

## **APPENDIX-9**

# **Supply Interrupted Population and Restoration Period**

**9.1 Rate of Distribution sub main and service pipe**

**(A-9.2)**

**9.2 Water supply interrupted population of Tehran City**

**(A-9.3~14)**

**9.3 Water supply interrupted population in each reservoir  
zone system**

**(A-9.15)**

**9.4 Schedule of restoration work in simulation**

**(A-9.16~20)**

## Appendix 9.1

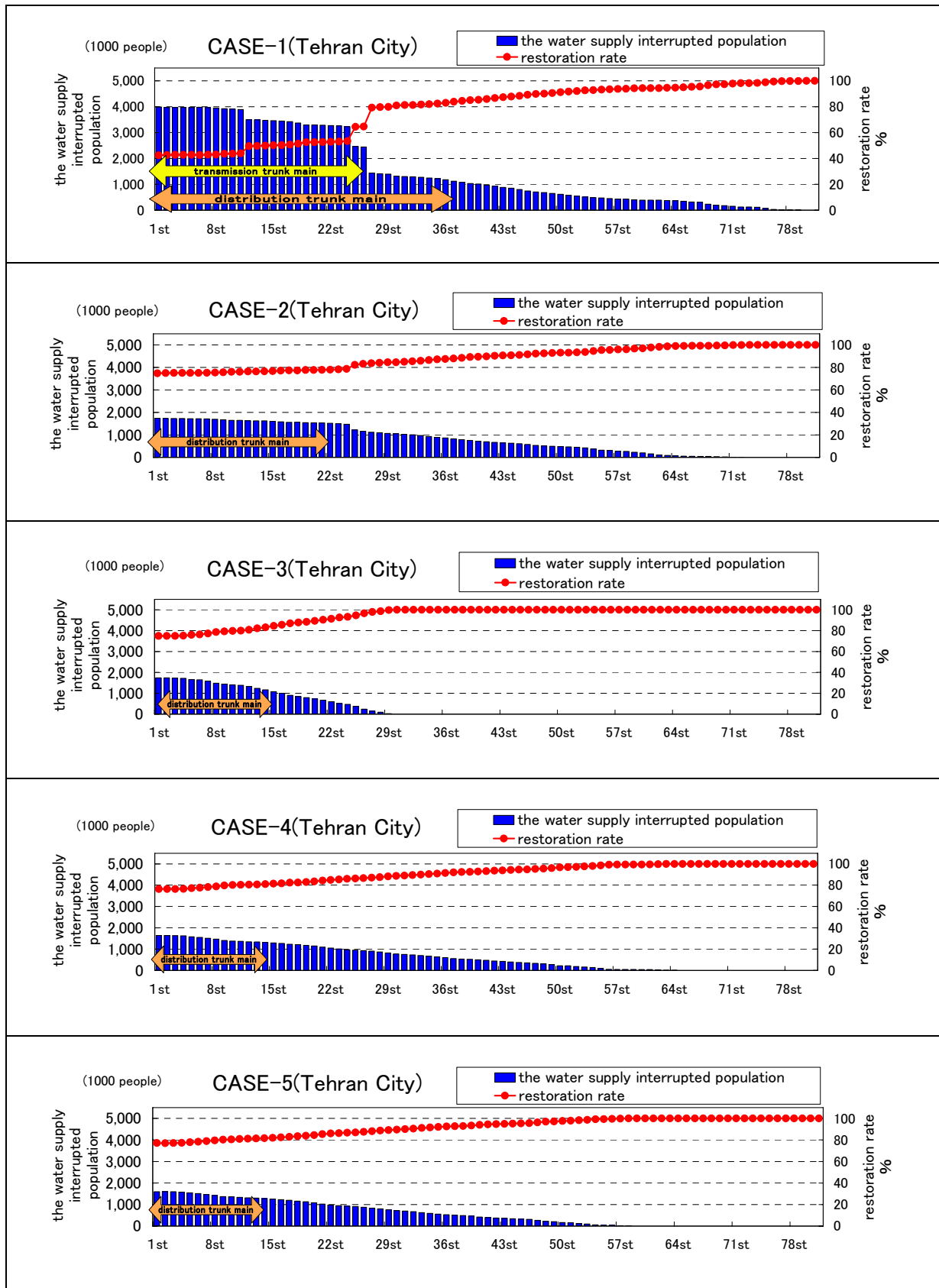
### Rate of Distribution sub main and service pipe

Earthquake name Regional name	A	B	C	D	E	Total
	Hanshin-Awaji Kobe City -East part	Hanshin-Awaji Kobe City -Central part	Hanshin-Awaji Kobe City -Tarumi	Hanshin-Awaji Kobe City - North	Hanshin-Awaji Toyonaka -City	
Distribution sub main	876	657	204	106	80	1,923
Service pipe	4,687	3,567	449	173	288	9,164
Rate	5.35	5.43	2.20	1.63	3.60	4.77

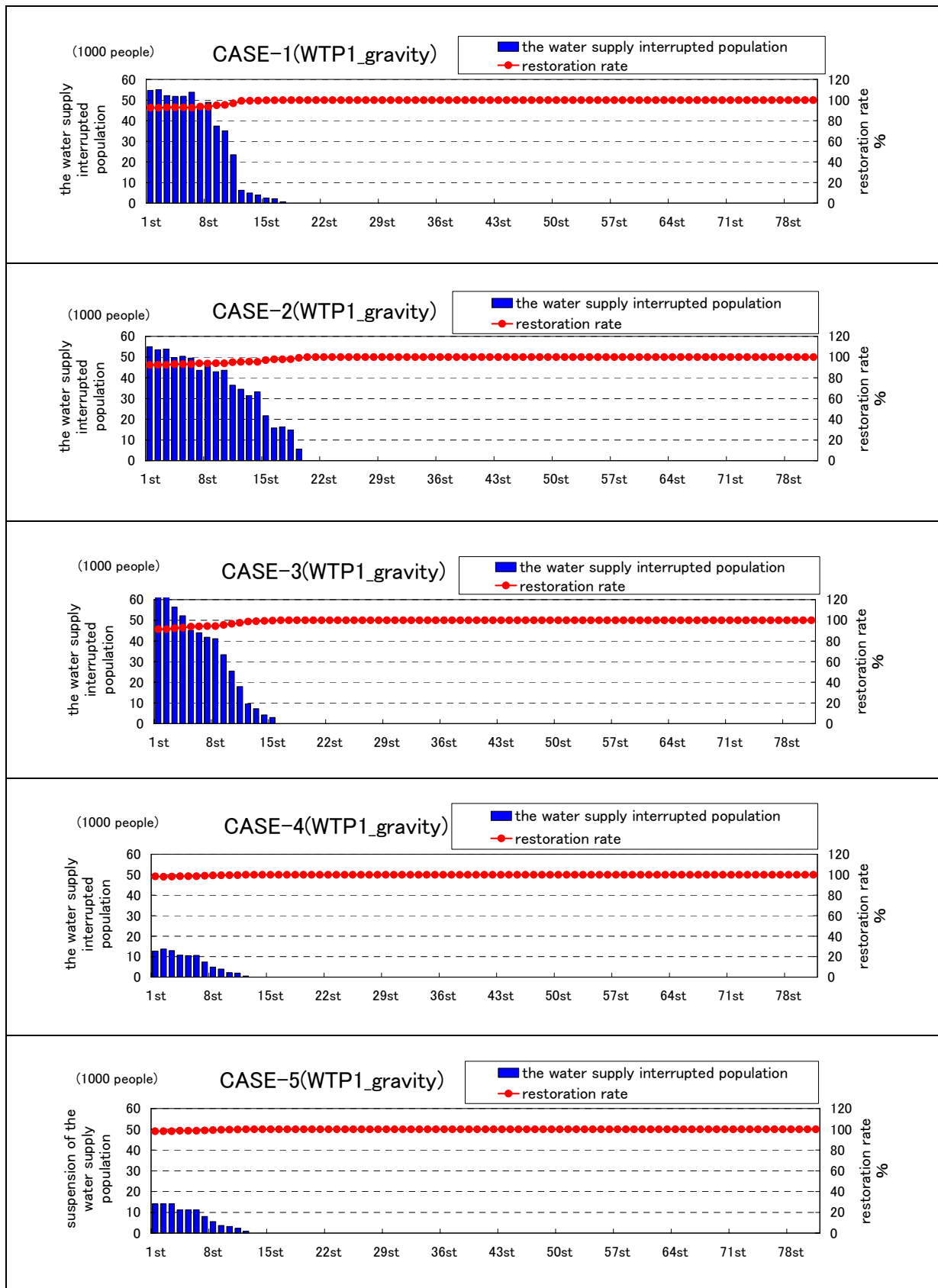
A~D: Hanshin-Awaji (Kobe) Earthquake Record of water service restoration, Kobe City waterworks bureau

E: Hanshin-Awaji (Kobe) Earthquake Damage situation and The middle verification of restoration business, Toyonaka waterworks bureau

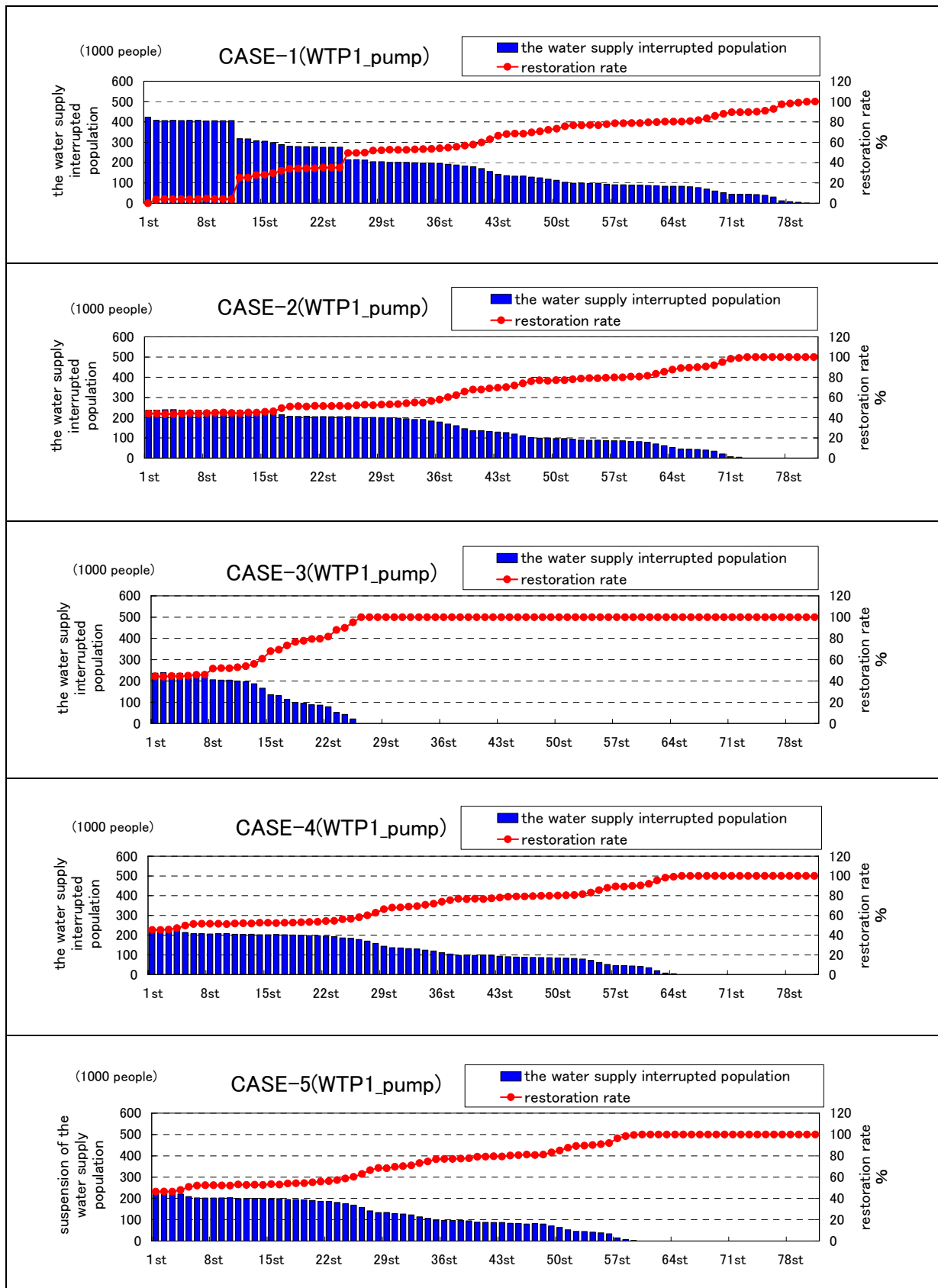
Water supply interrupted population of Tehran City



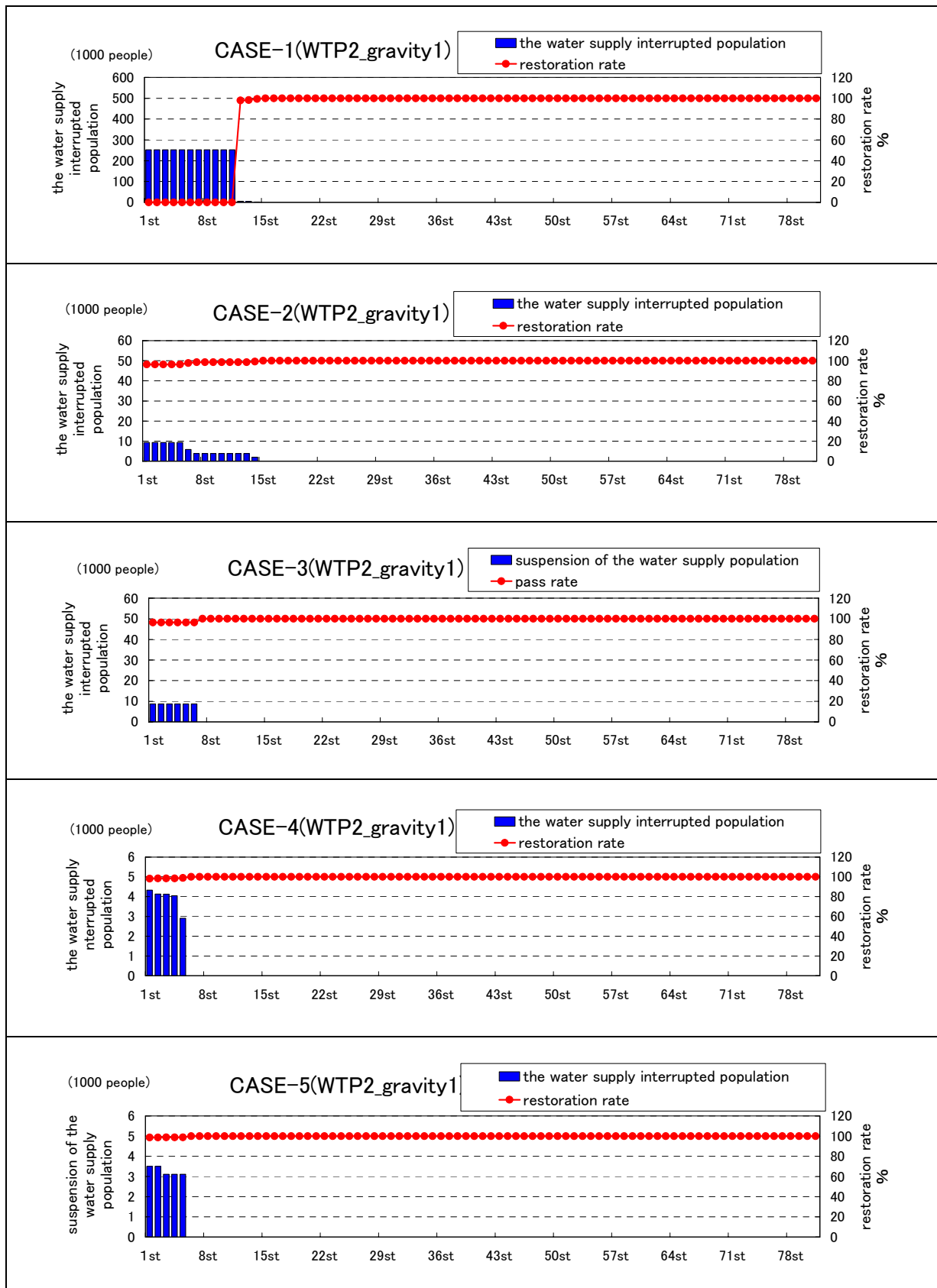
Water supply interrupted population of WTP1 - gravity



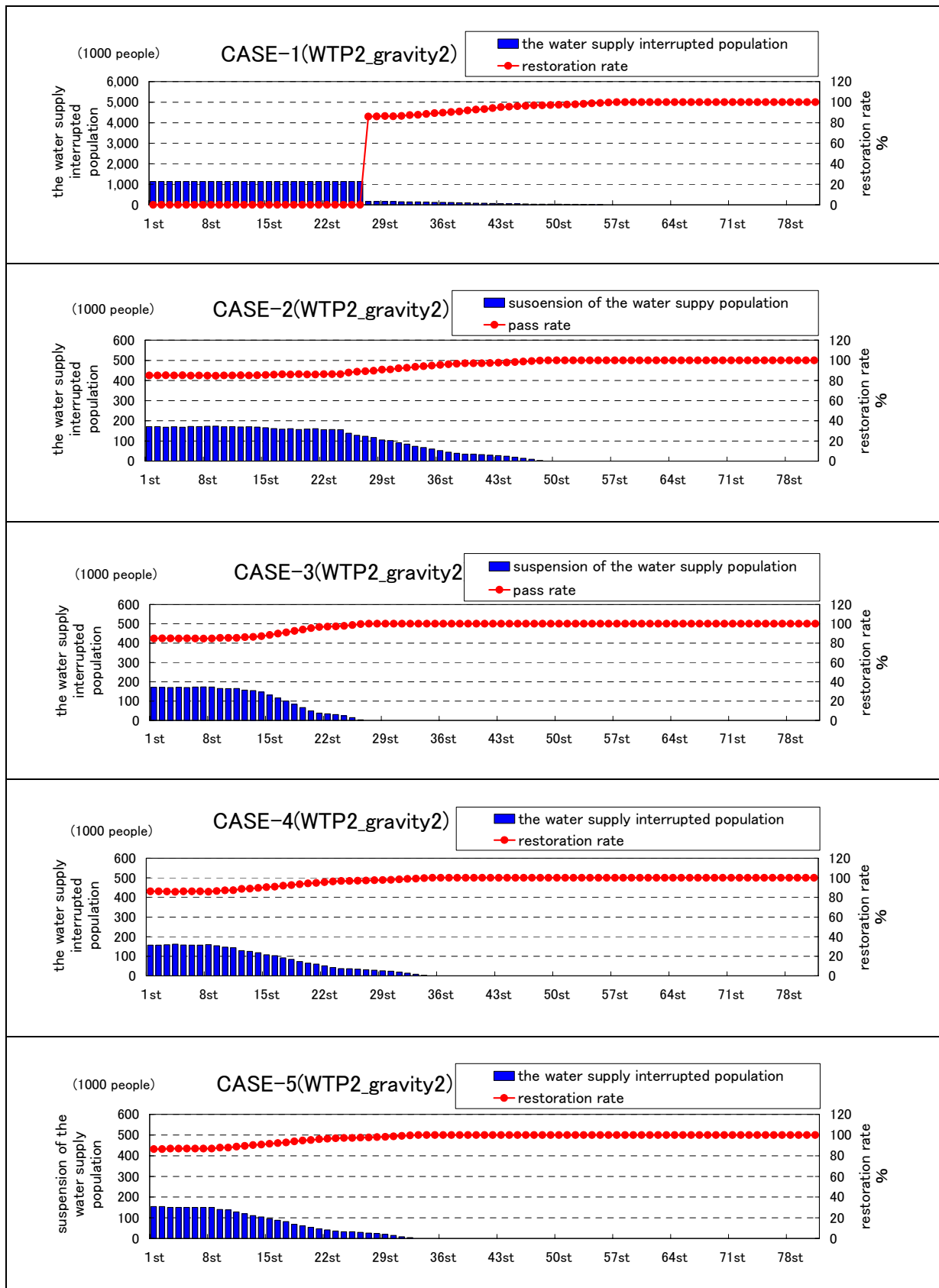
Water supply interrupted population of WTP-1- pump



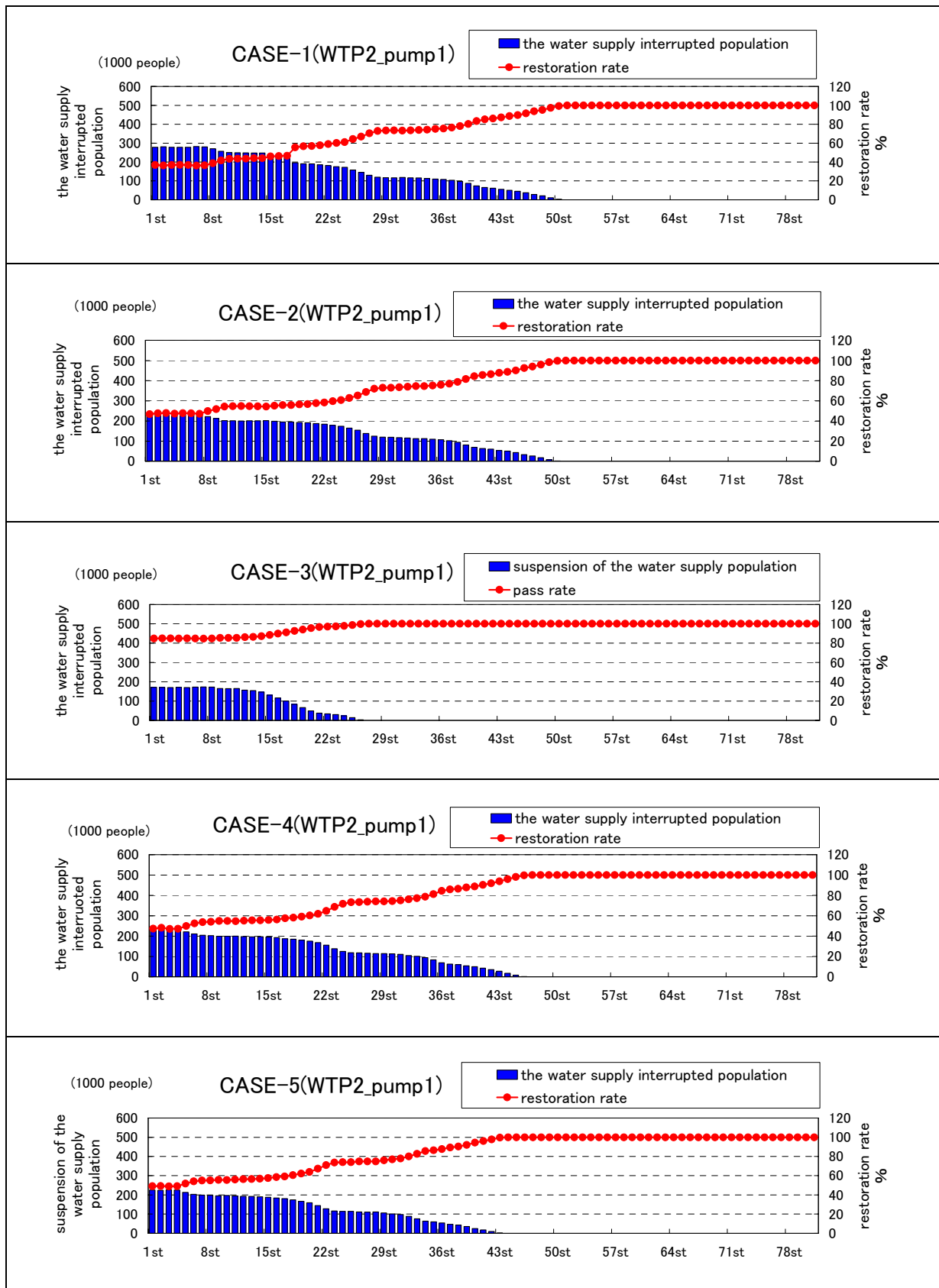
Water supply interrupted population of WTP-2 – gravity 1



