0.49%	1
28 44040 - Information Systems	\$165,780				100.00%					2
29 44100 - Insurance Charges	\$257,749						100.00%			3
30 Remainder	\$573,144	15.74%	3.77%	43.69%	15.31%	2.63%	0.00%	18.37%	0.49%	4
31 Total	\$1,940,746	12.30%	2.95%	34.16%	20.51%	2.06%	13.28%	14.36%	0.39%	

32

33 Notes:

- 34 (1) Per City staff, 7/11/17, equipment pool rentals are fleet expenses and should be functionalized based on Package 3700 (Water Operations) labor expenses.
 35 (2) Per City staff, 7/11/17, this is primarily related to billing and will be functionalized on a per-customer basis.
 36 (3) Insurance charges, functionalized as an administrative expense
 37 (4) The remainder of Package 3700 Contractual expenses are functionalized per Package 3700 labor expenses.

**City of Garden Grove - Water Division
Water Rate Study
Table B-11
Supporting Calculations for Cost-of-Service Analysis**

38
39 **3. FY 17/18 Average and Maximum Day Water Demand**
40

41	<u>Average Day Demand</u>	23,000 acre-feet					
42		14,258 gpm	20.53 MG				
43							
44	Check from Metered Consumption Data, total FY 15/16	8,674,834 ccf					
45		19,914.68 acre-feet, compared with production of	21,518 acre-feet, resulting in			7.45% non-revenue water	
46							
47	<u>Maximum Day Demand/Average Day Ratio</u>						
48	MDD/ADD Peaking Factor	1.45	29.7709328 predicted by 23K AF/year times 1.45; 21.6AFY*1.45=	27.95879			
49	(1) Source: Garden Grove Water Master Plan, 2008, pg. 4-15, recommended value for planning purposes.		compare to, provided by City	23			
50				1.12022			
51	<u>Max Hour/Average Day Ratio</u>						
52	PHD/MDD ratio * MDD/ADD Peaking Factor	2.03					
53	(1) Source: Garden Grove Water Master Plan, 2008, pg. 4-17, Table 4.7, PHD/MDD value of 1.40. Multiplied PHD/MDD * MDD/ADD Peaking Factor						
54							

55 **4. Fire Protection Equivalents**

60	Connection	Demand	Projected	Projected	Total	Number of Equivalent Fire		
61	Size (in)	Factor (1)	FY 17/18	FY 17/18	Connections	Public	Private	Total
62			Public	Private				
63			(2)	(3)				
62	0.75	1.00	0	0	0	0	0	0
63	1	1.00	0	0	0	0	0	0
64	1.5	2.90	0	3	3	0	9	9
65	2	6.19	0	69	69	0	427	427
66	3	17.98	0	3	3	0	54	54
67	4	38.32	0	106	106	0	4,062	4,062
68	6	111.31	3,998	268	4,266	445,021	29,831	474,852
69	8	237.21	0	183	183	0	43,409	43,409
70	10	426.58	0	9	9	0	3,839	3,839
71	12	689.04	0	0	0	0	0	0
72	Total		3,998	641	4,639	445,021	81,631	526,652

73 Notes:
 74 (1) AWWA M1, page 152 (7th edition page 162); demand factor = diameter ^ 2.63; exponent based on
 75 Hazen-Williams equation for flow through pressure conduits.
 76 (2) Source: City staff via email, 7/10/17
 77 (3) Source: City staff via email, 7/10/17

**City of Garden Grove - Water Division
Water Rate Study
Table B-11
Supporting Calculations for Cost-of-Service Analysis**

78 5. Calculation: Fire Protection Demand (1), and Fire Protection Allocation for Supply, Storage, and T&D

79 Fire Demand (gpm) = $1020 * \sqrt{\text{population}} / 2 * (1 - 0.01 * \sqrt{\text{population}})$
 80 where population is in thousands
 81 Fire Protection Allocation = $\text{Fire Demand} / (\text{Fire Demand} + \text{Maximum Daily Demand})$
 82
 83 Population for Garden Grove's Water Service Area = 176,277 (2)
 84 Fire Demand (gpm) = 11,744
 85 Average Daily Demand ADD (mgd) = 20.53 (4)
 86 Ratio of Peak Hour to Average Daily Demand = 1.45 (4)
 87 Maximum Daily Demand (mgd) = 29.77
 88 Maximum Daily Demand (gpm) = 20,674
 89 Therefore, Fire Protection Allocation = 36%
 90
 91 Fire Protection Allocation for COS 36%

92 Calculation notes:

- 93 (1) Calculation based on AWWA M1 6th edition, page 143. Calculation published by the American Insurance Association,
 94 formerly National Fire Underwriters Association.
 95 (2) Source: Department of Finance, State of California, population estimate 1/1/2017. <http://dof.ca.gov/Forecasting/Demographics/Estimates/E-1/>
 96 (4) See calculation above in this worksheet
 97

98 6. Allocation of Storage to Average Day, Peak Day, and Fire Flow Components

99
 100 Methodology: Page 8-18, September 2008 Water Master Plan. Average Day Demand from FY 15/16 is used in this analysis.
 101

102 Operational Storage, 30% of Maximum Day Demand	8.93	MG, based on Maximum Day Demand Peaking Factor of 1.45
103 Fire Flow, 4 hours at 4,000 gpm in West Zone and at 6,000 gpm in East Zone	2.52	
104 Emergency Storage, 100% of Average Day Demand	20.53	MG, based on annual demand of 23,000 acre-feet
105 Additional Surplus Storage	21.02	
106 Available Storage	53.00	

108 Storage Cost Classification	MG	Avg Day Demand	Peak Day Demand	Fireflow	Total
109 Function of Reservoir Volume (1)					
110 Operational Storage	8.93		100%		100%
111 Fire Fighting Storage	2.52			100%	100%
112 Emergency Storage	20.53	100%			100%
113 Remainder (2)	21.02	64.20%	27.93%	7.88%	100%
114 Total	53.00	64.20%	27.93%	7.88%	100.00%