Water supply interrupted population of WTP-2\_gravity2

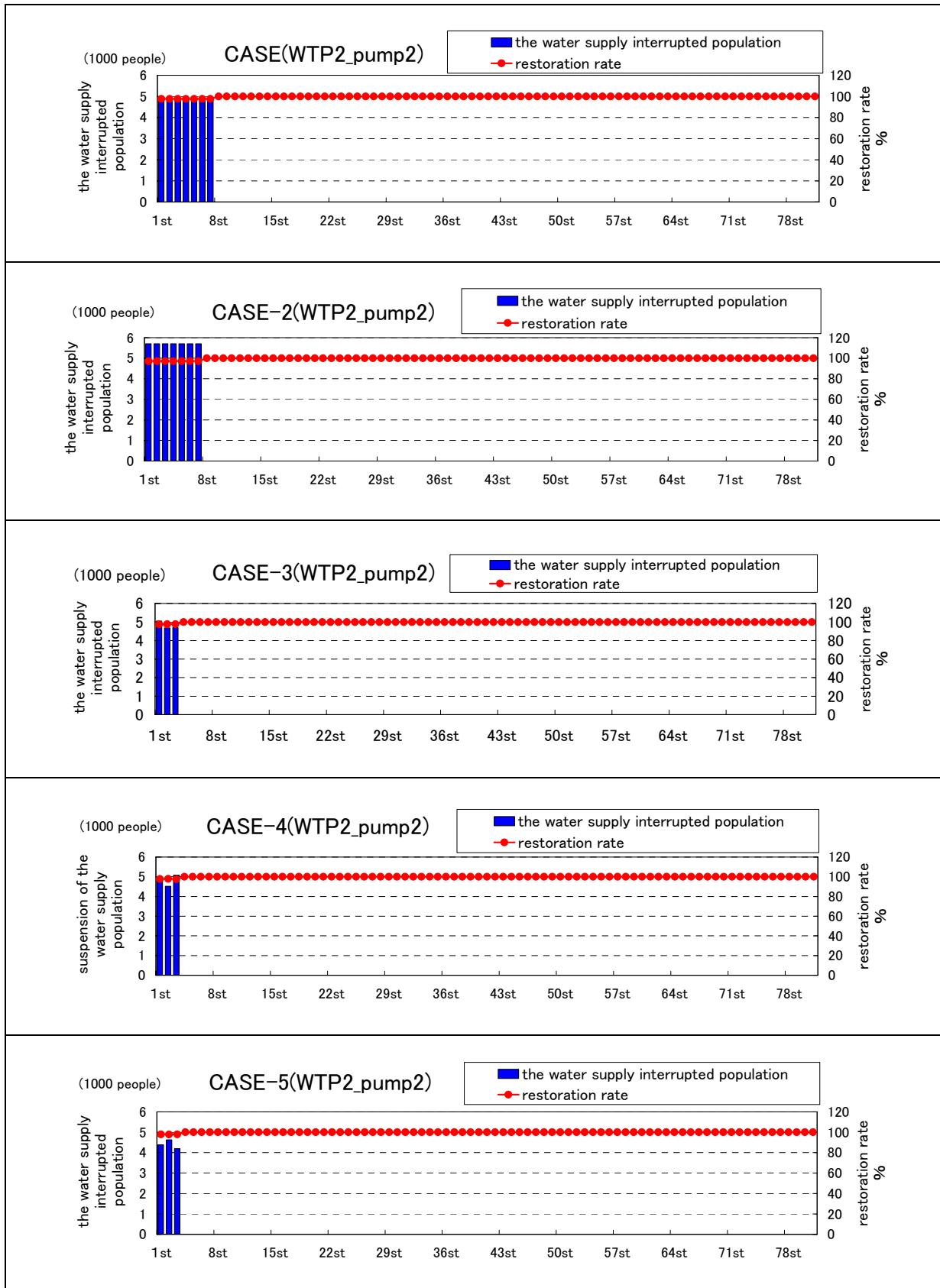


Water supply interrupted population of WTP-2 – pump 1



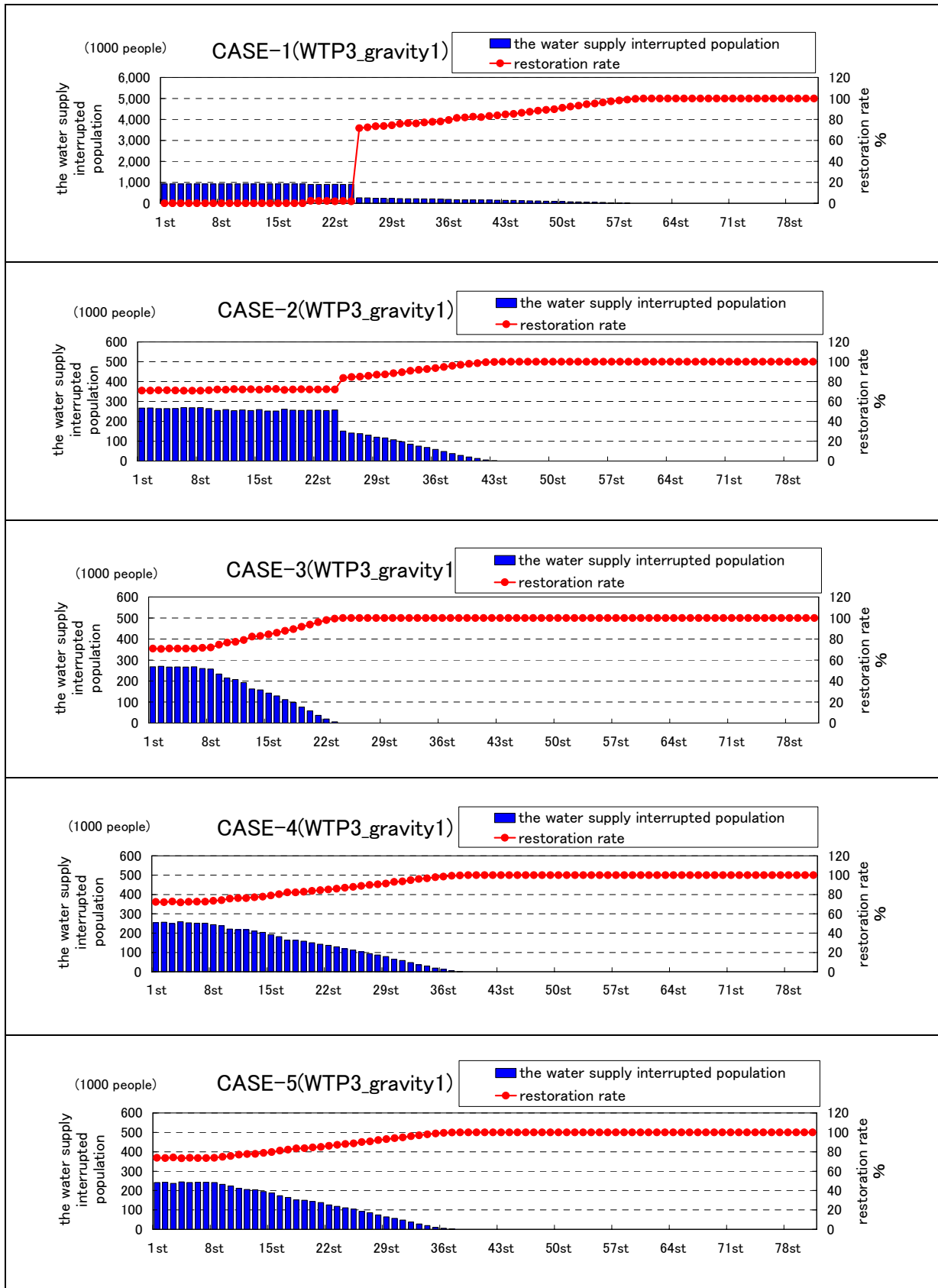


Water supply interrupted population of WTP-2 – pump 2

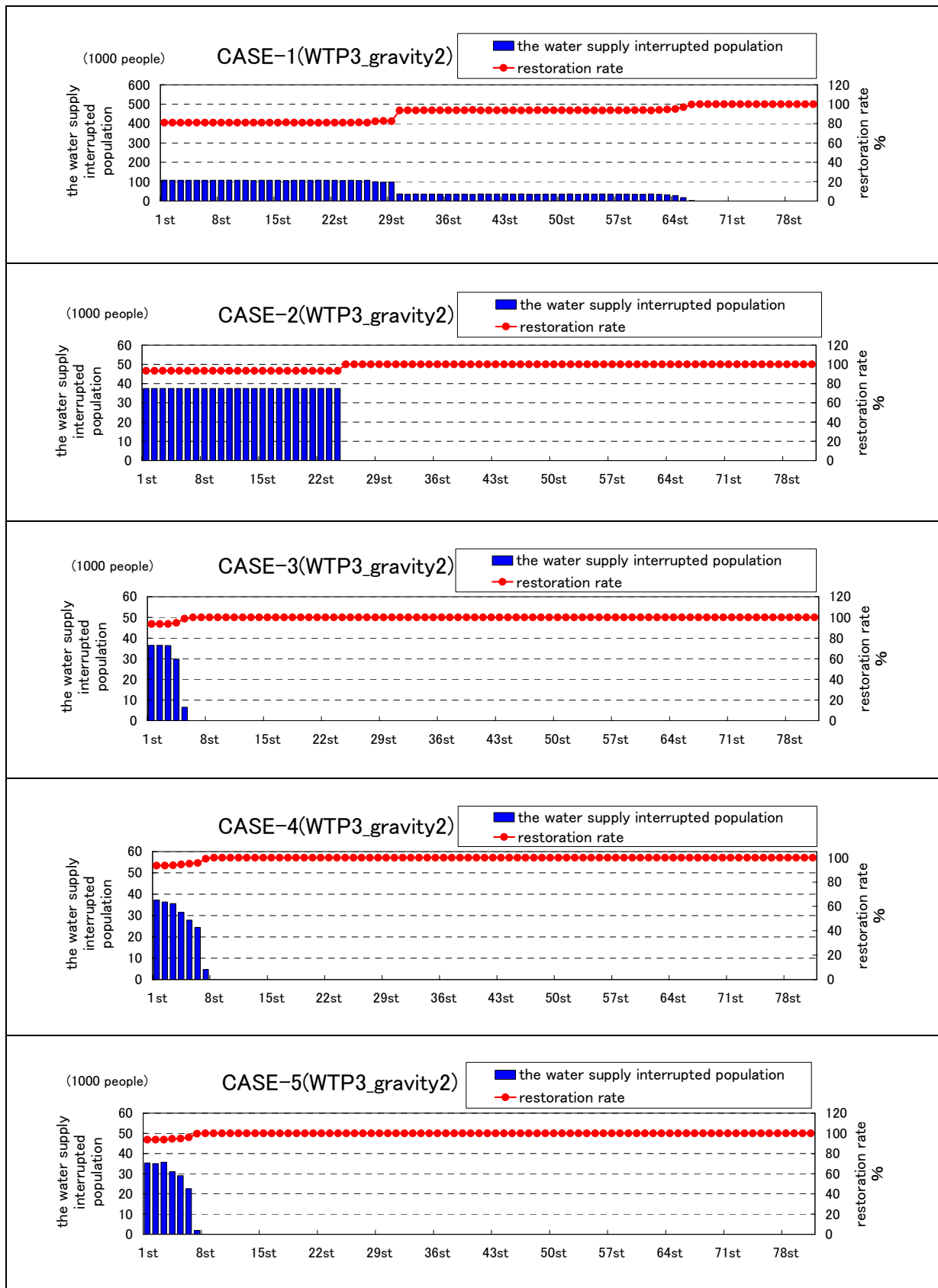


## Appendix 9.2

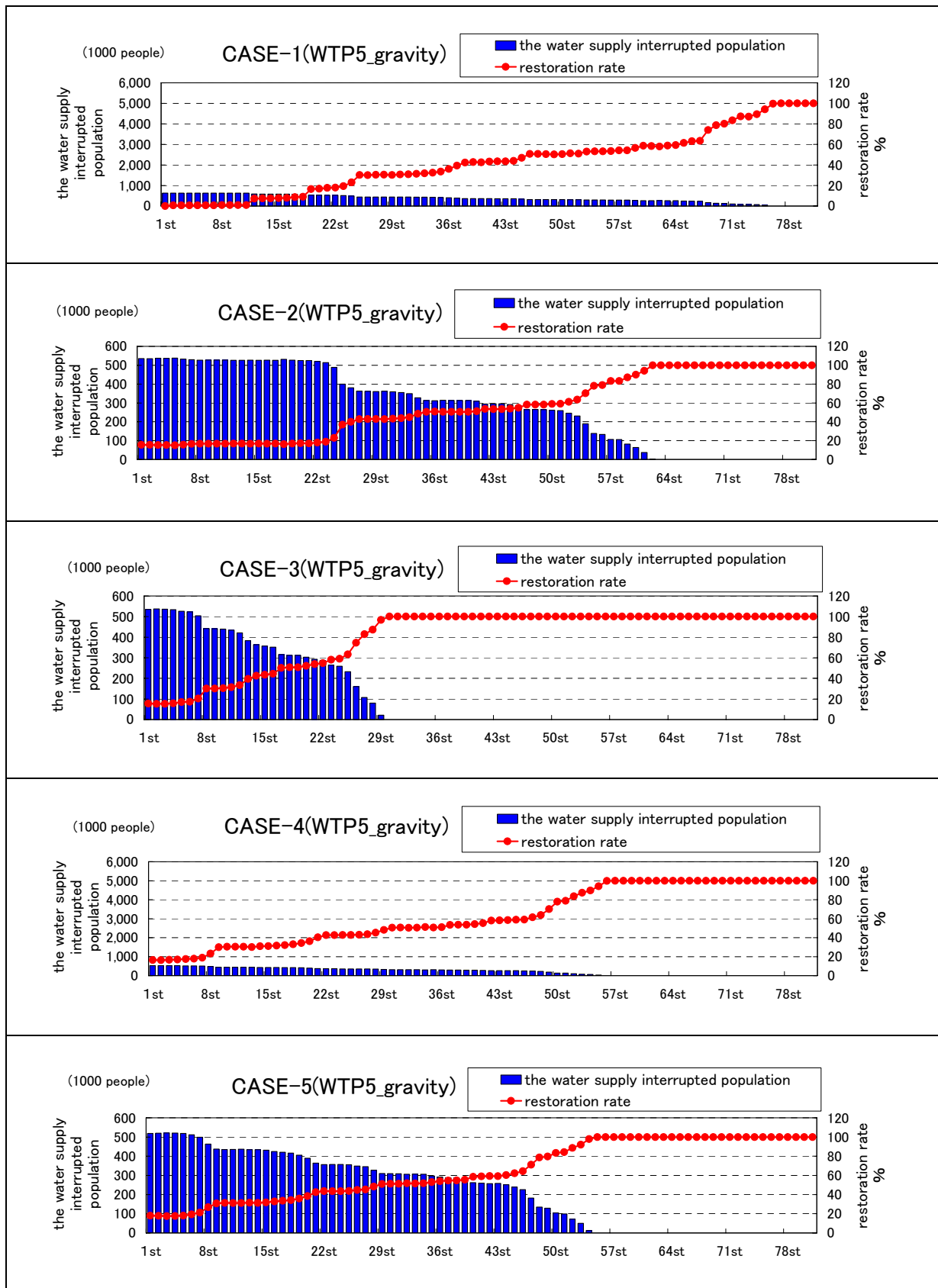
### Water supply interrupted population of WTP-3 - gravity 1



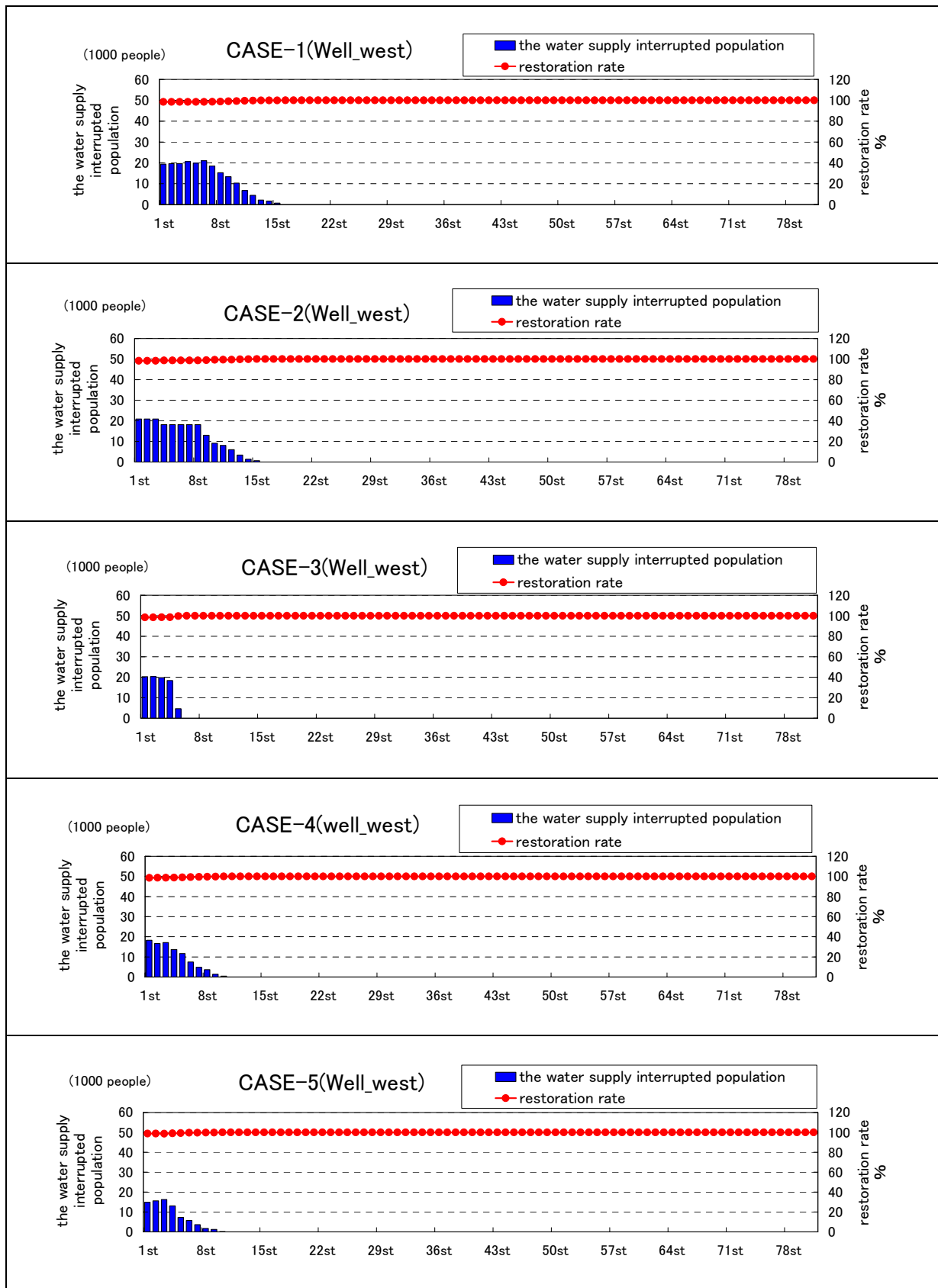
Water supply interrupted population of WTP-2 – gravity 2



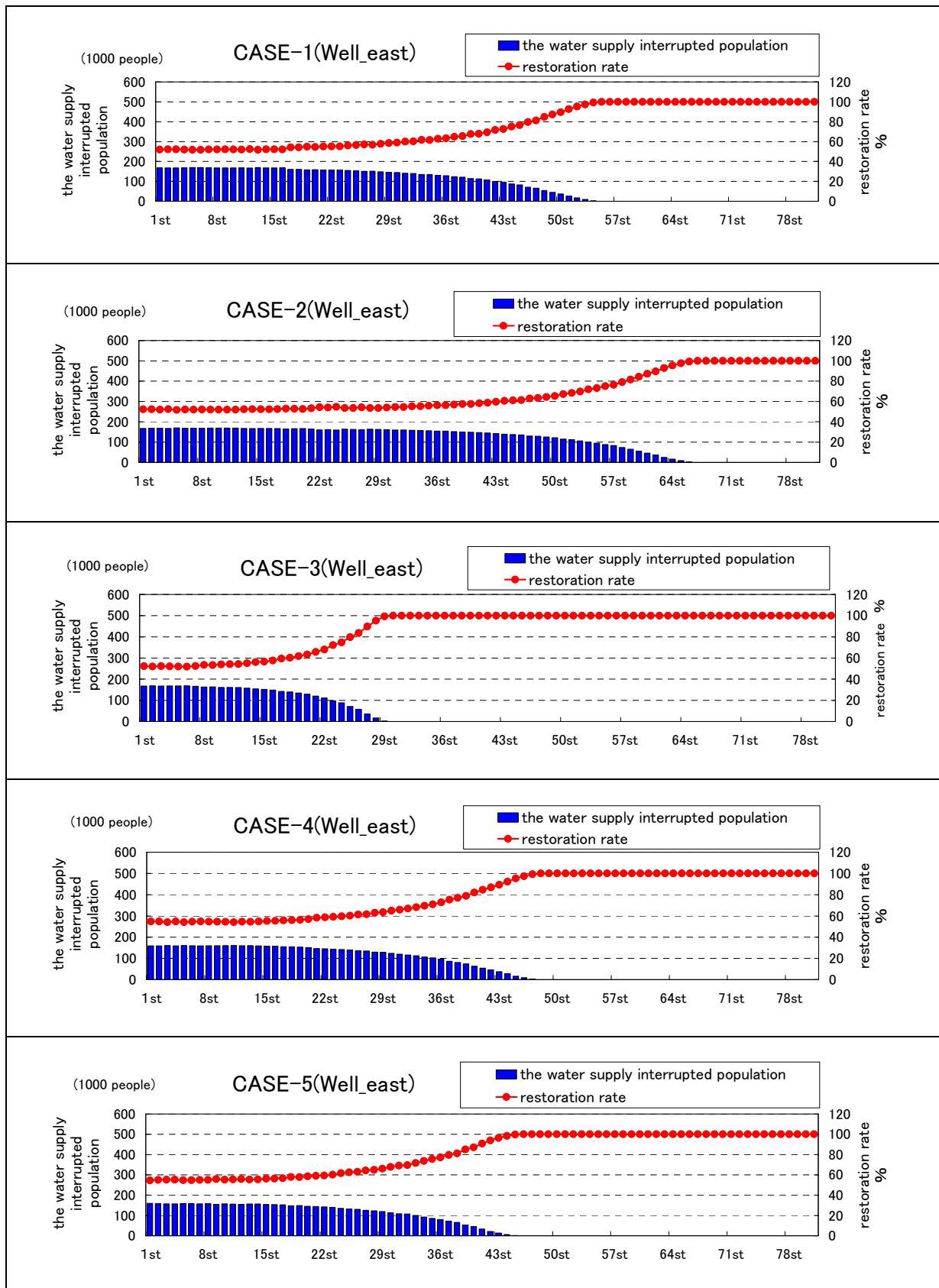
Water supply interrupted population of WTP-5 – gravity



Water supply interrupted population of Well - west



Water supply interrupted population of Well - east



## Water supply interrupted population in each reservoir zone system

ブロックNo	population (person)	N.tehran (person)	S.ray (person)	N.ray (person)	Mosha (person)	total (person)
1	90,017	90,017	0	2,488	90,017	182,522
2	275,753	275,753	18,417	36,755	275,753	606,678
3	177,147	17,160	16,857	25,440	0	59,457
4	159,628	16,339	15,352	21,940	2,792	56,423
5	128,276	6,804	8,444	7,644	2,706	25,598
6	261,615	14,362	11,545	17,511	0	43,418
7	337,737	1,832	0	0	0	1,832
8	136,112	136,112	0	0	136,112	272,224
10	50,910	50,910	0	0	50,910	101,820
11	120,856	2,842	0	0	0	2,842
12	24,225	24,225	0	0	0	24,225
13	285,713	285,713	0	168	0	285,881
14	42,081	42,081	0	0	0	42,081
15A	72,130	0	0	120	0	120
15-16-53	692,367	19,387	5,447	310,392	649	335,875
18	26,275	26,275	0	0	26,275	52,550
19	122,573	122,573	0	0	122,573	245,146
20	86,009	86,009	0	0	14,912	100,921
21	118,916	118,916	0	0	396	119,312
22	75,741	75,741	0	0	0	75,741
23	32,491	32,491	0	0	10,772	43,263
24	49,531	49,531	0	0	0	49,531
26	53,525	53,525	0	0	23,805	77,330
27	36,623	36,623	0	0	5,865	42,488
28	18,078	18,078	0	0	11,522	29,600
29	15,824	15,824	0	0	0	15,824
30	5,383	5,383	0	0	0	5,383
31	255,237	255,237	0	0	255,237	510,474
32	10,384	10,384	0	0	0	10,384
33	1,376	1,376	0	0	282	1,658
36	196,826	168,424	99,312	124,362	2,191	394,289
37	93,452	83,626	0	0	0	83,626
38	85,076	85,076	0	0	0	85,076
39	13,142	13,142	0	0	0	13,142
40	34,717	34,717	0	0	0	34,717
41	90,210	90,210	0	0	28,245	118,455
42	44,993	44,993	0	0	0	44,993
43	319,863	319,863	0	0	94	319,957
45	26,845	26,845	0	0	224	27,069
48	37,245	37,245	0	0	3,099	40,344
51	292,094	292,094	0	133	0	292,227
54	142,613	142,613	0	0	0	142,613
55	104,174	104,174	0	0	0	104,174
56	124,225	124,225	0	0	0	124,225
57	94,222	0	0	0	0	0
58	87,938	28,805	0	0	0	28,805
59	42,162	3,109	0	0	0	3,109
9-61	84,050	84,050	0	0	0	84,050
62	72,069	72,069	0	0	72,069	144,138
63	153,997	0	0	3,945	0	3,945
64	41,724	41,724	0	750	0	42,474
65	101,044	0	7,123	54,584	0	61,707
66	93,290	0	155	36,141	0	36,296
67	81,179	0	412	30,337	0	30,749
68	119,046	0	0	7,497	0	7,497
69	44,619	0	0	0	0	0
70	87,759	0	0	0	0	0
71	65,316	65,316	0	0	0	65,316
72	61,916	61,916	0	0	0	61,916
74	45,062	45,062	0	0	0	45,062
75	36,617	36,617	0	0	122	36,739
77	36,703	36,703	0	0	0	36,703
80	86,870	1,997	0	0	0	1,997
81	76,708	0	0	0	0	0
82	41,955	41,955	0	0	0	41,955
91	16,480	16,480	0	0	0	16,480
<b>計</b>	<b>6,938,734</b>	<b>3,994,553</b>	<b>183,064</b>	<b>680,207</b>	<b>1,136,622</b>	

Schedule of restoration work in simulation (CASE-1)

-The figure of transmission indicates the completion day of restoration work..

-The figure of distribution trunk main and distribution sub main indicates the execution period of restoration work..

team no	Restored region step1	reser vior-no	trans mission	distribution trunk main	distribution sub main	Restored region step2	reser vior	trans mission	distribution trunk main	distribution sub main	Restored region step3	reser vior	trans mission	distribution trunk main	distribution sub main				
District I	team1	WTP5_gravity	41	0	8 ~ 9	10 ~ 11													
			20	11	12 ~ 12	13 ~ 16													
			26	14	0 ~ 0	16 ~ 16													
			28	16	0 ~ 0	18 ~ 18													
			33	16	0 ~ 0	21 ~ 31													
			23	16	0 ~ 0	31 ~ 39													
			27	16	17 ~ 17	39 ~ 46													
			29	18	19 ~ 19	46 ~ 47													
			74	18	0 ~ 0	47 ~ 51													
			46	18	0 ~ 0	52 ~ 57													
			75	18	19 ~ 19	57 ~ 58													
			77	18	19 ~ 19	58 ~ 58													
			78	18	0 ~ 0	0 ~ 0													
			79	18	0 ~ 0	0 ~ 0													
			40	18	19 ~ 19	0 ~ 0													
45	18	19 ~ 20	59 ~ 59																
21	18	20 ~ 20	0 ~ 0																
	team2	WTP5_gravity	※1	-	-	-	-	-	-	-	-	-	-	-	-	-			
	team3	WTP5_gravity	※1	-	-	-	-	-	-	-	-	-	-	-	-	-			
District II	team1	WTP5_gravity	※1	-	-	-	-	-	-	-	-	-	-	-	-	-			
	team2	WTP5_gravity	※1	-	-	-	-	-	-	-	-	-	-	-	-	-			
	team3	WTP5_gravity	※1	-	-	-	-	-	-	-	-	-	-	-	-	-			
District III	team1	WTP1_pump	14	0	0 ~ 0	8 ~ 10													
			22	11	0 ~ 0	10 ~ 11													
						12 ~ 12													
						25 ~ 25													
						27 ~ 48													
			9-61	11	0 ~ 0	0 ~ 0													
			24	13	14 ~ 19	0 ~ 0													
			32	19	20 ~ 20	49 ~ 56													
			30	21	0 ~ 0	56 ~ 61													
			91	21	22 ~ 22	62 ~ 65													
			38	24	26 ~ 26	65 ~ 71													
			82	27	0 ~ 0	71 ~ 74													
			39	27	0 ~ 0	74 ~ 79													
			83	27	0 ~ 0	79 ~ 82													
						0 ~ 0													
	team2	WTP1_pump	※2	-	-	-	-	-	-	-	-	-	-	-	-	-			
District IV	team1	WTP3_gravity2	11	0	0 ~ 0	8 ~ 8	→ WTP3_gravity1	42	24	0 ~ 0	29 ~ 30								
			7	0	0 ~ 0	8 ~ 9		19	24	25 ~ 25	30 ~ 33								
			48	0	0 ~ 0	8 ~ 9		62	24	0 ~ 0	33 ~ 39								
			71	0	0 ~ 0	9 ~ 12		51	24	0 ~ 0	39 ~ 40								
						12 ~ 12		64	24	0 ~ 0	0 ~ 0								
								43	24	26 ~ 28	40 ~ 60								
								12	24	0 ~ 0	0 ~ 0								
	team2	WTP3_gravity2	※3	-	-	-	-	-	-	-	-	-	-	-	-	-			
	team3	WTP3_gravity	※1	-	-	-	-	-	-	-	-	-	-	-	-	-			
District V	team1	WTP2_pump2	59	0	0 ~ 0	8 ~ 8	→ WTP2_pump1	57	0	0 ~ 0	0 ~ 0								
			80	0	0 ~ 0	0 ~ 0		58	0	0 ~ 0	11 ~ 14								
			81	0	0 ~ 0	0 ~ 0		37	0	9 ~ 10	14 ~ 14								
			34	0	0 ~ 0	0 ~ 0					17 ~ 33								
								72	14	15 ~ 16	33 ~ 45								
								55	17	0 ~ 0	45 ~ 55								
	team2	WTP2_pump2	※4	-	-	-	-	-	-	-	-	-	-	-	-	-			
	team3	WTP2_pump2	※4	-	-	-	-	-	-	-	-	-	-	-	-	-			
District VI	team1	WELL_wast	15A	0	0 ~ 0	0 ~ 0	→ WELL_east	36	0	18 ~ 36	37 ~ 71								
			70	0	0 ~ 0	0 ~ 0		63	0	0 ~ 0	0 ~ 0								
			68	0	0 ~ 0	0 ~ 0													
			67	0	0 ~ 0	0 ~ 0													
			66	0	0 ~ 0	0 ~ 0													
			65	0	0 ~ 0	0 ~ 0													
			15-16-53	0	8 ~ 9	10 ~ 17													
			69	0	0 ~ 0	0 ~ 0													
	team2	WTP5_gravity	※1	-	-	-	-	-	-	-	-	-	-	-	-	-			
	team3	WTP5_gravity	※1	-	-	-	-	-	-	-	-	-	-	-	-	-			
	team4	WTP1_gravity	5	0	8 ~ 11	26 ~ 27													
4			0	12 ~ 17	28 ~ 30														
6			0	18 ~ 21	31 ~ 31														
3			0	22 ~ 25	32 ~ 32	→ WELL_east													





Schedule of restoration work in simulation (CASE-3)

-The figure of transmission indicates the completion day of restoration work..

-The figure of distribution trunk main and distribution sub main indicates the execution period of restoration work..

team no	Restored region step1	reser vior-no	trans mission	distribution trunk main	distribution sub main	Restored region step2	reser vior	trans mission	distribution trunk main	distribution sub main	Restored region step3	reser vior	trans mission	distribution trunk main	distribution sub main							
District I	team1	WTP5_gravity	41	0	4 ~ 4	6 ~ 8	※20班(60チーム)															
			20	0	4 ~ 4	8 ~ 14																
			26	0	0 ~ 0	14 ~ 17																
			28	0	0 ~ 0	17 ~ 21																
			33	0	0 ~ 0	21 ~ 21																
			23	0	0 ~ 0	21 ~ 23																
			27	0	5 ~ 5	23 ~ 26																
			29	0	5 ~ 5	26 ~ 26																
			74	0	0 ~ 0	26 ~ 26																
			46	0	0 ~ 0	0 ~ 0																
			75	0	5 ~ 5	26 ~ 26																
			77	0	5 ~ 5	26 ~ 26																
			78	0	0 ~ 0	0 ~ 0																
			79	0	0 ~ 0	0 ~ 0																
40	0	5 ~ 5	27 ~ 28																			
45	0	5 ~ 5	28 ~ 28																			
21	0	5 ~ 5	28 ~ 30																			
team2	WTP5_gravity	※1	-	-	-																	
team3	WTP5_gravity	※1	-	-	-																	
District II	team1	WTP5_gravity	※1	-	-	-																
	team2	WTP5_gravity	※1	-	-	-																
	team3	WTP5_gravity	※1	-	-	-																
District III	team1	WTP1_pump	14	0	0 ~ 0	8 ~ 8	※5班(15チーム)															
			22	0	0 ~ 0	8 ~ 15																
			9-61	0	0 ~ 0	0 ~ 0																
			24	0	4 ~ 5	16 ~ 18																
			32	0	5 ~ 5	18 ~ 20																
			30	0	0 ~ 0	20 ~ 21																
			91	0	5 ~ 5	21 ~ 23																
			38	0	5 ~ 6	23 ~ 24																
			82	0	0 ~ 0	24 ~ 26																
			39	0	0 ~ 0	26 ~ 26																
			83	0	0 ~ 0	0 ~ 0																
team2	WTP1_pump	※2	-	-	-																	
District IV	team1	WTP3_gravity2	11	0	0 ~ 0	4 ~ 4	→ WTP3_gravity1	42	0	0 ~ 0	9 ~ 9											
			7	0	0 ~ 0	4 ~ 4		19	0	7 ~ 7	9 ~ 11											
			48	0	0 ~ 0	4 ~ 6		62	0	0 ~ 0	11 ~ 14											
			71	0	0 ~ 0	6 ~ 6		51	0	0 ~ 0	14 ~ 14											
								64	0	0 ~ 0	0 ~ 0											
								43	0	7 ~ 8	14 ~ 24											
								12	0	0 ~ 0	0 ~ 0											
team2	WTP3_gravity2	※3	-	-	-	→ WTP3_gravity1																
team3	WTP5_gravity	※1	-	-	-																	
District V	team1	WTP2_pump2	59	0	0 ~ 0	4 ~ 4	→ WTP2_pump1	57	0	0 ~ 0	0 ~ 0											
			80	0	0 ~ 0	4 ~ 4		58	0	0 ~ 0	7 ~ 8											
			81	0	0 ~ 0	0 ~ 0		37	0	5 ~ 5	8 ~ 17											
			34	0	0 ~ 0	0 ~ 0																
								72	0	6 ~ 6	17 ~ 23											
								55	0	0 ~ 0	23 ~ 28											
team2	WTP2_pump2	※4	-	-	-	→ WTP2_pump1																
team3	WTP2_pump2	※4	-	-	-	→ WTP2_gravity1	1	0	5 ~ 5	7 ~ 7	→ WTP2_gravity2	54	0	0 ~ 0	0 ~ 0							
				8	0	6 ~ 6	7 ~ 7	31	0	0 ~ 0		0 ~ 0										
				18	0	0 ~ 0	0 ~ 0	2	0	8 ~ 13		14 ~ 22										
								10	0	0 ~ 0		23 ~ 27										
								56	0	0 ~ 0		0 ~ 0										
District VI	team1	WELL_wast	15A	0	0 ~ 0	0 ~ 0	→ WELL_east	36	0	7 ~ 12	13 ~ 30	※4班(12チーム)										
			70	0	0 ~ 0	0 ~ 0		63	0	0 ~ 0	0 ~ 0											
			68	0	0 ~ 0	0 ~ 0																
			67	0	0 ~ 0	0 ~ 0																
			66	0	0 ~ 0	0 ~ 0																
			65	0	0 ~ 0	0 ~ 0																
			15-16-53	0	4 ~ 4	5 ~ 6																
			69	0	0 ~ 0	0 ~ 0																
			team2	WTP5_gravity	※1	-		-	-													
			team3	WTP5_gravity	※1	-		-	-													
team4	WTP1_gravity	5	0	4 ~ 5	13 ~ 13																	
		4	0	6 ~ 8	13 ~ 15																	
		6	0	9 ~ 10	15 ~ 15																	
		3	0	11 ~ 12	16 ~ 16	→ WELL_east																

Schedule of restoration work in simulation (CASE-4)

-The figure of transmission indicates the completion day of restoration work..

-The figure of distribution trunk main and distribution sub main indicates the execution period of restoration work..

team no	Restored region step1	reser vior-no	trans mission	distribution trunk main	distribution sub main	Restored region step2	reser vior	trans mission	distribution trunk main	distribution sub main	Restored region step3	reser vior	trans mission	distribution trunk main	distribution sub main			
District I	team1	WTP5_gravity	41	0	0 ~ 0	4 ~ 9												
			20	0	0 ~ 0	9 ~ 22												
			26	0	0 ~ 0	22 ~ 30												
			28	0	0 ~ 0	30 ~ 37												
			33	0	0 ~ 0	37 ~ 38												
			23	0	0 ~ 0	38 ~ 42												
			27	0	0 ~ 0	42 ~ 48												
			29	0	0 ~ 0	48 ~ 49												
			74	0	0 ~ 0	49 ~ 49												
			46	0	0 ~ 0	0 ~ 0												
			75	0	0 ~ 0	49 ~ 50												
			77	0	0 ~ 0	50 ~ 50												
			78	0	0 ~ 0	0 ~ 0												
			79	0	0 ~ 0	0 ~ 0												
			40	0	0 ~ 0	50 ~ 52												
			45	0	0 ~ 0	52 ~ 53												
			21	0	0 ~ 0	53 ~ 57												
			team2	WTP5_gravity	※1	-	- ~ -	- ~ -										
			team3	WTP5_gravity	※1	-	- ~ -	- ~ -										
			District II	team1	WTP5_gravity	※1	-	- ~ -	- ~ -									
				team2	WTP5_gravity	※1	-	- ~ -	- ~ -									
team3	WTP5_gravity	※1		-	- ~ -	- ~ -												
District III	team1	WTP1_pump	14	0	0 ~ 0	4 ~ 6												
			22	0	0 ~ 0	7 ~ 30												
			9-61	0	0 ~ 0	0 ~ 0												
			24	0	0 ~ 0	31 ~ 38												
			32	0	0 ~ 0	39 ~ 44												
			30	0	0 ~ 0	45 ~ 48												
			91	0	0 ~ 0	49 ~ 55												
			38	0	0 ~ 0	55 ~ 58												
			82	0	0 ~ 0	58 ~ 63												
			39	0	0 ~ 0	63 ~ 65												
			83	0	0 ~ 0	0 ~ 0												
			team2	WTP1_pump	※2	-	- ~ -	- ~ -										
			District IV	team1	WTP3_gravity2	11	0	0 ~ 0	4 ~ 4	→ WTP3_gravity1	42	0	0 ~ 0	9 ~ 10				
						7	0	0 ~ 0	4 ~ 5		19	0	0 ~ 0	10 ~ 13				
48	0	0 ~ 0				5 ~ 8		62	0	0 ~ 0	13 ~ 18							
71	0	0 ~ 0				8 ~ 8		51	0	0 ~ 0	18 ~ 19							
								64	0	0 ~ 0	0 ~ 0							
								43	0	0 ~ 0	19 ~ 39							
								12	0	0 ~ 0	0 ~ 0							
team2	WTP3_gravity2	※3	-	- ~ -	- ~ -	→ WTP3_gravity1												
team3	WTP3_gravity	※1	-	- ~ -	- ~ -													
District V	team1	WTP2_pump2	59	0	0 ~ 0	4 ~ 4	→ WTP2_pump1	57	0	0 ~ 0	0 ~ 0							
			80	0	0 ~ 0	4 ~ 4		58	0	0 ~ 0	5 ~ 8							
			81	0	0 ~ 0	0 ~ 0		37	0	0 ~ 0	8 ~ 25							
			34	0	0 ~ 0	0 ~ 0												
								72	0	0 ~ 0	25 ~ 37							
								55	0	0 ~ 0	37 ~ 47							
team2	WTP2_pump2	※4	-	- ~ -	- ~ -	→ WTP2_pump1												
team3	WTP2_pump2	※4	-	- ~ -	- ~ -	→ WTP2_gravity1	1	0	0 ~ 0	5 ~ 5	→ WTP2_gravity2	54	0	0 ~ 0	0 ~ 0			
							8	0	0 ~ 0	6 ~ 6		31	0	0 ~ 0	0 ~ 0			
							18	0	0 ~ 0	0 ~ 0		2	0	7 ~ 8	9 ~ 26			
												10	0	0 ~ 0	27 ~ 36			
													56	0	0 ~ 0	0 ~ 0		
													13	0	0 ~ 0	0 ~ 0		
District VI	team1	WELL_wast	15A	0	0 ~ 0	0 ~ 0	→ WELL_east	36	0	12 ~ 13	14 ~ 48							
			70	0	0 ~ 0	0 ~ 0		63	0	0 ~ 0	0 ~ 0							
			68	0	0 ~ 0	0 ~ 0												
			67	0	0 ~ 0	0 ~ 0												
			66	0	0 ~ 0	0 ~ 0												
			65	0	0 ~ 0	0 ~ 0												
			15-16-53	0	0 ~ 0	4 ~ 11												
			69	0	0 ~ 0	0 ~ 0												
			team2	WTP5_gravity	※1	-	- ~ -	- ~ -										
			team3	WTP5_gravity	※1	-	- ~ -	- ~ -										
team4	WTP1_gravity	5	0	0 ~ 0	6 ~ 7													
		4	0	4 ~ 5	7 ~ 10													
		6	0	0 ~ 0	10 ~ 12													
		3	0	0 ~ 0	12 ~ 13	→ WELL_east												

Schedule of restoration work in simulation (CASE-5)

-The figure of transmission indicates the completion day of restoration work..

-The figure of distribution trunk main and distribution sub main indicates the execution period of restoration work..

team no	Restored region step1	reser vior-no	trans mission	distribution trunk main	distribution sub main	Restored region step2	reser vior	trans mission	distribution trunk main	distribution sub main	Restored region step3	reser vior	trans mission	distribution trunk main	distribution sub main			
District I	team1	WTP5_gravity	41	0	0 ~ 0	4 ~ 9												
			20	0	0 ~ 0	9 ~ 22												
			26	0	0 ~ 0	22 ~ 29												
			28	0	0 ~ 0	30 ~ 36												
			33	0	0 ~ 0	36 ~ 37												
			23	0	0 ~ 0	37 ~ 41												
			27	0	0 ~ 0	41 ~ 46												
			29	0	0 ~ 0	46 ~ 47												
			74	0	0 ~ 0	47 ~ 47												
			46	0	0 ~ 0	0 ~ 0												
			75	0	0 ~ 0	47 ~ 48												
			77	0	0 ~ 0	48 ~ 48												
			78	0	0 ~ 0	0 ~ 0												
79	0	0 ~ 0	0 ~ 0															
40	0	0 ~ 0	48 ~ 50															
45	0	0 ~ 0	50 ~ 52															
21	0	0 ~ 0	52 ~ 55															
team2	WTP5_gravity	※1	-	- ~ -	- ~ -													
team3	WTP5_gravity	※1	-	- ~ -	- ~ -													
District II	team1	WTP5_gravity	※1	-	- ~ -	- ~ -												
	team2	WTP5_gravity	※1	-	- ~ -	- ~ -												
	team3	WTP5_gravity	※1	-	- ~ -	- ~ -												
District III	team1	WTP1_pump	14	0	0 ~ 0	4 ~ 16												
			22	0	0 ~ 0	6 ~ 29												
			9-61	0	0 ~ 0	0 ~ 0												
			24	0	0 ~ 0	29 ~ 36												
			32	0	0 ~ 0	36 ~ 41												
			30	0	0 ~ 0	41 ~ 45												
			91	0	0 ~ 0	45 ~ 50												
			38	0	0 ~ 0	50 ~ 53												
			82	0	0 ~ 0	53 ~ 58												
			39	0	0 ~ 0	58 ~ 60												
			83	0	0 ~ 0	0 ~ 0												
			team2	WTP1_pump	※2	-	- ~ -	- ~ -										
			District IV	team1	WTP3_gravity2	11	0	0 ~ 0	4 ~ 4	→ WTP3_gravity1	42	0	0 ~ 0	9 ~ 10				
7	0	0 ~ 0				4 ~ 5		19	0	0 ~ 0	10 ~ 13							
48	0	0 ~ 0				5 ~ 8		62	0	0 ~ 0	13 ~ 18							
71	0	0 ~ 0				8 ~ 8		51	0	0 ~ 0	18 ~ 19							
								64	0	0 ~ 0	0 ~ 0							
								43	0	0 ~ 0	19 ~ 38							
team2	WTP3_gravity2	※3	-	- ~ -	- ~ -	→ WTP3_gravity1	12	0	0 ~ 0	0 ~ 0								
team3	WTP3_gravity	※1	-	- ~ -	- ~ -													
District V	team1	WTP2_pump2	59	0	0 ~ 0	4 ~ 4	→ WTP2_pump1	57	0	0 ~ 0	0 ~ 0							
			80	0	0 ~ 0	4 ~ 4		58	0	0 ~ 0	5 ~ 8							
			81	0	0 ~ 0	0 ~ 0		37	0	0 ~ 0	8 ~ 24							
			34	0	0 ~ 0	0 ~ 0												
								72	0	0 ~ 0	24 ~ 35							
								55	0	0 ~ 0	35 ~ 44							
team2	WTP2_pump2	※4	-	- ~ -	- ~ -	→ WTP2_pump1												
team3	WTP2_pump2	※4	-	- ~ -	- ~ -	→ WTP2_gravity1	1	0	0 ~ 0	5 ~ 5	→ WTP2_gravity2	54	0	0 ~ 0	0 ~ 0			
							8	0	0 ~ 0	6 ~ 6		31	0	0 ~ 0	0 ~ 0			
							18	0	0 ~ 0	0 ~ 0		2	0	7 ~ 8	9 ~ 25			
												10	0	0 ~ 0	25 ~ 34			
												56	0	0 ~ 0	0 ~ 0			
												13	0	0 ~ 0	0 ~ 0			
District VI	team1	WELL_wast	15A	0	0 ~ 0	0 ~ 0	→ WELL_east	36	0	12 ~ 13	14 ~ 46							
			70	0	0 ~ 0	0 ~ 0		63	0	0 ~ 0	0 ~ 0							
			68	0	0 ~ 0	0 ~ 0												
			67	0	0 ~ 0	0 ~ 0												
			66	0	0 ~ 0	0 ~ 0												
			65	0	0 ~ 0	0 ~ 0												
			15-16-53	0	0 ~ 0	4 ~ 11												
			69	0	0 ~ 0	0 ~ 0												
			team2	WTP5_gravity	※1	-	- ~ -	- ~ -										
			team3	WTP5_gravity	※1	-	- ~ -	- ~ -										
team4	WTP1_gravity	5	0	0 ~ 0	6 ~ 7													
		4	0	4 ~ 5	7 ~ 10													
		6	0	0 ~ 0	10 ~ 12													
		3	0	0 ~ 0	12 ~ 13	→ WELL_east												

# APPENDIX 10

## Economic Analysis For Project Evaluation and Financial Planning

Appendix 10.1 Calculation of Benefit (Reduction of Damaged Production Value: Residential Users)

Day after Earthquake	Number of Interrupted Population before Investment	Number of Interrupted Population after Investment	Reduction in Number of Interrupted Population	Unit Value for Damage per Person per Day (USD)	Reduction of Damaged Value (USD)	Accumulated Reduction of Damaged Value (USD)
Day 1	3994553	1738083	2256470	3.84	8664845	8664845
Day 2	3975348	1738353	2236995	3.84	8590061	17254906
Day 3	3969524	1732970	2236554	3.84	8588367	25843273
Day 4	3971113	1716634	2254479	3.84	8657199	34500472
Day 5	3971930	1659775	2312155	3.84	8878675	43379148
Day 6	3978260	1645047	2333213	3.84	8959538	52338685
Day 7	3964673	1595306	2379367	3.84	9136769	61475455
Day 8	3945467	1483279	2462188	3.84	9454802	70930257
Day 9	3920453	1439289	2481164	3.84	9527670	80457926
Day 10	3907871	1407268	2500603	3.84	9602316	90060242
Day 11	3893584	1381854	2511730	3.84	9645043	99705285
Day 12	3494853	1329230	2165623	3.84	8315992	108021277
Day 13	3490013	1235978	2254035	3.84	8655494	116676772
Day 14	3473303	1166856	2306447	3.84	8856756	125533528
Day 15	3485205	1075447	2409758	3.84	9253471	134786999
Day 16	3448137	999772	2448365	3.84	9401722	144188721
Day 17	3422603	901838	2520765	3.84	9679738	153868458
Day 18	3372203	847015	2525188	3.84	9696722	163565180
Day 19	3295567	794790	2500777	3.84	9602984	173168164
Day 20	3294964	733028	2561936	3.84	9837834	183005998
Day 21	3283228	668129	2615099	3.84	10041980	193047978
Day 22	3274485	597249	2677236	3.84	10280586	203328564
Day 23	3257100	510159	2746941	3.84	10548253	213876818
Day 24	3230573	462682	2767891	3.84	10628701	224505519
Day 25	2466029	373827	2092202	3.84	8034056	232539575
Day 26	2486667	238970	2209697	3.84	8485236	241024812
Day 27	1436082	145393	1290689	3.84	4956246	245981057
Day 28	1410110	96642	1313468	3.84	5043717	251024774
Day 29	1396895	23047	1373848	3.84	5275576	256300351
Day 30	1315797	0	1315797	3.84	5052660	261353011
Day 31	1300488	0	1300488	3.84	4993874	266346885
Day 32	1291079	0	1291079	3.84	4957743	271304628
Day 33	1267664	0	1267664	3.84	4867830	276172458
Day 34	1245790	0	1245790	3.84	4783834	280956292
Day 35	1217017	0	1217017	3.84	4673345	285629637
Day 36	1177720	0	1177720	3.84	4522445	290152082
Day 37	1118552	0	1118552	3.84	4295240	294447322
Day 38	1076650	0	1076650	3.84	4134336	298581658
Day 39	1030476	0	1030476	3.84	3957028	302538685
Day 40	1011536	0	1011536	3.84	3884298	306422984
Day 41	968116	0	968116	3.84	3717565	310140549
Day 42	924985	0	924985	3.84	3551942	313692492
Day 43	883470	0	883470	3.84	3392525	317085016
Day 44	849050	0	849050	3.84	3260352	320345368
Day 45	802904	0	802904	3.84	3083151	323428520
Day 46	747650	0	747650	3.84	2870976	326299496
Day 47	710135	0	710135	3.84	2726918	329026414
Day 48	683599	0	683599	3.84	2625020	331651434
Day 49	650264	0	650264	3.84	2497014	334148448
Day 50	613343	0	613343	3.84	2355237	336503685
Day 51	573510	0	573510	3.84	2202278	338705964
Day 52	545071	0	545071	3.84	2093073	340799036
Day 53	510663	0	510663	3.84	1960946	342759982
Day 54	489505	0	489505	3.84	1879699	344639681
Day 55	475044	0	475044	3.84	1824169	346463850
Day 56	451960	0	451960	3.84	1735526	348199377
Day 57	434388	0	434388	3.84	1668050	349867427
Day 58	426323	0	426323	3.84	1637080	351504507
Day 59	402801	0	402801	3.84	1546756	353051263
Day 60	386100	0	386100	3.84	1482624	354533887
Day 61	386572	0	386572	3.84	1484436	356018323
Day 62	385541	0	385541	3.84	1480477	357498801
Day 63	375811	0	375811	3.84	1443114	358941915
Day 64	369358	0	369358	3.84	1418335	360360250
Day 65	345837	0	345837	3.84	1328014	361688264
Day 66	317155	0	317155	3.84	1217875	362906139
Day 67	308623	0	308623	3.84	1185112	364091251
Day 68	234486	0	234486	3.84	900426	364991677
Day 69	195267	0	195267	3.84	749825	365741503
Day 70	177524	0	177524	3.84	681692	366423195
Day 71	149451	0	149451	3.84	573892	366997087
Day 72	125710	0	125710	3.84	482726	367498813
Day 73	125758	0	125758	3.84	482911	367962724
Day 74	110065	0	110065	3.84	422650	368385373
Day 75	76000	0	76000	3.84	291840	368677213
Day 76	33018	0	33018	3.84	126789	368804003
Day 77	11817	0	11817	3.84	45377	368849380
Day 78	7979	0	7979	3.84	30639	368880019
Day 79	4966	0	4966	3.84	19069	368899089
Day 80-90	799	0	799	3.84	3068	368902157
Total	125796180	29727910	96068270	3.84	368902157	368902157

Appendix 10.2 Calculation of Benefit (Reduction of Damaged Production Value: Commercial Users)

Day after Earthquake	Number of Interrupted Population before Investment	Number of Interrupted Population after Investment	Reduction in Number of Interrupted Population	Unit Value for Damage per Entity per Day (USD)	Reduction of Damaged Value (USD)	Accumulated Reduction of Damaged Value (USD)
Day 1	300710	130843	169867	4.85	823855.25	823855.25
Day 2	299264	130863	168401	4.85	816745	1640600
Day 3	298826	130458	168368	4.85	816584	2457184
Day 4	298945	129228	169717	4.85	823128	3280312
Day 5	299007	124948	174059	4.85	844186	4124498
Day 6	299483	123839	175644	4.85	851875	4976373
Day 7	298461	119342	179119	4.85	868726	5845099
Day 8	297015	111661	185354	4.85	898965	6744064
Day 9	295132	108350	186782	4.85	905893	7649956
Day 10	294185	105939	188245	4.85	912990	8562947
Day 11	293109	104026	189083	4.85	917053	9479999
Day 12	263093	100064	163028	4.85	790686	10270686
Day 13	262728	93044	169684	4.85	822966	11093652
Day 14	261470	87841	173629	4.85	842102	11935754
Day 15	262366	80960	181407	4.85	879822	12815576
Day 16	259576	75263	184313	4.85	893918	13709494
Day 17	257654	67890	189763	4.85	920351	14629845
Day 18	253859	63763	190096	4.85	921966	15551811
Day 19	248090	59832	188258	4.85	913054	16464865
Day 20	248045	55182	192863	4.85	935383	17400248
Day 21	247161	50297	196865	4.85	954794	18355042
Day 22	246503	44961	201542	4.85	977480	19325522
Day 23	245194	38405	206790	4.85	1002930	20335452
Day 24	243198	34831	208367	4.85	1010579	21346032
Day 25	185643	28142	157501	4.85	763880	22109911
Day 26	184336	17990	166346	4.85	806778	22916689
Day 27	108108	10945	97163	4.85	471241	23387930
Day 28	106153	7275	98878	4.85	479558	23867488
Day 29	105158	1735	103423	4.85	501603	24369091
Day 30	99053	0	99053	4.85	480408	24849499
Day 31	97901	0	97901	4.85	474819	25324317
Day 32	97192	0	97192	4.85	471383	25795701
Day 33	95430	0	95430	4.85	462834	26258535
Day 34	93783	0	93783	4.85	454848	26713383
Day 35	91617	0	91617	4.85	444343	27157725
Day 36	88659	0	88659	4.85	429995	27587720
Day 37	84205	0	84205	4.85	408392	27996113
Day 38	81050	0	81050	4.85	393094	28389206
Day 39	77574	0	77574	4.85	376235	28765441
Day 40	76148	0	76148	4.85	369320	29134761
Day 41	72880	0	72880	4.85	353467	29488228
Day 42	69633	0	69633	4.85	337719	29825947
Day 43	66508	0	66508	4.85	322562	30148509
Day 44	63916	0	63916	4.85	309995	30458504
Day 45	60443	0	60443	4.85	293147	30751651
Day 46	56283	0	56283	4.85	272973	31024624
Day 47	53459	0	53459	4.85	259276	31283900
Day 48	51461	0	51461	4.85	249587	31533487
Day 49	48952	0	48952	4.85	237417	31770904
Day 50	46172	0	46172	4.85	223936	31994840
Day 51	43174	0	43174	4.85	209393	32204234
Day 52	41033	0	41033	4.85	199010	32403243
Day 53	38443	0	38443	4.85	186447	32589691
Day 54	36850	0	36850	4.85	178722	32768413
Day 55	35761	0	35761	4.85	173442	32941855
Day 56	34024	0	34024	4.85	165014	33106869
Day 57	32701	0	32701	4.85	158599	33265468
Day 58	32094	0	32094	4.85	155654	33421122
Day 59	30323	0	30323	4.85	147066	33568188
Day 60	29066	0	29066	4.85	140968	33709156
Day 61	29101	0	29101	4.85	141141	33850296
Day 62	29024	0	29024	4.85	140764	33991060
Day 63	28291	0	28291	4.85	137212	34128272
Day 64	27805	0	27805	4.85	134856	34263128
Day 65	26035	0	26035	4.85	126268	34389395
Day 66	23875	0	23875	4.85	115796	34505191
Day 67	23233	0	23233	4.85	112681	34617872
Day 68	17652	0	17652	4.85	85613	34703485
Day 69	14700	0	14700	4.85	71294	34774778
Day 70	13364	0	13364	4.85	64815	34839594
Day 71	11251	0	11251	4.85	54566	34894159
Day 72	9463	0	9463	4.85	45898	34940057
Day 73	9467	0	9467	4.85	45915	34985972
Day 74	8286	0	8286	4.85	40186	35026158
Day 75	5721	0	5721	4.85	27748	35053906
Day 76	2486	0	2486	4.85	12055	35065961
Day 77	890	0	890	4.85	4314	35070276
Day 78	601	0	601	4.85	2913	35073189
Day 79	374	0	374	4.85	1813	35075002
Day 80-90	60	0	60	4.85	292	35075294
Total	9469936	2237917	7232019	4.85	35075294	35075294

Appendix 10.3 Calculation of Benefit (Reduction of Cost of Workers for Restoration)

Day after Earthquake	Number of Required Workers for Restoration before Investment	Number of Required Workers for Restoration after Investment	Reduction in Number of Required Workers for Restoration	Wage per Worker per Day (USD)	Reduction of Wage for Required Workers (USD)	Accumulated Reduction of Wage for Required Workers (USD)
Day 1	684	648	36	9.74	351	351
Day 2	684	648	36	9.74	351	701
Day 3	684	648	36	9.74	351	1052
Day 4	684	648	36	9.74	351	1403
Day 5	684	648	36	9.74	351	1753
Day 6	684	648	36	9.74	351	2104
Day 7	684	648	36	9.74	351	2454
Day 8	684	648	36	9.74	351	2805
Day 9	684	648	36	9.74	351	3156
Day 10	684	648	36	9.74	351	3506
Day 11	684	648	36	9.74	351	3857
Day 12	684	648	36	9.74	351	4208
Day 13	684	648	36	9.74	351	4558
Day 14	684	648	36	9.74	351	4909
Day 15	684	648	36	9.74	351	5260
Day 16	684	648	36	9.74	351	5610
Day 17	684	648	36	9.74	351	5961
Day 18	684	648	36	9.74	351	6312
Day 19	684	648	36	9.74	351	6662
Day 20	684	648	36	9.74	351	7013
Day 21	684	648	36	9.74	351	7363
Day 22	684	648	36	9.74	351	7714
Day 23	684	648	36	9.74	351	8065
Day 24	684	648	36	9.74	351	8415
Day 25	684	576	108	9.74	1052	9467
Day 26	660	576	84	9.74	818	10285
Day 27	648	504	144	9.74	1403	11688
Day 28	636	468	168	9.74	1636	13324
Day 29	636	396	240	9.74	2338	15662
Day 30	648	396	252	9.74	2454	18116
Day 31	648	0	648	9.74	6312	24428
Day 32	648	0	648	9.74	6312	30739
Day 33	648	0	648	9.74	6312	37051
Day 34	648	0	648	9.74	6312	43362
Day 35	648	0	648	9.74	6312	49674
Day 36	648	0	648	9.74	6312	55986
Day 37	648	0	648	9.74	6312	62297
Day 38	648	0	648	9.74	6312	68609
Day 39	648	0	648	9.74	6312	74920
Day 40	648	0	648	9.74	6312	81232
Day 41	648	0	648	9.74	6312	87543
Day 42	648	0	648	9.74	6312	93855
Day 43	648	0	648	9.74	6312	100166
Day 44	648	0	648	9.74	6312	106478
Day 45	648	0	648	9.74	6312	112789
Day 46	648	0	648	9.74	6312	119101
Day 47	648	0	648	9.74	6312	125412
Day 48	648	0	648	9.74	6312	131724
Day 49	648	0	648	9.74	6312	138035
Day 50	648	0	648	9.74	6312	144347
Day 51	648	0	648	9.74	6312	150658
Day 52	648	0	648	9.74	6312	156970
Day 53	648	0	648	9.74	6312	163281
Day 54	648	0	648	9.74	6312	169593
Day 55	648	0	648	9.74	6312	175904
Day 56	576	0	576	9.74	5610	181515
Day 57	576	0	576	9.74	5610	187125
Day 58	576	0	576	9.74	5610	192735
Day 59	576	0	576	9.74	5610	198345
Day 60	576	0	576	9.74	5610	203956
Day 61	504	0	504	9.74	4909	208865
Day 62	504	0	504	9.74	4909	213774
Day 63	504	0	504	9.74	4909	218682
Day 64	504	0	504	9.74	4909	223591
Day 65	504	0	504	9.74	4909	228500
Day 66	504	0	504	9.74	4909	233409
Day 67	468	0	468	9.74	4558	237968
Day 68	144	0	144	9.74	1403	239370
Day 69	144	0	144	9.74	1403	240773
Day 70	144	0	144	9.74	1403	242175
Day 71	144	0	144	9.74	1403	243578
Day 72	72	0	72	9.74	701	244279
Day 73	72	0	72	9.74	701	244980
Day 74	72	0	72	9.74	701	245682
Day 75	72	0	72	9.74	701	246383
Day 76	72	0	72	9.74	701	247084
Day 77	72	0	72	9.74	701	247786
Day 78	72	0	72	9.74	701	248487
Day 79	72	0	72	9.74	701	249188
Day 80-90	216	0	216	9.74	2104	251292
<b>Total</b>	<b>44268</b>	<b>18468</b>	<b>25800</b>	<b>9.74</b>	<b>251292</b>	<b>251292</b>



Appendix 10.4 Calculation of Benefit (Reduction of Cost of Workers for Emergency Water Supply)

Day after Earthquake	Number of Required Workers for Emergency before Investment	Number of Required Workers for Emergency after Investment	Reduction in Number of Required Workers for Emergency	Wage per Worker per Day (USD)	Reduction of Wage for Required Workers (USD)	Accumulated Reduction of Wage for Required Workers (USD)
Day 1	336	336	0	9.74	0	0
Day 2	336	336	0	9.74	0	0
Day 3	336	336	0	9.74	0	0
Day 4	336	336	0	9.74	0	0
Day 5	336	300	36	9.74	351	351
Day 6	336	300	36	9.74	351	701
Day 7	336	255	81	9.74	789	1490
Day 8	336	243	93	9.74	906	2396
Day 9	312	228	84	9.74	818	3214
Day 10	300	225	75	9.74	731	3945
Day 11	297	225	72	9.74	701	4646
Day 12	297	222	75	9.74	731	5376
Day 13	291	222	69	9.74	672	6049
Day 14	291	216	75	9.74	731	6779
Day 15	282	183	99	9.74	964	7743
Day 16	282	156	126	9.74	1227	8971
Day 17	276	153	123	9.74	1198	10169
Day 18	228	138	90	9.74	877	11045
Day 19	228	135	93	9.74	906	11951
Day 20	228	135	93	9.74	906	12857
Day 21	228	132	96	9.74	935	13792
Day 22	228	126	102	9.74	993	14785
Day 23	228	111	117	9.74	1140	15925
Day 24	228	99	129	9.74	1256	17181
Day 25	228	69	159	9.74	1549	18730
Day 26	228	69	159	9.74	1549	20279
Day 27	228	42	186	9.74	1812	22090
Day 28	222	36	186	9.74	1812	23902
Day 29	222	24	198	9.74	1929	25830
Day 30	222	24	198	9.74	1929	27759
Day 31	210	0	210	9.74	2045	29804
Day 32	183	0	183	9.74	1782	31587
Day 33	180	0	180	9.74	1753	33340
Day 34	165	0	165	9.74	1607	34947
Day 35	165	0	165	9.74	1607	36554
Day 36	165	0	165	9.74	1607	38161
Day 37	165	0	165	9.74	1607	39768
Day 38	165	0	165	9.74	1607	41376
Day 39	165	0	165	9.74	1607	42983
Day 40	159	0	159	9.74	1549	44531
Day 41	141	0	141	9.74	1373	45905
Day 42	141	0	141	9.74	1373	47278
Day 43	141	0	141	9.74	1373	48651
Day 44	141	0	141	9.74	1373	50025
Day 45	141	0	141	9.74	1373	51398
Day 46	135	0	135	9.74	1315	52713
Day 47	129	0	129	9.74	1256	53969
Day 48	129	0	129	9.74	1256	55226
Day 49	126	0	126	9.74	1227	56453
Day 50	126	0	126	9.74	1227	57680
Day 51	126	0	126	9.74	1227	58908
Day 52	123	0	123	9.74	1198	60106
Day 53	123	0	123	9.74	1198	61304
Day 54	123	0	123	9.74	1198	62502
Day 55	123	0	123	9.74	1198	63700
Day 56	117	0	117	9.74	1140	64839
Day 57	99	0	99	9.74	964	65803
Day 58	93	0	93	9.74	906	66709
Day 59	87	0	87	9.74	847	67557
Day 60	81	0	81	9.74	789	68346
Day 61	60	0	60	9.74	584	68930
Day 62	54	0	54	9.74	526	69456
Day 63	54	0	54	9.74	526	69982
Day 64	51	0	51	9.74	497	70479
Day 65	51	0	51	9.74	497	70975
Day 66	51	0	51	9.74	497	71472
Day 67	45	0	45	9.74	438	71910
Day 68	39	0	39	9.74	380	72290
Day 69	39	0	39	9.74	380	72670
Day 70	39	0	39	9.74	380	73050
Day 71	39	0	39	9.74	380	73430
Day 72	21	0	21	9.74	205	73634
Day 73	21	0	21	9.74	205	73839
Day 74	21	0	21	9.74	205	74043
Day 75	12	0	12	9.74	117	74160
Day 76	12	0	12	9.74	117	74277
Day 77	12	0	12	9.74	117	74394
Day 78	12	0	12	9.74	117	74511
Day 79	12	0	12	9.74	117	74628
Day 80-90	9	0	9	9.74	88	74716
Total	13083	5412	7671	9.74	74716	74716

## Appendix 10.5 Calculation of Annual Benefit

(Reduction of Damaged Production Value: Financial Price)

Day after Earthquake	Expected Annual Benefit (Probability=0.0020) (USD)	Expected Annual Benefit (Probability=0.0025) (USD)	Expected Annual Benefit (Probability=0.0033) (USD)	Expected Annual Benefit (Probability=0.0050) (USD)	Expected Annual Benefit (Probability=0.010) (USD)	Expected Annual Benefit (Probability=0.020) (USD)
Day 1	18977	23722	31313	47444	94887	189774
Day 2	18814	23517	31042	47034	94068	188136
Day 3	18810	23512	31036	47025	94050	188099
Day 4	18961	23701	31285	47402	94803	189607
Day 5	19446	24307	32085	48614	97229	194457
Day 6	19623	24529	32378	49057	98114	196228
Day 7	20011	25014	33018	50027	100055	200110
Day 8	20708	25884	34167	51769	103538	207075
Day 9	20867	26084	34431	52168	104336	208671
Day 10	21031	26288	34701	52577	105153	210306
Day 11	21124	26405	34855	52810	105621	211242
Day 12	18213	22767	30052	45533	91067	182134
Day 13	18957	23696	31279	47392	94785	189569
Day 14	19398	24247	32006	48494	96989	193977
Day 15	20267	25333	33440	50666	101333	202666
Day 16	20591	25739	33976	51478	102956	205913
Day 17	21200	26500	34980	53000	106001	212002
Day 18	21237	26547	35042	53093	106187	212374
Day 19	21032	26290	34703	52580	105160	210321
Day 20	21546	26933	35552	53866	107732	215464
Day 21	21994	27492	36289	54984	109968	219935
Day 22	22516	28145	37152	56290	112581	225161
Day 23	23102	28878	38119	57756	115512	231024
Day 24	23279	29098	38410	58196	116393	232786
Day 25	17596	21995	29033	43990	87979	175959
Day 26	18584	23230	30664	46460	92920	185840
Day 27	10855	13569	17911	27137	54275	108550
Day 28	11047	13808	18227	27616	55233	110465
Day 29	11554	14443	19065	28886	57772	115544
Day 30	11066	13833	18259	27665	55331	110661
Day 31	10937	13672	18047	27343	54687	109374
Day 32	10858	13573	17916	27146	54291	108583
Day 33	10661	13327	17591	26653	53307	106613
Day 34	10477	13097	17288	26193	52387	104774
Day 35	10235	12794	16888	25588	51177	102354
Day 36	9905	12381	16343	24762	49524	99049
Day 37	9407	11759	15522	23518	47036	94073
Day 38	9055	11319	14941	22637	45274	90549
Day 39	8667	10833	14300	21666	43333	86665
Day 40	8507	10634	14037	21268	42536	85072
Day 41	8142	10178	13434	20355	40710	81421
Day 42	7779	9724	12836	19448	38897	77793
Day 43	7430	9288	12260	18575	37151	74302
Day 44	7141	8926	11782	17852	35703	71407
Day 45	6753	8441	11142	16881	33763	67526
Day 46	6288	7860	10375	15720	31439	62879
Day 47	5972	7465	9854	14931	29862	59724
Day 48	5749	7187	9486	14373	28746	57492
Day 49	5469	6836	9024	13672	27344	54689
Day 50	5158	6448	8511	12896	25792	51583
Day 51	4823	6029	7959	12058	24117	48233
Day 52	4584	5730	7564	11460	22921	45842
Day 53	4295	5368	7086	10737	21474	42948
Day 54	4117	5146	6793	10292	20584	41168
Day 55	3995	4994	6592	9976	19976	39952
Day 56	3801	4751	6272	9503	19005	38011
Day 57	3653	4567	6028	9133	18266	36533
Day 58	3585	4482	5916	8964	17927	35855
Day 59	3388	4235	5590	8469	16938	33876
Day 60	3247	4059	5358	8118	16236	32472
Day 61	3251	4064	5364	8128	16256	32512
Day 62	3242	4053	5350	8106	16212	32425
Day 63	3161	3951	5215	7902	15803	31607
Day 64	3106	3883	5126	7766	15532	31064
Day 65	2909	3636	4799	7271	14543	29086
Day 66	2667	3334	4401	6668	13337	26673
Day 67	2596	3244	4283	6489	12978	25956
Day 68	1972	2465	3254	4930	9860	19721
Day 69	1642	2053	2710	4106	8211	16422
Day 70	1493	1866	2463	3733	7465	14930
Day 71	1257	1571	2074	3142	6285	12569
Day 72	1057	1322	1744	2643	5286	10572
Day 73	1058	1322	1745	2644	5288	10577
Day 74	926	1157	1527	2314	4628	9257
Day 75	639	799	1055	1598	3196	6392
Day 76	278	347	458	694	1388	2777
Day 77	99	124	164	248	497	994
Day 78	67	84	111	168	336	671
Day 79	42	52	69	104	209	418
Day 80-90	7	8	11	17	34	67
<b>Total</b>	<b>807955</b>	<b>1009944</b>	<b>1333126</b>	<b>2019887</b>	<b>4039775</b>	<b>8079549</b>

## Appendix 10.6 Calculation of Annual Benefit

(Reduction of Damaged Production Value: Economic Price)

Day after Earthquake	Expected Annual Benefit (Probability=0.0020) (USD)	Expected Annual Benefit (Probability=0.0025) (USD)	Expected Annual Benefit (Probability=0.0033) (USD)	Expected Annual Benefit (Probability=0.0050) (USD)	Expected Annual Benefit (Probability=0.010) (USD)	Expected Annual Benefit (Probability=0.020) (USD)
Day 1	18408	23010	30373	46020	92040	184081
Day 2	18249	22812	30111	45623	91246	182492
Day 3	18246	22807	30105	45614	91228	182456
Day 4	18392	22990	30347	45980	91959	183918
Day 5	18862	23578	31123	47156	94312	188624
Day 6	19034	23793	31406	47585	95171	190341
Day 7	19411	24263	32028	48527	97053	194107
Day 8	20086	25108	33142	50216	100432	200863
Day 9	20241	25301	33398	50603	101206	202411
Day 10	20400	25500	33659	50999	101998	203997
Day 11	20490	25613	33809	51226	102452	204905
Day 12	17667	22084	29150	44167	88335	176670
Day 13	18388	22985	30341	45971	91941	183882
Day 14	18816	23520	31046	47039	94079	188158
Day 15	19659	24573	32437	49146	98293	196586
Day 16	19974	24967	32956	49934	99868	199735
Day 17	20564	25705	33931	51410	102821	205642
Day 18	20600	25750	33990	51501	103001	206003
Day 19	20401	25501	33662	51003	102006	204011
Day 20	20900	26125	34485	52250	104500	209000
Day 21	21334	26667	35201	53334	106669	213337
Day 22	21841	27301	36037	54602	109203	218406
Day 23	22409	28012	36975	56023	112046	224093
Day 24	22580	28225	37257	56451	112901	225802
Day 25	17068	21335	28162	42670	85340	170680
Day 26	18027	22533	29744	45066	90133	180265
Day 27	10529	13162	17373	26323	52647	105293
Day 28	10715	13394	17680	26788	53576	107152
Day 29	11208	14010	18493	28019	56039	112077
Day 30	10734	13418	17711	26835	53671	107342
Day 31	10609	13262	17505	26523	53046	106093
Day 32	10533	13166	17379	26331	52663	105325
Day 33	10341	12927	17063	25854	51707	103415
Day 34	10163	12704	16769	25408	50815	101630
Day 35	9928	12410	16382	24821	49642	99283
Day 36	9608	12010	15853	24019	48039	96077
Day 37	9125	11406	15056	22813	45625	91250
Day 38	8783	10979	14492	21958	43916	87832
Day 39	8407	10508	13871	21016	42033	84065
Day 40	8252	10315	13616	20630	41260	82520
Day 41	7898	9872	13031	19745	39489	78978
Day 42	7546	9432	12451	18865	37730	75459
Day 43	7207	9009	11892	18018	36036	72073
Day 44	6926	8658	11429	17316	34632	69265
Day 45	6550	8188	10808	16375	32750	65500
Day 46	6099	7624	10064	15248	30496	60993
Day 47	5793	7242	9559	14483	28966	57932
Day 48	5577	6971	9202	13942	27884	55767
Day 49	5305	6631	8753	13262	26524	53048
Day 50	5004	6254	8256	12509	25018	50036
Day 51	4679	5848	7720	11697	23393	46786
Day 52	4447	5558	7337	11117	22233	44466
Day 53	4166	5207	6874	10415	20830	41659
Day 54	3993	4992	6589	9983	19967	39933
Day 55	3875	4844	6394	9688	19377	38754
Day 56	3687	4609	6084	9218	18435	36870
Day 57	3544	4430	5847	8859	17718	35437
Day 58	3478	4347	5739	8695	17390	34779
Day 59	3286	4108	5422	8215	16430	32860
Day 60	3150	3937	5197	7874	15749	31498
Day 61	3154	3942	5203	7884	15768	31536
Day 62	3145	3932	5190	7863	15726	31452
Day 63	3066	3832	5059	7665	15329	30658
Day 64	3013	3766	4972	7533	15066	30132
Day 65	2821	3527	4655	7053	14107	28213
Day 66	2587	3234	4269	6468	12937	25873
Day 67	2518	3147	4154	6294	12589	25177
Day 68	1913	2391	3156	4782	9565	19129
Day 69	1593	1991	2628	3982	7965	15930
Day 70	1448	1810	2390	3621	7241	14482
Day 71	1219	1524	2012	3048	6096	12192
Day 72	1026	1282	1692	2564	5128	10255
Day 73	1026	1282	1693	2565	5130	10259
Day 74	898	1122	1482	2245	4490	8979
Day 75	620	775	1023	1550	3100	6200
Day 76	269	337	444	673	1347	2694
Day 77	96	121	159	241	482	964
Day 78	65	81	107	163	325	651
Day 79	41	51	67	101	203	405
Day 80-90	7	8	11	16	33	65
Total	783716	979645	1293132	1959291	3918581	7837163

## Appendix 10.7 Calculation of Annual Benefit

(Reduction of Cost of Workers for Restoration: Financial Price)

Day after Earthquake	Expected Annual Benefit (Probability=0.0020) (USD)	Expected Annual Benefit (Probability=0.0025) (USD)	Expected Annual Benefit (Probability=0.0033) (USD)	Expected Annual Benefit (Probability=0.0050) (USD)	Expected Annual Benefit (Probability=0.010) (USD)	Expected Annual Benefit (Probability=0.020) (USD)
Day 1	1	1	1	2	4	7
Day 2	1	1	1	2	4	7
Day 3	1	1	1	2	4	7
Day 4	1	1	1	2	4	7
Day 5	1	1	1	2	4	7
Day 6	1	1	1	2	4	7
Day 7	1	1	1	2	4	7
Day 8	1	1	1	2	4	7
Day 9	1	1	1	2	4	7
Day 10	1	1	1	2	4	7
Day 11	1	1	1	2	4	7
Day 12	1	1	1	2	4	7
Day 13	1	1	1	2	4	7
Day 14	1	1	1	2	4	7
Day 15	1	1	1	2	4	7
Day 16	1	1	1	2	4	7
Day 17	1	1	1	2	4	7
Day 18	1	1	1	2	4	7
Day 19	1	1	1	2	4	7
Day 20	1	1	1	2	4	7
Day 21	1	1	1	2	4	7
Day 22	1	1	1	2	4	7
Day 23	1	1	1	2	4	7
Day 24	1	1	1	2	4	7
Day 25	2	3	3	5	11	21
Day 26	2	2	3	4	8	16
Day 27	3	4	5	7	14	28
Day 28	3	4	5	8	16	33
Day 29	5	6	8	12	23	47
Day 30	5	6	8	12	25	49
Day 31	13	16	21	32	63	126
Day 32	13	16	21	32	63	126
Day 33	13	16	21	32	63	126
Day 34	13	16	21	32	63	126
Day 35	13	16	21	32	63	126
Day 36	13	16	21	32	63	126
Day 37	13	16	21	32	63	126
Day 38	13	16	21	32	63	126
Day 39	13	16	21	32	63	126
Day 40	13	16	21	32	63	126
Day 41	13	16	21	32	63	126
Day 42	13	16	21	32	63	126
Day 43	13	16	21	32	63	126
Day 44	13	16	21	32	63	126
Day 45	13	16	21	32	63	126
Day 46	13	16	21	32	63	126
Day 47	13	16	21	32	63	126
Day 48	13	16	21	32	63	126
Day 49	13	16	21	32	63	126
Day 50	13	16	21	32	63	126
Day 51	13	16	21	32	63	126
Day 52	13	16	21	32	63	126
Day 53	13	16	21	32	63	126
Day 54	13	16	21	32	63	126
Day 55	13	16	21	32	63	126
Day 56	11	14	19	28	56	112
Day 57	11	14	19	28	56	112
Day 58	11	14	19	28	56	112
Day 59	11	14	19	28	56	112
Day 60	11	14	19	28	56	112
Day 61	10	12	16	25	49	98
Day 62	10	12	16	25	49	98
Day 63	10	12	16	25	49	98
Day 64	10	12	16	25	49	98
Day 65	10	12	16	25	49	98
Day 66	10	12	16	25	49	98
Day 67	9	11	15	23	46	91
Day 68	3	4	5	7	14	28
Day 69	3	4	5	7	14	28
Day 70	3	4	5	7	14	28
Day 71	3	4	5	7	14	28
Day 72	1	2	2	4	7	14
Day 73	1	2	2	4	7	14
Day 74	1	2	2	4	7	14
Day 75	1	2	2	4	7	14
Day 76	1	2	2	4	7	14
Day 77	1	2	2	4	7	14
Day 78	1	2	2	4	7	14
Day 79	1	2	2	4	7	14
Day 80-90	4	5	7	11	21	42
<b>Total</b>	<b>503</b>	<b>628</b>	<b>829</b>	<b>1256</b>	<b>2513</b>	<b>5026</b>

## Appendix 10.8 Calculation of Annual Benefit

(Reduction of Cost of Workers for Restoration: Economic Price)

Day after Earthquake	Expected Annual Benefit (Probability=0.0020) (USD)	Expected Annual Benefit (Probability=0.0025) (USD)	Expected Annual Benefit (Probability=0.0033) (USD)	Expected Annual Benefit (Probability=0.0050) (USD)	Expected Annual Benefit (Probability=0.010) (USD)	Expected Annual Benefit (Probability=0.020) (USD)
Day 1	1	1	1	2	3	7
Day 2	1	1	1	2	3	7
Day 3	1	1	1	2	3	7
Day 4	1	1	1	2	3	7
Day 5	1	1	1	2	3	7
Day 6	1	1	1	2	3	7
Day 7	1	1	1	2	3	7
Day 8	1	1	1	2	3	7
Day 9	1	1	1	2	3	7
Day 10	1	1	1	2	3	7
Day 11	1	1	1	2	3	7
Day 12	1	1	1	2	3	7
Day 13	1	1	1	2	3	7
Day 14	1	1	1	2	3	7
Day 15	1	1	1	2	3	7
Day 16	1	1	1	2	3	7
Day 17	1	1	1	2	3	7
Day 18	1	1	1	2	3	7
Day 19	1	1	1	2	3	7
Day 20	1	1	1	2	3	7
Day 21	1	1	1	2	3	7
Day 22	1	1	1	2	3	7
Day 23	1	1	1	2	3	7
Day 24	1	1	1	2	3	7
Day 25	2	3	3	5	10	20
Day 26	2	2	3	4	8	16
Day 27	3	3	4	7	14	27
Day 28	3	4	5	8	16	32
Day 29	5	6	7	11	23	45
Day 30	5	6	8	12	24	48
Day 31	12	15	20	31	61	122
Day 32	12	15	20	31	61	122
Day 33	12	15	20	31	61	122
Day 34	12	15	20	31	61	122
Day 35	12	15	20	31	61	122
Day 36	12	15	20	31	61	122
Day 37	12	15	20	31	61	122
Day 38	12	15	20	31	61	122
Day 39	12	15	20	31	61	122
Day 40	12	15	20	31	61	122
Day 41	12	15	20	31	61	122
Day 42	12	15	20	31	61	122
Day 43	12	15	20	31	61	122
Day 44	12	15	20	31	61	122
Day 45	12	15	20	31	61	122
Day 46	12	15	20	31	61	122
Day 47	12	15	20	31	61	122
Day 48	12	15	20	31	61	122
Day 49	12	15	20	31	61	122
Day 50	12	15	20	31	61	122
Day 51	12	15	20	31	61	122
Day 52	12	15	20	31	61	122
Day 53	12	15	20	31	61	122
Day 54	12	15	20	31	61	122
Day 55	12	15	20	31	61	122
Day 56	11	14	18	27	54	109
Day 57	11	14	18	27	54	109
Day 58	11	14	18	27	54	109
Day 59	11	14	18	27	54	109
Day 60	11	14	18	27	54	109
Day 61	10	12	16	24	48	95
Day 62	10	12	16	24	48	95
Day 63	10	12	16	24	48	95
Day 64	10	12	16	24	48	95
Day 65	10	12	16	24	48	95
Day 66	10	12	16	24	48	95
Day 67	9	11	15	22	44	88
Day 68	3	3	4	7	14	27
Day 69	3	3	4	7	14	27
Day 70	3	3	4	7	14	27
Day 71	3	3	4	7	14	27
Day 72	1	2	2	3	7	14
Day 73	1	2	2	3	7	14
Day 74	1	2	2	3	7	14
Day 75	1	2	2	3	7	14
Day 76	1	2	2	3	7	14
Day 77	1	2	2	3	7	14
Day 78	1	2	2	3	7	14
Day 79	1	2	2	3	7	14
Day 80	4	5	7	10	20	41
<b>Total</b>	<b>488</b>	<b>609</b>	<b>804</b>	<b>1219</b>	<b>2438</b>	<b>4875</b>

Appendix 10.9 Calculation of Annual Benefit

(Reduction of Workers for Emergency Water Supply: Financial Price)

Day after Earthquake	Expected Annual Benefit (Probability=0.0020) (USD)	Expected Annual Benefit (Probability=0.0025) (USD)	Expected Annual Benefit (Probability=0.0033) (USD)	Expected Annual Benefit (Probability=0.0050) (USD)	Expected Annual Benefit (Probability=0.010) (USD)	Expected Annual Benefit (Probability=0.020) (USD)
Day 1	0	0	0	0	0	0
Day 2	0	0	0	0	0	0
Day 3	0	0	0	0	0	0
Day 4	0	0	0	0	0	0
Day 5	1	1	1	2	4	7
Day 6	1	1	1	2	4	7
Day 7	2	2	3	4	8	16
Day 8	2	2	3	5	9	18
Day 9	2	2	3	4	8	16
Day 10	1	2	2	4	7	15
Day 11	1	2	2	4	7	14
Day 12	1	2	2	4	7	15
Day 13	1	2	2	3	7	13
Day 14	1	2	2	4	7	15
Day 15	2	2	3	5	10	19
Day 16	2	3	4	6	12	25
Day 17	2	3	4	6	12	24
Day 18	2	2	3	4	9	18
Day 19	2	2	3	5	9	18
Day 20	2	2	3	5	9	18
Day 21	2	2	3	5	9	19
Day 22	2	2	3	5	10	20
Day 23	2	3	4	6	11	23
Day 24	3	3	4	6	13	25
Day 25	3	4	5	8	15	31
Day 26	3	4	5	8	15	31
Day 27	4	5	6	9	18	36
Day 28	4	5	6	9	18	36
Day 29	4	5	6	10	19	39
Day 30	4	5	6	10	19	39
Day 31	4	5	7	10	20	41
Day 32	4	4	6	9	18	36
Day 33	4	4	6	9	18	35
Day 34	3	4	5	8	16	32
Day 35	3	4	5	8	16	32
Day 36	3	4	5	8	16	32
Day 37	3	4	5	8	16	32
Day 38	3	4	5	8	16	32
Day 39	3	4	5	8	16	32
Day 40	3	4	5	8	15	31
Day 41	3	3	5	7	14	27
Day 42	3	3	5	7	14	27
Day 43	3	3	5	7	14	27
Day 44	3	3	5	7	14	27
Day 45	3	3	5	7	14	27
Day 46	3	3	4	7	13	26
Day 47	3	3	4	6	13	25
Day 48	3	3	4	6	13	25
Day 49	2	3	4	6	12	25
Day 50	2	3	4	6	12	25
Day 51	2	3	4	6	12	25
Day 52	2	3	4	6	12	24
Day 53	2	3	4	6	12	24
Day 54	2	3	4	6	12	24
Day 55	2	3	4	6	12	24
Day 56	2	3	4	6	11	23
Day 57	2	2	3	5	10	19
Day 58	2	2	3	5	9	18
Day 59	2	2	3	4	8	17
Day 60	2	2	3	4	8	16
Day 61	1	1	2	3	6	12
Day 62	1	1	2	3	5	11
Day 63	1	1	2	3	5	11
Day 64	1	1	2	2	5	10
Day 65	1	1	2	2	5	10
Day 66	1	1	2	2	5	10
Day 67	1	1	1	2	4	9
Day 68	1	1	1	2	4	8
Day 69	1	1	1	2	4	8
Day 70	1	1	1	2	4	8
Day 71	1	1	1	2	4	8
Day 72	0	1	1	1	2	4
Day 73	0	1	1	1	2	4
Day 74	0	1	1	1	2	4
Day 75	0	0	1	1	1	2
Day 76	0	0	0	1	1	2
Day 77	0	0	0	1	1	2
Day 78	0	0	0	1	1	2
Day 79	0	0	0	1	1	2
Day 80-90	0	0	0	0	1	2
<b>Total</b>	<b>149</b>	<b>187</b>	<b>247</b>	<b>374</b>	<b>747</b>	<b>1494</b>

Appendix 10.10 Calculation of Annual Benefit

(Reduction of Cost of Workers for Emergency Water Supply: Economic Price)

Day after Earthquake	Expected Annual Benefit (Probability=0.0020) (USD)	Expected Annual Benefit (Probability=0.0025) (USD)	Expected Annual Benefit (Probability=0.0033) (USD)	Expected Annual Benefit (Probability=0.0050) (USD)	Expected Annual Benefit (Probability=0.010) (USD)	Expected Annual Benefit (Probability=0.020) (USD)
Day 1	0	0	0	0	0	0
Day 2	0	0	0	0	0	0
Day 3	0	0	0	0	0	0
Day 4	0	0	0	0	0	0
Day 5	1	1	1	2	3	7
Day 6	1	1	1	2	3	7
Day 7	2	2	3	4	8	15
Day 8	2	2	3	4	9	18
Day 9	2	2	3	4	8	16
Day 10	1	2	2	4	7	14
Day 11	1	2	2	3	7	14
Day 12	1	2	2	4	7	14
Day 13	1	2	2	3	7	13
Day 14	1	2	2	4	7	14
Day 15	2	2	3	5	9	19
Day 16	2	3	4	6	12	24
Day 17	2	3	4	6	12	23
Day 18	2	2	3	4	9	17
Day 19	2	2	3	4	9	18
Day 20	2	2	3	4	9	18
Day 21	2	2	3	5	9	18
Day 22	2	2	3	5	10	19
Day 23	2	3	4	6	11	22
Day 24	2	3	4	6	12	24
Day 25	3	4	5	8	15	30
Day 26	3	4	5	8	15	30
Day 27	4	4	6	9	18	35
Day 28	4	4	6	9	18	35
Day 29	4	5	6	9	19	37
Day 30	4	5	6	9	19	37
Day 31	4	5	7	10	20	40
Day 32	3	4	6	9	17	35
Day 33	3	4	6	9	17	34
Day 34	3	4	5	8	16	31
Day 35	3	4	5	8	16	31
Day 36	3	4	5	8	16	31
Day 37	3	4	5	8	16	31
Day 38	3	4	5	8	16	31
Day 39	3	4	5	8	16	31
Day 40	3	4	5	8	15	30
Day 41	3	3	4	7	13	27
Day 42	3	3	4	7	13	27
Day 43	3	3	4	7	13	27
Day 44	3	3	4	7	13	27
Day 45	3	3	4	7	13	27
Day 46	3	3	4	6	13	26
Day 47	2	3	4	6	12	24
Day 48	2	3	4	6	12	24
Day 49	2	3	4	6	12	24
Day 50	2	3	4	6	12	24
Day 51	2	3	4	6	12	24
Day 52	2	3	4	6	12	23
Day 53	2	3	4	6	12	23
Day 54	2	3	4	6	12	23
Day 55	2	3	4	6	12	23
Day 56	2	3	4	6	11	22
Day 57	2	2	3	5	9	19
Day 58	2	2	3	4	9	18
Day 59	2	2	3	4	8	16
Day 60	2	2	3	4	8	15
Day 61	1	1	2	3	6	11
Day 62	1	1	2	3	5	10
Day 63	1	1	2	3	5	10
Day 64	1	1	2	2	5	10
Day 65	1	1	2	2	5	10
Day 66	1	1	2	2	5	10
Day 67	1	1	1	2	4	9
Day 68	1	1	1	2	4	7
Day 69	1	1	1	2	4	7
Day 70	1	1	1	2	4	7
Day 71	1	1	1	2	4	7
Day 72	0	0	1	2	4	4
Day 73	0	0	1	2	4	4
Day 74	0	0	1	2	4	4
Day 75	0	0	0	1	1	2
Day 76	0	0	0	1	1	2
Day 77	0	0	0	1	1	2
Day 78	0	0	0	1	1	2
Day 79	0	0	0	1	1	2
Day 80	0	0	0	0	1	2
<b>Total</b>	<b>145</b>	<b>181</b>	<b>239</b>	<b>362</b>	<b>725</b>	<b>1449</b>

Appendix 10.11 Benefit Accrual Stream (Economic Case A)

Year	Financial Benefit				Economic Benefit			
	Direct Benefit			Total	Direct Benefit			Total
	Interruption of Water Supply for Users	Redution in Cost for Restoration	Reduction in Cost for Emergency Water Supply		Interruption of Water Supply for Users	Redution in Cost for Restoration	Reduction in Cost for Emergency Water Supply	
2008	0	0	0	0	0	0	0	0
2009	5658	25	1	5684	5488	25	1	5514
2010	11316	51	2	11369	10976	49	2	11028
2011	16974	76	3	17053	16465	74	3	16541
2012	36777	165	7	36948	35673	160	7	35840
2013	56579	254	10	56844	54882	246	10	55138
2014	76382	342	14	76739	74091	332	14	74437
2015	96185	3621	149	99956	93300	3512	145	96957
2016	807955	3621	149	811725	783716	3512	145	787374
2017	807955	3621	149	811725	783716	3512	145	787374
2018	807955	3621	149	811725	783716	3512	145	787374
2019	807955	3621	149	811725	783716	3512	145	787374
2020	807955	3621	149	811725	783716	3512	145	787374
2021	807955	3621	149	811725	783716	3512	145	787374
2022	807955	3621	149	811725	783716	3512	145	787374
2023	807955	3621	149	811725	783716	3512	145	787374
2024	807955	3621	149	811725	783716	3512	145	787374
2025	807955	3621	149	811725	783716	3512	145	787374
2026	807955	3621	149	811725	783716	3512	145	787374
2027	807955	3621	149	811725	783716	3512	145	787374
2028	807955	3621	149	811725	783716	3512	145	787374
2029	807955	3621	149	811725	783716	3512	145	787374
2030	807955	3621	149	811725	783716	3512	145	787374
2031	807955	3621	149	811725	783716	3512	145	787374
2032	807955	3621	149	811725	783716	3512	145	787374
2033	807955	3621	149	811725	783716	3512	145	787374
2034	807955	3621	149	811725	783716	3512	145	787374
2035	807955	3621	149	811725	783716	3512	145	787374
2036	807955	3621	149	811725	783716	3512	145	787374
2037	807955	3621	149	811725	783716	3512	145	787374
2038	807955	3621	149	811725	783716	3512	145	787374
2039	807955	3621	149	811725	783716	3512	145	787374
2040	807955	3621	149	811725	783716	3512	145	787374
2041	807955	3621	149	811725	783716	3512	145	787374
2042	807955	3621	149	811725	783716	3512	145	787374
2043	807955	3621	149	811725	783716	3512	145	787374
2044	807955	3621	149	811725	783716	3512	145	787374
2045	807955	3621	149	811725	783716	3512	145	787374
2046	807955	3621	149	811725	783716	3512	145	787374
2047	807955	3621	149	811725	783716	3512	145	787374
2048	807955	3621	149	811725	783716	3512	145	787374
2049	807955	3621	149	811725	783716	3512	145	787374
2050	807955	3621	149	811725	783716	3512	145	787374
2051	807955	3621	149	811725	783716	3512	145	787374
2052	807955	3621	149	811725	783716	3512	145	787374
2053	807955	3621	149	811725	783716	3512	145	787374
2054	807955	3621	149	811725	783716	3512	145	787374
2055	807955	3621	149	811725	783716	3512	145	787374
2056	807955	3621	149	811725	783716	3512	145	787374
2057	807955	3621	149	811725	783716	3512	145	787374
Total	34233977	156619	6463	34397060	33206958	151921	6269	33365148



Appendix 10.12 Benefit Accrual Stream (Economic Case B)

Year	Financial Benefit				Economic Benefit			
	Direct Benefit			Total	Direct Benefit			Total
	Interruption of Water Supply for Users	Reduction in Cost for Restoration	Reduction in Cost for Emergency Water Supply		Interruption of Water Supply for Users	Reduction in Cost for Restoration	Reduction in Cost for Emergency Water Supply	
2008	0	0	0	0	0	0	0	0
2009	7072	32	1	7105	6860	31	1	6892
2010	14145	63	3	14211	13721	61	3	13785
2011	21217	95	4	21316	20581	92	4	20677
2012	45971	206	9	46185	44592	200	8	44800
2013	70724	317	13	71054	68603	307	13	68923
2014	95478	428	18	95923	92614	415	17	93046
2015	120231	4526	187	124945	116624	4391	181	121196
2016	1009944	4526	187	1014657	979645	4391	181	984217
2017	1009944	4526	187	1014657	979645	4391	181	984217
2018	1009944	4526	187	1014657	979645	4391	181	984217
2019	1009944	4526	187	1014657	979645	4391	181	984217
2020	1009944	4526	187	1014657	979645	4391	181	984217
2021	1009944	4526	187	1014657	979645	4391	181	984217
2022	1009944	4526	187	1014657	979645	4391	181	984217
2023	1009944	4526	187	1014657	979645	4391	181	984217
2024	1009944	4526	187	1014657	979645	4391	181	984217
2025	1009944	4526	187	1014657	979645	4391	181	984217
2026	1009944	4526	187	1014657	979645	4391	181	984217
2027	1009944	4526	187	1014657	979645	4391	181	984217
2028	1009944	4526	187	1014657	979645	4391	181	984217
2029	1009944	4526	187	1014657	979645	4391	181	984217
2030	1009944	4526	187	1014657	979645	4391	181	984217
2031	1009944	4526	187	1014657	979645	4391	181	984217
2032	1009944	4526	187	1014657	979645	4391	181	984217
2033	1009944	4526	187	1014657	979645	4391	181	984217
2034	1009944	4526	187	1014657	979645	4391	181	984217
2035	1009944	4526	187	1014657	979645	4391	181	984217
2036	1009944	4526	187	1014657	979645	4391	181	984217
2037	1009944	4526	187	1014657	979645	4391	181	984217
2038	1009944	4526	187	1014657	979645	4391	181	984217
2039	1009944	4526	187	1014657	979645	4391	181	984217
2040	1009944	4526	187	1014657	979645	4391	181	984217
2041	1009944	4526	187	1014657	979645	4391	181	984217
2042	1009944	4526	187	1014657	979645	4391	181	984217
2043	1009944	4526	187	1014657	979645	4391	181	984217
2044	1009944	4526	187	1014657	979645	4391	181	984217
2045	1009944	4526	187	1014657	979645	4391	181	984217
2046	1009944	4526	187	1014657	979645	4391	181	984217
2047	1009944	4526	187	1014657	979645	4391	181	984217
2048	1009944	4526	187	1014657	979645	4391	181	984217
2049	1009944	4526	187	1014657	979645	4391	181	984217
2050	1009944	4526	187	1014657	979645	4391	181	984217
2051	1009944	4526	187	1014657	979645	4391	181	984217
2052	1009944	4526	187	1014657	979645	4391	181	984217
2053	1009944	4526	187	1014657	979645	4391	181	984217
2054	1009944	4526	187	1014657	979645	4391	181	984217
2055	1009944	4526	187	1014657	979645	4391	181	984217
2056	1009944	4526	187	1014657	979645	4391	181	984217
2057	1009944	4526	187	1014657	979645	4391	181	984217
Total	42792471	195774	8079	42996325	41508697	189901	7837	41706435

Appendix 10.13 Benefit Accrual Stream (Economic Case C)

Year	Financial Benefit				Economic Benefit			
	Direct Benefit			Total	Direct Benefit			Total
	Interruption of Water Supply for Users	Redution in Cost for Restoration	Reduction in Cost for Emergency Water Supply		Interruption of Water Supply for Users	Redution in Cost for Restoration	Reduction in Cost for Emergency Water Supply	
2008	0	0	0	0	0	0	0	0
2009	9336	42	2	9379	9056	41	2	9098
2010	18671	84	3	18758	18111	81	3	18196
2011	28007	126	5	28138	27167	122	5	27293
2012	60681	272	11	60965	58861	264	11	59136
2013	93356	418	17	93792	90555	406	17	90978
2014	126031	565	23	126619	122250	548	23	122820
2015	158705	5975	247	164927	153944	5796	239	159979
2016	1333126	5975	247	1339347	1293132	5796	239	1299167
2017	1333126	5975	247	1339347	1293132	5796	239	1299167
2018	1333126	5975	247	1339347	1293132	5796	239	1299167
2019	1333126	5975	247	1339347	1293132	5796	239	1299167
2020	1333126	5975	247	1339347	1293132	5796	239	1299167
2021	1333126	5975	247	1339347	1293132	5796	239	1299167
2022	1333126	5975	247	1339347	1293132	5796	239	1299167
2023	1333126	5975	247	1339347	1293132	5796	239	1299167
2024	1333126	5975	247	1339347	1293132	5796	239	1299167
2025	1333126	5975	247	1339347	1293132	5796	239	1299167
2026	1333126	5975	247	1339347	1293132	5796	239	1299167
2027	1333126	5975	247	1339347	1293132	5796	239	1299167
2028	1333126	5975	247	1339347	1293132	5796	239	1299167
2029	1333126	5975	247	1339347	1293132	5796	239	1299167
2030	1333126	5975	247	1339347	1293132	5796	239	1299167
2031	1333126	5975	247	1339347	1293132	5796	239	1299167
2032	1333126	5975	247	1339347	1293132	5796	239	1299167
2033	1333126	5975	247	1339347	1293132	5796	239	1299167
2034	1333126	5975	247	1339347	1293132	5796	239	1299167
2035	1333126	5975	247	1339347	1293132	5796	239	1299167
2036	1333126	5975	247	1339347	1293132	5796	239	1299167
2037	1333126	5975	247	1339347	1293132	5796	239	1299167
2038	1333126	5975	247	1339347	1293132	5796	239	1299167
2039	1333126	5975	247	1339347	1293132	5796	239	1299167
2040	1333126	5975	247	1339347	1293132	5796	239	1299167
2041	1333126	5975	247	1339347	1293132	5796	239	1299167
2042	1333126	5975	247	1339347	1293132	5796	239	1299167
2043	1333126	5975	247	1339347	1293132	5796	239	1299167
2044	1333126	5975	247	1339347	1293132	5796	239	1299167
2045	1333126	5975	247	1339347	1293132	5796	239	1299167
2046	1333126	5975	247	1339347	1293132	5796	239	1299167
2047	1333126	5975	247	1339347	1293132	5796	239	1299167
2048	1333126	5975	247	1339347	1293132	5796	239	1299167
2049	1333126	5975	247	1339347	1293132	5796	239	1299167
2050	1333126	5975	247	1339347	1293132	5796	239	1299167
2051	1333126	5975	247	1339347	1293132	5796	239	1299167
2052	1333126	5975	247	1339347	1293132	5796	239	1299167
2053	1333126	5975	247	1339347	1293132	5796	239	1299167
2054	1333126	5975	247	1339347	1293132	5796	239	1299167
2055	1333126	5975	247	1339347	1293132	5796	239	1299167
2056	1333126	5975	247	1339347	1293132	5796	239	1299167
2057	1333126	5975	247	1339347	1293132	5796	239	1299167
Total	56486062	258422	10664	56755149	54791480	250669	10344	55052494

Appendix 10.14 Benefit Accrual Stream (Economic Case D)

Year	Financial Benefit				Economic Benefit			
	Direct Benefit			Total	Direct Benefit			Total
	Interruption of Water Supply for Users	Redution in Cost for Restoration	Reduction in Cost for Emergency Water Supply		Interruption of Water Supply for Users	Redution in Cost for Restoration	Reduction in Cost for Emergency Water Supply	
2008	0	0	0	0	0	0	0	0
2009	14145	63	3	14211	13721	61	3	13785
2010	28290	127	5	28422	27441	123	5	27569
2011	42435	190	8	42633	41162	184	8	41354
2012	91942	412	17	92371	89183	400	16	89600
2013	141449	634	26	142109	137205	615	25	137846
2014	190956	856	35	191847	185227	830	34	186091
2015	240463	9053	374	249889	233249	8781	362	242392
2016	2019887	9053	374	2029314	1959291	8781	362	1968434
2017	2019887	9053	374	2029314	1959291	8781	362	1968434
2018	2019887	9053	374	2029314	1959291	8781	362	1968434
2019	2019887	9053	374	2029314	1959291	8781	362	1968434
2020	2019887	9053	374	2029314	1959291	8781	362	1968434
2021	2019887	9053	374	2029314	1959291	8781	362	1968434
2022	2019887	9053	374	2029314	1959291	8781	362	1968434
2023	2019887	9053	374	2029314	1959291	8781	362	1968434
2024	2019887	9053	374	2029314	1959291	8781	362	1968434
2025	2019887	9053	374	2029314	1959291	8781	362	1968434
2026	2019887	9053	374	2029314	1959291	8781	362	1968434
2027	2019887	9053	374	2029314	1959291	8781	362	1968434
2028	2019887	9053	374	2029314	1959291	8781	362	1968434
2029	2019887	9053	374	2029314	1959291	8781	362	1968434
2030	2019887	9053	374	2029314	1959291	8781	362	1968434
2031	2019887	9053	374	2029314	1959291	8781	362	1968434
2032	2019887	9053	374	2029314	1959291	8781	362	1968434
2033	2019887	9053	374	2029314	1959291	8781	362	1968434
2034	2019887	9053	374	2029314	1959291	8781	362	1968434
2035	2019887	9053	374	2029314	1959291	8781	362	1968434
2036	2019887	9053	374	2029314	1959291	8781	362	1968434
2037	2019887	9053	374	2029314	1959291	8781	362	1968434
2038	2019887	9053	374	2029314	1959291	8781	362	1968434
2039	2019887	9053	374	2029314	1959291	8781	362	1968434
2040	2019887	9053	374	2029314	1959291	8781	362	1968434
2041	2019887	9053	374	2029314	1959291	8781	362	1968434
2042	2019887	9053	374	2029314	1959291	8781	362	1968434
2043	2019887	9053	374	2029314	1959291	8781	362	1968434
2044	2019887	9053	374	2029314	1959291	8781	362	1968434
2045	2019887	9053	374	2029314	1959291	8781	362	1968434
2046	2019887	9053	374	2029314	1959291	8781	362	1968434
2047	2019887	9053	374	2029314	1959291	8781	362	1968434
2048	2019887	9053	374	2029314	1959291	8781	362	1968434
2049	2019887	9053	374	2029314	1959291	8781	362	1968434
2050	2019887	9053	374	2029314	1959291	8781	362	1968434
2051	2019887	9053	374	2029314	1959291	8781	362	1968434
2052	2019887	9053	374	2029314	1959291	8781	362	1968434
2053	2019887	9053	374	2029314	1959291	8781	362	1968434
2054	2019887	9053	374	2029314	1959291	8781	362	1968434
2055	2019887	9053	374	2029314	1959291	8781	362	1968434
2056	2019887	9053	374	2029314	1959291	8781	362	1968434
2057	2019887	9053	374	2029314	1959291	8781	362	1968434
Total	85584943	391549	16158	85992649	83017394	379802	15673	83412870

Appendix 10.15 Benefit Accrual Stream (Economic Case E)

Year	Financial Benefit				Economic Benefit			
	Direct Benefit			Total	Direct Benefit			Total
	Interruption of Water Supply for Users	Redution in Cost for Restoration	Reduction in Cost for Emergency Water Supply		Interruption of Water Supply for Users	Redution in Cost for Restoration	Reduction in Cost for Emergency Water Supply	
2008	0	0	0	0	0	0	0	0
2009	28290	127	5	28422	27441	123	5	27569
2010	56579	254	10	56844	54882	246	10	55138
2011	84869	380	16	85265	82323	369	15	82707
2012	183883	824	34	184741	178367	799	33	179199
2013	282897	1268	52	284218	274410	1230	51	275691
2014	381911	1712	71	383694	370454	1660	69	372183
2015	480926	18105	747	499778	466498	17562	725	484785
2016	4039775	18105	747	4058627	3918581	17562	725	3936868
2017	4039775	18105	747	4058627	3918581	17562	725	3936868
2018	4039775	18105	747	4058627	3918581	17562	725	3936868
2019	4039775	18105	747	4058627	3918581	17562	725	3936868
2020	4039775	18105	747	4058627	3918581	17562	725	3936868
2021	4039775	18105	747	4058627	3918581	17562	725	3936868
2022	4039775	18105	747	4058627	3918581	17562	725	3936868
2023	4039775	18105	747	4058627	3918581	17562	725	3936868
2024	4039775	18105	747	4058627	3918581	17562	725	3936868
2025	4039775	18105	747	4058627	3918581	17562	725	3936868
2026	4039775	18105	747	4058627	3918581	17562	725	3936868
2027	4039775	18105	747	4058627	3918581	17562	725	3936868
2028	4039775	18105	747	4058627	3918581	17562	725	3936868
2029	4039775	18105	747	4058627	3918581	17562	725	3936868
2030	4039775	18105	747	4058627	3918581	17562	725	3936868
2031	4039775	18105	747	4058627	3918581	17562	725	3936868
2032	4039775	18105	747	4058627	3918581	17562	725	3936868
2033	4039775	18105	747	4058627	3918581	17562	725	3936868
2034	4039775	18105	747	4058627	3918581	17562	725	3936868
2035	4039775	18105	747	4058627	3918581	17562	725	3936868
2036	4039775	18105	747	4058627	3918581	17562	725	3936868
2037	4039775	18105	747	4058627	3918581	17562	725	3936868
2038	4039775	18105	747	4058627	3918581	17562	725	3936868
2039	4039775	18105	747	4058627	3918581	17562	725	3936868
2040	4039775	18105	747	4058627	3918581	17562	725	3936868
2041	4039775	18105	747	4058627	3918581	17562	725	3936868
2042	4039775	18105	747	4058627	3918581	17562	725	3936868
2043	4039775	18105	747	4058627	3918581	17562	725	3936868
2044	4039775	18105	747	4058627	3918581	17562	725	3936868
2045	4039775	18105	747	4058627	3918581	17562	725	3936868
2046	4039775	18105	747	4058627	3918581	17562	725	3936868
2047	4039775	18105	747	4058627	3918581	17562	725	3936868
2048	4039775	18105	747	4058627	3918581	17562	725	3936868
2049	4039775	18105	747	4058627	3918581	17562	725	3936868
2050	4039775	18105	747	4058627	3918581	17562	725	3936868
2051	4039775	18105	747	4058627	3918581	17562	725	3936868
2052	4039775	18105	747	4058627	3918581	17562	725	3936868
2053	4039775	18105	747	4058627	3918581	17562	725	3936868
2054	4039775	18105	747	4058627	3918581	17562	725	3936868
2055	4039775	18105	747	4058627	3918581	17562	725	3936868
2056	4039775	18105	747	4058627	3918581	17562	725	3936868
2057	4039775	18105	747	4058627	3918581	17562	725	3936868
Total	171169885	783097	32316	171985299	166034789	759605	31347	166825740

Appendix 10.16 Benefit Accrual Stream (Economic Case F)

Year	Financial Benefit				Economic Benefit			
	Direct Benefit			Total	Direct Benefit			Total
	Interruption of Water Supply for Users	Redution in Cost for Restoration	Reduction in Cost for Emergency Water Supply		Interruption of Water Supply for Users	Redution in Cost for Restoration	Reduction in Cost for Emergency Water Supply	
2008	0	0	0	0	0	0	0	0
2009	56579	254	10	56844	54882	246	10	55138
2010	113159	507	21	113687	109764	492	20	110276
2011	169738	761	31	170531	164646	738	30	165415
2012	367767	1648	68	369483	356734	1599	66	358398
2013	565795	2536	105	568435	548821	2460	102	551382
2014	763823	3423	141	767387	740908	3321	137	744366
2015	961851	36211	1494	999556	932996	35125	1449	969570
2016	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2017	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2018	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2019	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2020	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2021	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2022	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2023	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2024	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2025	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2026	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2027	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2028	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2029	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2030	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2031	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2032	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2033	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2034	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2035	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2036	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2037	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2038	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2039	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2040	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2041	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2042	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2043	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2044	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2045	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2046	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2047	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2048	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2049	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2050	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2051	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2052	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2053	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2054	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2055	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2056	8079549	36211	1494	8117254	7837163	35125	1449	7873737
2057	8079549	36211	1494	8117254	7837163	35125	1449	7873737
Total	342339771	1566195	64632	343970598	332069578	1519209	62693	333651480

Appendix 10.17 Cost Stream (Facilities and Equipment)

Year	Financial Cost				Economic Cost			
	Cost Breakdown			Total	Cost Breakdown			Total
	Initial Investment	Replacement	O&M		Initial Investment	Replacement	O&M	
2008	483533	0	0	483533	449964	0	0	449964
2009	483533	0	0	483533	449964	0	0	449964
2010	483534	0	0	483534	449965	0	0	449965
2011	736475	0	0	736475	685346	0	0	685346
2012	736475	0	0	736475	685346	0	0	685346
2013	736475	0	0	736475	685346	0	0	685346
2014	736475	0	0	736475	685346	0	0	685346
2015	635040	0	0	635040	590953	0	0	590953
2016	635040	0	0	635040	590953	0	0	590953
2017	635040	0	0	635040	590953	0	0	590953
2018	635040	0	0	635040	590953	0	0	590953
2019	635040	0	0	635040	590953	0	0	590953
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
2036	0	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0	0
2038	0	152600	0	152600	0	142006	0	142006
2039	0	152600	0	152600	0	142006	0	142006
2040	0	152600	0	152600	0	142006	0	142006
2041	0	334000	0	334000	0	310812	0	310812
2042	0	334000	0	334000	0	310812	0	310812
2043	0	334000	0	334000	0	310812	0	310812
2044	0	334000	0	334000	0	310812	0	310812
2045	0	486200	0	486200	0	452446	0	452446
2046	0	486200	0	486200	0	452446	0	452446
2047	0	486200	0	486200	0	452446	0	452446
2048	0	486200	0	486200	0	452446	0	452446
2049	0	486200	0	486200	0	452446	0	452446
2050	0	0	0	0	0	0	0	0
2051	0	0	0	0	0	0	0	0
2052	0	0	0	0	0	0	0	0
2053	0	0	0	0	0	0	0	0
2054	0	0	0	0	0	0	0	0
2055	0	0	0	0	0	0	0	0
2056	0	0	0	0	0	0	0	0
2057	0	0	0	0	0	0	0	0
Total	751700	422480	0	1179650	704604	393149	0	1097754

Appendix 10.18 Cost Stream (Pipelines)

Year	Financial Cost				Economic Cost			
	Cost Breakdown			Total	Cost Breakdown			Total
	Initial Investment	Replacement	O&M		Initial Investment	Replacement	O&M	
2008	50000	0	0	50000	42438	0	0	42438
2009	50000	0	0	50000	42438	0	0	42438
2010	50000	0	0	50000	42438	0	0	42438
2011	175000	0	0	175000	148531	0	0	148531
2012	175000	0	0	175000	148531	0	0	148531
2013	175000	0	0	175000	148531	0	0	148531
2014	175000	0	0	175000	148531	0	0	148531
2015	1258000	0	0	1258000	1067728	0	0	1067728
2016	1258000	0	0	1258000	1067728	0	0	1067728
2017	1258000	0	0	1258000	1067728	0	0	1067728
2018	1258000	0	0	1258000	1067728	0	0	1067728
2019	1258000	0	0	1258000	1067728	0	0	1067728
2020	0	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0	0
2036	0	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0	0
2038	0	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	0	0
2040	0	0	0	0	0	0	0	0
2041	0	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0	0
2047	0	0	0	0	0	0	0	0
2048	0	0	0	0	0	0	0	0
2049	0	0	0	0	0	0	0	0
2050	0	0	0	0	0	0	0	0
2051	0	0	0	0	0	0	0	0
2052	0	0	0	0	0	0	0	0
2053	0	0	0	0	0	0	0	0
2054	0	0	0	0	0	0	0	0
2055	0	0	0	0	0	0	0	0
2056	0	0	0	0	0	0	0	0
2057	0	0	0	0	0	0	0	0
Total	7140000	0	0	7140000	6060075	0	0	6060075

Appendix 10.19 Cost Stream (Emergency Water Supply)

Year	Financial Cost			Total	Economic Cost			Total
	Cost Breakdown				Cost Breakdown			
	Initial Investment	Replacement	O&M		Initial Investment	Replacement	O&M	
2008	676000	0	0	676000	631217	0	0	631217
2009	676000	0	0	676000	631217	0	0	631217
2010	676000	0	0	676000	631217	0	0	631217
2011	649500	0	1560	651060	606472	0	1324	607796
2012	649500	0	1560	651060	606472	0	1324	607796
2013	649500	0	1560	651060	606472	0	1324	607796
2014	649500	0	1560	651060	606472	0	1324	607796
2015	586000	0	4680	590680	547179	0	3972	551151
2016	586000	0	4680	590680	547179	0	3972	551151
2017	586000	0	4680	590680	547179	0	3972	551151
2018	586000	0	4680	590680	547179	0	3972	551151
2019	586000	0	4680	590680	547179	0	3972	551151
2020	0	0	4680	4680	0	0	3972	3972
2021	0	0	4680	4680	0	0	3972	3972
2022	0	0	4680	4680	0	0	3972	3972
2023	0	0	4680	4680	0	0	3972	3972
2024	0	0	4680	4680	0	0	3972	3972
2025	0	0	4680	4680	0	0	3972	3972
2026	0	0	4680	4680	0	0	3972	3972
2027	0	0	4680	4680	0	0	3972	3972
2028	0	0	4680	4680	0	0	3972	3972
2029	0	0	4680	4680	0	0	3972	3972
2030	0	0	4680	4680	0	0	3972	3972
2031	0	0	4680	4680	0	0	3972	3972
2032	0	0	4680	4680	0	0	3972	3972
2033	0	0	4680	4680	0	0	3972	3972
2034	0	0	4680	4680	0	0	3972	3972
2035	0	0	4680	4680	0	0	3972	3972
2036	0	0	4680	4680	0	0	3972	3972
2037	0	0	4680	4680	0	0	3972	3972
2038	0	0	4680	4680	0	0	3972	3972
2039	0	0	4680	4680	0	0	3972	3972
2040	0	0	4680	4680	0	0	3972	3972
2041	0	0	4680	4680	0	0	3972	3972
2042	0	0	4680	4680	0	0	3972	3972
2043	0	0	4680	4680	0	0	3972	3972
2044	0	0	4680	4680	0	0	3972	3972
2045	0	0	4680	4680	0	0	3972	3972
2046	0	0	4680	4680	0	0	3972	3972
2047	0	0	4680	4680	0	0	3972	3972
2048	0	0	4680	4680	0	0	3972	3972
2049	0	0	4680	4680	0	0	3972	3972
2050	0	0	4680	4680	0	0	3972	3972
2051	0	0	4680	4680	0	0	3972	3972
2052	0	0	4680	4680	0	0	3972	3972
2053	0	0	4680	4680	0	0	3972	3972
2054	0	0	4680	4680	0	0	3972	3972
2055	0	0	4680	4680	0	0	3972	3972
2056	0	0	4680	4680	0	0	3972	3972
2057	0	0	4680	4680	0	0	3972	3972
Total	7556000	0	207480	7763480	7055434	0	176099	7231533



Appendix 10.20 Cost Stream (Total Cost)

Year	Financial Cost				Economic Cost			
	Cost Breakdown			Total	Cost Breakdown			Total
	Initial Investment	Replacement	Administration, Consulting fee, Contingency and O&M		Initial Investment	Replacement	O&M	
2008	1209533	0	338525	1548058	1123619	0	314613	1438232
2009	1209533	0	338525	1548058	1123619	0	314613	1438232
2010	1209534	0	338525	1548059	1123619	0	314613	1438233
2011	1560975	0	438447	1999422	1440350	0	404622	1844972
2012	1560975	0	438447	1999422	1440350	0	404622	1844972
2013	1560975	0	438447	1999422	1440350	0	404622	1844972
2014	1560975	0	438447	1999422	1440350	0	404622	1844972
2015	2479040	0	698516	3177556	2205860	0	621613	2827472
2016	2479040	0	698516	3177556	2205860	0	621613	2827472
2017	2479040	0	698516	3177556	2205860	0	621613	2827472
2018	2479040	0	698516	3177556	2205860	0	621613	2827472
2019	2479040	0	698516	3177556	2205860	0	621613	2827472
2020	0	0	4680	4680	0	0	3972	3972
2021	0	0	4680	4680	0	0	3972	3972
2022	0	0	4680	4680	0	0	3972	3972
2023	0	0	4680	4680	0	0	3972	3972
2024	0	0	4680	4680	0	0	3972	3972
2025	0	0	4680	4680	0	0	3972	3972
2026	0	0	4680	4680	0	0	3972	3972
2027	0	0	4680	4680	0	0	3972	3972
2028	0	0	4680	4680	0	0	3972	3972
2029	0	0	4680	4680	0	0	3972	3972
2030	0	0	4680	4680	0	0	3972	3972
2031	0	0	4680	4680	0	0	3972	3972
2032	0	0	4680	4680	0	0	3972	3972
2033	0	0	4680	4680	0	0	3972	3972
2034	0	0	4680	4680	0	0	3972	3972
2035	0	0	4680	4680	0	0	3972	3972
2036	0	0	4680	4680	0	0	3972	3972
2037	0	0	4680	4680	0	0	3972	3972
2038	0	152600	4680	157280	0	142006	3972	145978
2039	0	152600	4680	157280	0	142006	3972	145978
2040	0	152600	4680	157280	0	142006	3972	145978
2041	0	334000	4680	338680	0	310812	3972	314785
2042	0	334000	4680	338680	0	310812	3972	314785
2043	0	334000	4680	338680	0	310812	3972	314785
2044	0	334000	4680	338680	0	310812	3972	314785
2045	0	486200	4680	490880	0	452446	3972	456418
2046	0	486200	4680	490880	0	452446	3972	456418
2047	0	486200	4680	490880	0	452446	3972	456418
2048	0	486200	4680	490880	0	452446	3972	456418
2049	0	486200	4680	490880	0	452446	3972	456418
2050	0	0	4680	4680	0	0	3972	3972
2051	0	0	4680	4680	0	0	3972	3972
2052	0	0	4680	4680	0	0	3972	3972
2053	0	0	4680	4680	0	0	3972	3972
2054	0	0	4680	4680	0	0	3972	3972
2055	0	0	4680	4680	0	0	3972	3972
2056	0	0	4680	4680	0	0	3972	3972
2057	0	0	4680	4680	0	0	3972	3972
Total	22267700	4224800	6439780	32932280	20161553	3931499	5821334	29914385

Appendix 10.21 Calculations of FIRR, EIRR, B/C and NPV (Economic Case A-1)

Year	FIRR= 0.24%		B/C= 0.470		FNPV	EIRR= 0.62%		B/C= 0.502		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	5684	1548058	5414	1474341	-1468927	5514	1438232	5251	1369744	-1364493
2010	11369	1548059	10312	1404135	-1393824	11028	1438233	10002	1304520	-1294517
2011	17053	1999422	14731	1727176	-1712445	16541	1844972	14289	1593756	-1579467
2012	36948	1999422	30397	1644929	-1614532	35840	1844972	29486	1517863	-1488377
2013	56844	1999422	44538	1566599	-1522061	55138	1844972	43202	1445584	-1402381
2014	76739	1999422	57264	1491999	-1434736	74437	1844972	55546	1376746	-1321200
2015	99956	3177556	71037	2258229	-2187193	96957	2827472	68905	2009432	-1940526
2016	811725	3177556	549408	2150695	-1601287	787374	2827472	532925	1913745	-1380819
2017	811725	3177556	523245	2048281	-1525035	787374	2827472	507548	1822614	-1315066
2018	811725	3177556	498329	1950743	-1452414	787374	2827472	483379	1735823	-1252444
2019	811725	3177556	474599	1857851	-1383252	787374	2827472	460361	1653165	-1192804
2020	811725	4680	451999	2606	449393	787374	3972	438439	2212	436227
2021	811725	4680	430475	2482	427993	787374	3972	417561	2107	415455
2022	811725	4680	409976	2364	407613	787374	3972	397677	2006	395671
2023	811725	4680	390454	2251	388203	787374	3972	378740	1911	376830
2024	811725	4680	371861	2144	369717	787374	3972	360705	1820	358885
2025	811725	4680	354153	2042	352111	787374	3972	343529	1733	341795
2026	811725	4680	337289	1945	335344	787374	3972	327170	1651	325520
2027	811725	4680	321227	1852	319375	787374	3972	311590	1572	310019
2028	811725	4680	305931	1764	304167	787374	3972	296753	1497	295256
2029	811725	4680	291363	1680	289683	787374	3972	282622	1426	281196
2030	811725	4680	277488	1600	275888	787374	3972	269164	1358	267806
2031	811725	4680	264275	1524	262751	787374	3972	256346	1293	255053
2032	811725	4680	251690	1451	250239	787374	3972	244139	1232	242908
2033	811725	4680	239705	1382	238323	787374	3972	232514	1173	231341
2034	811725	4680	228290	1316	226974	787374	3972	221442	1117	220324
2035	811725	4680	217419	1254	216166	787374	3972	210897	1064	209833
2036	811725	4680	207066	1194	205872	787374	3972	200854	1013	199841
2037	811725	4680	197206	1137	196069	787374	3972	191290	965	190325
2038	811725	157280	187815	36391	151424	787374	145978	182181	33776	148404
2039	811725	157280	178871	34658	144213	787374	145978	173505	32168	141338
2040	811725	157280	170354	33008	137346	787374	145978	165243	30636	134607
2041	811725	338680	162242	67693	94549	787374	314785	157374	62917	94458
2042	811725	338680	154516	64469	90046	787374	314785	149880	59921	89960
2043	811725	338680	147158	61399	85759	787374	314785	142743	57067	85676
2044	811725	338680	140150	58476	81675	787374	314785	135946	54350	81596
2045	811725	490880	133477	80718	52758	787374	456418	129472	75051	54421
2046	811725	490880	127121	76874	50246	787374	456418	123307	71478	51829
2047	811725	490880	121067	73214	47853	787374	456418	117435	68074	49361
2048	811725	490880	115302	69727	45575	787374	456418	111843	64832	47011
2049	811725	490880	109812	66407	43404	787374	456418	106517	61745	44772
2050	811725	4680	104582	603	103979	787374	3972	101445	512	100933
2051	811725	4680	99602	574	99028	787374	3972	96614	487	96127
2052	811725	4680	94859	547	94312	787374	3972	92014	464	91549
2053	811725	4680	90342	521	89821	787374	3972	87632	442	87190
2054	811725	4680	86040	496	85544	787374	3972	83459	421	83038
2055	811725	4680	81943	472	81471	787374	3972	79485	401	79084
2056	811725	4680	78041	450	77591	787374	3972	75700	382	75318
2057	811725	4680	74325	429	73896	787374	3972	72095	364	71731
Total	34397060	32932280	10284759	21882150	-11597391	33365148	29914385	9976217	19883858	-9907641

Appendix 10.22 Calculations of FIRR, EIRR, B/C and NPV (Economic Case A-2)

Year	FIRR=-0.29%		B/C=0.427		FNPV	EIRR=0.03%		B/C=0.452		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	5684	1702864	5414	1621775	-1616361	5514	1582055	5251	1506719	-1501468
2010	11369	1702865	10312	1544549	-1534237	11028	1582056	10002	1434972	-1424969
2011	17053	2199364	14731	1899893	-1885162	16541	2029469	14289	1753131	-1738842
2012	36948	2199364	30397	1809422	-1779025	35840	2029469	29486	1669649	-1640163
2013	56844	2199364	44538	1723259	-1678721	55138	2029469	43202	1590142	-1546940
2014	76739	2199364	57264	1641199	-1583936	74437	2029469	55546	1514421	-1458875
2015	99956	3495311	71037	2484052	-2413016	96957	3110220	68905	2210375	-2141470
2016	811725	3495311	549408	2365764	-1816356	787374	3110220	532925	2105119	-1572194
2017	811725	3495311	523245	2253109	-1729863	787374	3421242	507548	2205363	-1697815
2018	811725	3495311	498329	2145818	-1647489	787374	3110220	483379	1909405	-1426026
2019	811725	3495311	474599	2043636	-1569037	787374	3110220	460361	1818481	-1358120
2020	811725	5148	451999	2867	449132	787374	4369	438439	2433	436006
2021	811725	5148	430475	2730	427745	787374	4369	417561	2317	415244
2022	811725	5148	409976	2600	407376	787374	4369	397677	2207	395470
2023	811725	5148	390454	2476	387978	787374	4369	378740	2102	376638
2024	811725	5148	371861	2358	369502	787374	4369	360705	2002	358703
2025	811725	5148	354153	2246	351907	787374	4369	343529	1906	341622
2026	811725	5148	337289	2139	335150	787374	4369	327170	1816	325354
2027	811725	5148	321227	2037	319190	787374	4369	311590	1729	309861
2028	811725	5148	305931	1940	303991	787374	4369	296753	1647	295106
2029	811725	5148	291363	1848	289515	787374	4369	282622	1568	281053
2030	811725	5148	277488	1760	275728	787374	4369	269164	1494	267670
2031	811725	5148	264275	1676	262598	787374	4369	256346	1423	254924
2032	811725	5148	251690	1596	250094	787374	4369	244139	1355	242785
2033	811725	5148	239705	1520	238185	787374	4369	232514	1290	231223
2034	811725	5148	228290	1448	226842	787374	4369	221442	1229	220213
2035	811725	5148	217419	1379	216040	787374	4369	210897	1170	209726
2036	811725	5148	207066	1313	205753	787374	4369	200854	1115	199739
2037	811725	5148	197206	1251	195955	787374	4369	191290	1062	190228
2038	811725	173008	187815	40030	147785	787374	160576	182181	37154	150527
2039	811725	173008	178871	38124	140747	787374	160576	173505	35384	138121
2040	811725	173008	170354	36309	134045	787374	160576	165243	33699	131544
2041	811725	372548	162242	74462	87780	787374	346263	157374	69208	88166
2042	811725	372548	154516	70916	83600	787374	346263	149880	65913	83968
2043	811725	372548	147158	67539	79619	787374	346263	142743	62774	79969
2044	811725	372548	140150	64323	75827	787374	346263	135946	59785	76161
2045	811725	539968	133477	88790	44687	787374	502060	129472	82557	46916
2046	811725	539968	127121	84562	42559	787374	502060	123307	78625	44682
2047	811725	539968	121067	80535	40532	787374	502060	117435	74881	42554
2048	811725	539968	115302	76700	38602	787374	502060	111843	71315	40528
2049	811725	539968	109812	73048	36764	787374	502060	106517	67920	38598
2050	811725	5148	104582	663	103919	787374	4369	101445	563	100882
2051	811725	5148	99602	632	98971	787374	4369	96614	536	96078
2052	811725	5148	94859	602	94258	787374	4369	92014	511	91503
2053	811725	5148	90342	573	89769	787374	4369	87632	486	87146
2054	811725	5148	86040	546	85495	787374	4369	83459	463	82996
2055	811725	5148	81943	520	81423	787374	4369	79485	441	79044
2056	811725	5148	78041	495	77546	787374	4369	75700	420	75280
2057	811725	5148	74325	471	73853	787374	4369	72095	400	71695
Total	34397060	36225508	10284759	24070365	-13785606	33365148	33216846	9976217	22072731	-12096514

Appendix 10.23 Calculations of FIRR, EIRR, B/C and NPV (Economic Case A-3)

Year	FIRR=-0.34%		B/C=0.423		FNPV	EIRR=0.02%		B/C=0.452		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	5116	1548058	4872	1474341	-1469469	4962	1438232	4726	1369744	-1365018
2010	10232	1548059	9281	1404135	-1394855	9925	1438233	9002	1304520	-1295517
2011	15348	1999422	13258	1727176	-1713918	14887	1844972	12860	1593756	-1580896
2012	33253	1999422	27358	1644929	-1617572	32256	1844972	26537	1517863	-1491326
2013	51159	1999422	40085	1566599	-1526515	49624	1844972	38882	1445584	-1406702
2014	69065	1999422	51537	1491999	-1440462	66993	1844972	49991	1376746	-1326755
2015	89960	3177556	63933	2258229	-2194296	87261	2827472	62015	2009432	-1947417
2016	730553	3177556	494467	2150695	-1656228	708636	2827472	479633	1913745	-1434112
2017	730553	3177556	470921	2048281	-1577360	708636	2827472	456793	1822614	-1365821
2018	730553	3177556	448496	1950743	-1502247	708636	2827472	435041	1735823	-1300782
2019	730553	3177556	427139	1857851	-1430712	708636	2827472	414325	1653165	-1238840
2020	730553	4680	406799	2606	404193	708636	3972	394595	2212	392383
2021	730553	4680	387428	2482	384946	708636	3972	375805	2107	373698
2022	730553	4680	368979	2364	366615	708636	3972	357909	2006	355903
2023	730553	4680	351408	2251	349157	708636	3972	340866	1911	338955
2024	730553	4680	334675	2144	332531	708636	3972	324634	1820	322815
2025	730553	4680	318738	2042	316696	708636	3972	309176	1733	307443
2026	730553	4680	303560	1945	301615	708636	3972	294453	1651	292803
2027	730553	4680	289105	1852	287253	708636	3972	280431	1572	278860
2028	730553	4680	275338	1764	273574	708636	3972	267078	1497	265581
2029	730553	4680	262226	1680	260547	708636	3972	254360	1426	252934
2030	730553	4680	249739	1600	248140	708636	3972	242247	1358	240889
2031	730553	4680	237847	1524	236323	708636	3972	230712	1293	229418
2032	730553	4680	226521	1451	225070	708636	3972	219725	1232	218494
2033	730553	4680	215734	1382	214352	708636	3972	209262	1173	208089
2034	730553	4680	205461	1316	204145	708636	3972	199297	1117	198180
2035	730553	4680	195677	1254	194424	708636	3972	189807	1064	188743
2036	730553	4680	186359	1194	185166	708636	3972	180769	1013	179755
2037	730553	4680	177485	1137	176348	708636	3972	172161	965	171196
2038	730553	157280	169033	36391	132642	708636	145978	163962	33776	130186
2039	730553	157280	160984	34658	126326	708636	145978	156155	32168	123987
2040	730553	157280	153318	33008	120311	708636	145978	148719	30636	118083
2041	730553	338680	146017	67693	78325	708636	314785	141637	62917	78720
2042	730553	338680	139064	64469	74595	708636	314785	134892	59921	74972
2043	730553	338680	132442	61399	71043	708636	314785	128469	57067	71401
2044	730553	338680	126135	58476	67660	708636	314785	122351	54350	68001
2045	730553	490880	120129	80718	39411	708636	456418	116525	75051	41474
2046	730553	490880	114408	76874	37534	708636	456418	110976	71478	39499
2047	730553	490880	108960	73214	35747	708636	456418	105692	68074	37618
2048	730553	490880	103772	69727	34044	708636	456418	100659	64832	35826
2049	730553	490880	98830	66407	32423	708636	456418	95865	61745	34120
2050	730553	4680	94124	603	93521	708636	3972	91300	512	90789
2051	730553	4680	89642	574	89068	708636	3972	86953	487	86465
2052	730553	4680	85373	547	84826	708636	3972	82812	464	82348
2053	730553	4680	81308	521	80787	708636	3972	78869	442	78427
2054	730553	4680	77436	496	76940	708636	3972	75113	421	74692
2055	730553	4680	73749	472	73276	708636	3972	71536	401	71135
2056	730553	4680	70237	450	69787	708636	3972	68130	382	67748
2057	730553	4680	66892	429	66464	708636	3972	64886	364	64522
Total	30957354	32932280	9256283	21882150	-12625867	30028633	29914385	8978595	19883858	-10905263

Appendix 10.24 Calculations of FIRR, EIRR, B/C and NPV (Economic Case A-4)

Year	FIRR=-0.87%		B/C=0.385		FNPV	EIRR=-0.51%		B/C=0.411		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	5116	1702864	4872	1621775	-1616903	4962	1582055	4726	1506719	-1501993
2010	10232	1702865	9281	1544549	-1535268	9925	1582056	9002	1434972	-1425969
2011	15348	2199364	13258	1899893	-1886635	14887	2029469	12860	1753131	-1740271
2012	33253	2199364	27358	1809422	-1782064	32256	2029469	26537	1669649	-1643112
2013	51159	2199364	40085	1723259	-1683175	49624	2029469	38882	1590142	-1551260
2014	69065	2199364	51537	1641199	-1589662	66993	2029469	49991	1514421	-1464430
2015	89960	3495311	63933	2484052	-2420119	87261	3110220	62015	2210375	-2148360
2016	730553	3495311	494467	2365764	-1871297	708636	3110220	479633	2105119	-1625486
2017	730553	3495311	470921	2253109	-1782188	708636	3110220	456793	2004875	-1548082
2018	730553	3495311	448496	2145818	-1697322	708636	3110220	435041	1909405	-1474364
2019	730553	3495311	427139	2043636	-1616497	708636	3110220	414325	1818481	-1404156
2020	730553	5148	406799	2867	403933	708636	4369	394595	2433	392162
2021	730553	5148	387428	2730	384698	708636	4369	375805	2317	373488
2022	730553	5148	368979	2600	366379	708636	4369	357909	2207	355703
2023	730553	5148	351408	2476	348932	708636	4369	340866	2102	338764
2024	730553	5148	334675	2358	332316	708636	4369	324634	2002	322633
2025	730553	5148	318738	2246	316492	708636	4369	309176	1906	307269
2026	730553	5148	303560	2139	301421	708636	4369	294453	1816	292637
2027	730553	5148	289105	2037	287067	708636	4369	280431	1729	278702
2028	730553	5148	275338	1940	273397	708636	4369	267078	1647	265431
2029	730553	5148	262226	1848	260379	708636	4369	254360	1568	252791
2030	730553	5148	249739	1760	247980	708636	4369	242247	1494	240754
2031	730553	5148	237847	1676	236171	708636	4369	230712	1423	229289
2032	730553	5148	226521	1596	224925	708636	4369	219725	1355	218371
2033	730553	5148	215734	1520	214214	708636	4369	209262	1290	207972
2034	730553	5148	205461	1448	204013	708636	4369	199297	1229	198069
2035	730553	5148	195677	1379	194298	708636	4369	189807	1170	188637
2036	730553	5148	186359	1313	185046	708636	4369	180769	1115	179654
2037	730553	5148	177485	1251	176234	708636	4369	172161	1062	171099
2038	730553	173008	169033	40030	129003	708636	160576	163962	37154	126809
2039	730553	173008	160984	38124	122860	708636	160576	156155	35384	120770
2040	730553	173008	153318	36309	117010	708636	160576	148719	33699	115019
2041	730553	372548	146017	74462	71555	708636	346263	141637	69208	72428
2042	730553	372548	139064	70916	68148	708636	346263	134892	65913	68979
2043	730553	372548	132442	67539	64903	708636	346263	128469	62774	65695
2044	730553	372548	126135	64323	61812	708636	346263	122351	59785	62566
2045	730553	539968	120129	88790	31339	708636	502060	116525	82557	33968
2046	730553	539968	114408	84562	29847	708636	502060	110976	78625	32351
2047	730553	539968	108960	80535	28425	708636	502060	105692	74881	30810
2048	730553	539968	103772	76700	27072	708636	502060	100659	71315	29343
2049	730553	539968	98830	73048	25783	708636	502060	95865	67920	27946
2050	730553	5148	94124	663	93461	708636	4369	91300	563	90737
2051	730553	5148	89642	632	89010	708636	4369	86953	536	86417
2052	730553	5148	85373	602	84772	708636	4369	82812	511	82302
2053	730553	5148	81308	573	80735	708636	4369	78869	486	78382
2054	730553	5148	77436	546	76891	708636	4369	75113	463	74650
2055	730553	5148	73749	520	73229	708636	4369	71536	441	71095
2056	730553	5148	70237	495	69742	708636	4369	68130	420	67710
2057	730553	5148	66892	471	66421	708636	4369	64886	400	64485
Total	30957354	36225508	9256283	24070365	-14814082	30028633	32905824	8978595	21872244	-12893649

Appendix 10.25 Calculations of FIRR, EIRR, B/C and NPV (Economic Case B-1)

Year	FIRR= 1.54%		B/C= 0.588		FNPV	EIRR= 1.93%		B/C= 0.627		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	7105	1548058	6767	1474341	-1467574	6892	1438232	6564	1369744	-1363180
2010	14211	1548059	12890	1404135	-1391246	13785	1438233	12503	1304520	-1292017
2011	21316	1999422	18414	1727176	-1708762	20677	1844972	17861	1593756	-1575894
2012	46185	1999422	37997	1644929	-1606932	44800	1844972	36857	1517863	-1481006
2013	71054	1999422	55673	1566599	-1510926	68923	1844972	54003	1445584	-1391581
2014	95923	1999422	71580	1491999	-1420420	93046	1844972	69432	1376746	-1307314
2015	124945	3177556	88796	2258229	-2169434	121196	2827472	86132	2009432	-1923300
2016	1014657	3177556	686760	2150695	-1463935	984217	2827472	666157	1913745	-1247588
2017	1014657	3177556	654057	2048281	-1394224	984217	2827472	634435	1822614	-1188179
2018	1014657	3177556	622911	1950743	-1327832	984217	2827472	604224	1735823	-1131599
2019	1014657	3177556	593249	1857851	-1264602	984217	2827472	575451	1653165	-1077713
2020	1014657	4680	564999	2606	562393	984217	3972	548049	2212	545837
2021	1014657	4680	538094	2482	535612	984217	3972	521951	2107	519845
2022	1014657	4680	512471	2364	510107	984217	3972	497096	2006	495090
2023	1014657	4680	488067	2251	485816	984217	3972	473425	1911	471515
2024	1014657	4680	464826	2144	462682	984217	3972	450881	1820	449061
2025	1014657	4680	442691	2042	440650	984217	3972	429411	1733	427678
2026	1014657	4680	421611	1945	419666	984217	3972	408963	1651	407312
2027	1014657	4680	401534	1852	399682	984217	3972	389488	1572	387916
2028	1014657	4680	382413	1764	380650	984217	3972	370941	1497	369444
2029	1014657	4680	364203	1680	362523	984217	3972	353277	1426	351851
2030	1014657	4680	346860	1600	345260	984217	3972	336454	1358	335097
2031	1014657	4680	330343	1524	328819	984217	3972	320433	1293	319140
2032	1014657	4680	314613	1451	313161	984217	3972	305174	1232	303942
2033	1014657	4680	299631	1382	298249	984217	3972	290642	1173	289469
2034	1014657	4680	285363	1316	284047	984217	3972	276802	1117	275685
2035	1014657	4680	271774	1254	270521	984217	3972	263621	1064	262557
2036	1014657	4680	258832	1194	257639	984217	3972	251068	1013	250054
2037	1014657	4680	246507	1137	245370	984217	3972	239112	965	238147
2038	1014657	157280	234769	36391	198378	984217	145978	227726	33776	193950
2039	1014657	157280	223589	34658	188931	984217	145978	216882	32168	184714
2040	1014657	157280	212942	33008	179934	984217	145978	206554	30636	175918
2041	1014657	338680	202802	67693	135109	984217	314785	196718	62917	133801
2042	1014657	338680	193145	64469	128675	984217	314785	187350	59921	127430
2043	1014657	338680	183947	61399	122548	984217	314785	178429	57067	121362
2044	1014657	338680	175188	58476	116712	984217	314785	169932	54350	115582
2045	1014657	490880	166846	80718	86128	984217	456418	161840	75051	86789
2046	1014657	490880	158901	76874	82026	984217	456418	154134	71478	82656
2047	1014657	490880	151334	73214	78120	984217	456418	146794	68074	78720
2048	1014657	490880	144128	69727	74400	984217	456418	139804	64832	74972
2049	1014657	490880	137264	66407	70857	984217	456418	133146	61745	71401
2050	1014657	4680	130728	603	130125	984217	3972	126806	512	126294
2051	1014657	4680	124503	574	123929	984217	3972	120768	487	120280
2052	1014657	4680	118574	547	118027	984217	3972	115017	464	114553
2053	1014657	4680	112928	521	112407	984217	3972	109540	442	109098
2054	1014657	4680	107550	496	107054	984217	3972	104324	421	103903
2055	1014657	4680	102429	472	101956	984217	3972	99356	401	98955
2056	1014657	4680	97551	450	97101	984217	3972	94625	382	94243
2057	1014657	4680	92906	429	92477	984217	3972	90119	364	89755
Total	42996325	32932280	12855949	21882150	-9026201	41706435	29914385	12470271	19883858	-7413587

Appendix 10.26 Calculations of FIRR, EIRR, B/C and NPV (Economic Case B-2)

Year	FIRR= 0.98%		B/C= 0.534		FNPV	EIRR= 1.36%		B/C= 0.570		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	7105	1702864	6767	1621775	-1615008	6892	1582055	6564	1506719	-1500155
2010	14211	1702865	12890	1544549	-1531659	13785	1582056	12503	1434972	-1422469
2011	21316	2199364	18414	1899893	-1881479	20677	2029469	17861	1753131	-1735270
2012	46185	2199364	37997	1809422	-1771425	44800	2029469	36857	1669649	-1632792
2013	71054	2199364	55673	1723259	-1667586	68923	2029469	54003	1590142	-1536139
2014	95923	2199364	71580	1641199	-1569620	93046	2029469	69432	1514421	-1444989
2015	124945	3495311	88796	2484052	-2395257	121196	3110220	86132	2210375	-2124243
2016	1014657	3495311	686760	2365764	-1679004	984217	3110220	666157	2105119	-1438962
2017	1014657	3495311	654057	2253109	-1599052	984217	3110220	634435	2004875	-1370440
2018	1014657	3495311	622911	2145818	-1522907	984217	3110220	604224	1909405	-1305181
2019	1014657	3495311	593249	2043636	-1450387	984217	3110220	575451	1818481	-1243030
2020	1014657	5148	564999	2867	562132	984217	4369	548049	2433	545616
2021	1014657	5148	538094	2730	535364	984217	4369	521951	2317	519634
2022	1014657	5148	512471	2600	509871	984217	4369	497096	2207	494890
2023	1014657	5148	488067	2476	485591	984217	4369	473425	2102	471323
2024	1014657	5148	464826	2358	462468	984217	4369	450881	2002	448880
2025	1014657	5148	442691	2246	440445	984217	4369	429411	1906	427504
2026	1014657	5148	421611	2139	419472	984217	4369	408963	1816	407147
2027	1014657	5148	401534	2037	399497	984217	4369	389488	1729	387759
2028	1014657	5148	382413	1940	380473	984217	4369	370941	1647	369294
2029	1014657	5148	364203	1848	362355	984217	4369	353277	1568	351709
2030	1014657	5148	346860	1760	345100	984217	4369	336454	1494	334961
2031	1014657	5148	330343	1676	328667	984217	4369	320433	1423	319010
2032	1014657	5148	314613	1596	313016	984217	4369	305174	1355	303819
2033	1014657	5148	299631	1520	298111	984217	4369	290642	1290	289352
2034	1014657	5148	285363	1448	283915	984217	4369	276802	1229	275573
2035	1014657	5148	271774	1379	270395	984217	4369	263621	1170	262451
2036	1014657	5148	258832	1313	257519	984217	4369	251068	1115	249953
2037	1014657	5148	246507	1251	245256	984217	4369	239112	1062	238050
2038	1014657	173008	234769	40030	194739	984217	160576	227726	37154	190572
2039	1014657	173008	223589	38124	185465	984217	160576	216882	35384	181497
2040	1014657	173008	212942	36309	176634	984217	160576	206554	33699	172854
2041	1014657	372548	202802	74462	128340	984217	346263	196718	69208	127509
2042	1014657	372548	193145	70916	122228	984217	346263	187350	65913	121438
2043	1014657	372548	183947	67539	116408	984217	346263	178429	62774	115655
2044	1014657	372548	175188	64323	110865	984217	346263	169932	59785	110147
2045	1014657	539968	166846	88790	78056	984217	502060	161840	82557	79284
2046	1014657	539968	158901	84562	74339	984217	502060	154134	78625	75508
2047	1014657	539968	151334	80535	70799	984217	502060	146794	74881	71913
2048	1014657	539968	144128	76700	67427	984217	502060	139804	71315	68488
2049	1014657	539968	137264	73048	64217	984217	502060	133146	67920	65227
2050	1014657	5148	130728	663	130065	984217	4369	126806	563	126243
2051	1014657	5148	124503	632	123871	984217	4369	120768	536	120232
2052	1014657	5148	118574	602	117973	984217	4369	115017	511	114506
2053	1014657	5148	112928	573	112355	984217	4369	109540	486	109054
2054	1014657	5148	107550	546	107005	984217	4369	104324	463	103861
2055	1014657	5148	102429	520	101909	984217	4369	99356	441	98915
2056	1014657	5148	97551	495	97056	984217	4369	94625	420	94205
2057	1014657	5148	92906	471	92435	984217	4369	90119	400	89719
Total	42996325	36225508	12855949	24070365	-11214416	41706435	32905824	12470271	21872244	-9401973

Appendix 10.27 Calculations of FIRR, EIRR, B/C and NPV (Economic Case B-3)

Year	FIRR= 0.92%		B/C= 0.529		FNPV	EIRR= 1.30%		B/C= 0.564		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	6395	1548058	6090	1474341	-1468251	6203	1438232	5908	1369744	-1363837
2010	12790	1548059	11601	1404135	-1392535	12406	1438233	11253	1304520	-1293267
2011	19185	1999422	16572	1727176	-1710603	18609	1844972	16075	1593756	-1577681
2012	41567	1999422	34197	1644929	-1610732	40320	1844972	33171	1517863	-1484691
2013	63949	1999422	50106	1566599	-1516494	62030	1844972	48603	1445584	-1396981
2014	86331	1999422	64422	1491999	-1427578	83741	1844972	62489	1376746	-1314257
2015	112450	3177556	79916	2258229	-2178313	109077	2827472	77519	2009432	-1931913
2016	913191	3177556	618084	2150695	-1532611	885795	2827472	599541	1913745	-1314203
2017	913191	3177556	588651	2048281	-1459629	885795	2827472	570992	1822614	-1251622
2018	913191	3177556	560620	1950743	-1390123	885795	2827472	543802	1735823	-1192021
2019	913191	3177556	533924	1857851	-1323927	885795	2827472	517906	1653165	-1135258
2020	913191	4680	508499	2606	505893	885795	3972	493244	2212	491032
2021	913191	4680	484285	2482	481803	885795	3972	469756	2107	467650
2022	913191	4680	461224	2364	458860	885795	3972	447387	2006	445381
2023	913191	4680	439261	2251	437009	885795	3972	426083	1911	424172
2024	913191	4680	418343	2144	416199	885795	3972	405793	1820	403973
2025	913191	4680	398422	2042	396380	885795	3972	386470	1733	384737
2026	913191	4680	379450	1945	377505	885795	3972	368066	1651	366416
2027	913191	4680	361381	1852	359529	885795	3972	350539	1572	348967
2028	913191	4680	344172	1764	342408	885795	3972	333847	1497	332350
2029	913191	4680	327783	1680	326103	885795	3972	317949	1426	316524
2030	913191	4680	312174	1600	310574	885795	3972	302809	1358	301451
2031	913191	4680	297309	1524	295785	885795	3972	288390	1293	287096
2032	913191	4680	283151	1451	281700	885795	3972	274657	1232	273425
2033	913191	4680	269668	1382	268286	885795	3972	261578	1173	260405
2034	913191	4680	256827	1316	255510	885795	3972	249122	1117	248005
2035	913191	4680	244597	1254	243343	885795	3972	237259	1064	236195
2036	913191	4680	232949	1194	231755	885795	3972	225961	1013	224947
2037	913191	4680	221856	1137	220719	885795	3972	215201	965	214236
2038	913191	157280	211292	36391	174901	885795	145978	204953	33776	171177
2039	913191	157280	201230	34658	166572	885795	145978	195193	32168	163026
2040	913191	157280	191648	33008	158640	885795	145978	185898	30636	155263
2041	913191	338680	182522	67693	114829	885795	314785	177046	62917	114129
2042	913191	338680	173830	64469	109361	885795	314785	168615	59921	108695
2043	913191	338680	165553	61399	104153	885795	314785	160586	57067	103519
2044	913191	338680	157669	58476	99194	885795	314785	152939	54350	98589
2045	913191	490880	150161	80718	69443	885795	456418	145656	75051	70605
2046	913191	490880	143011	76874	66136	885795	456418	138720	71478	67243
2047	913191	490880	136201	73214	62987	885795	456418	132115	68074	64041
2048	913191	490880	129715	69727	59987	885795	456418	125823	64832	60991
2049	913191	490880	123538	66407	57131	885795	456418	119832	61745	58087
2050	913191	4680	117655	603	117052	885795	3972	114126	512	113614
2051	913191	4680	112053	574	111478	885795	3972	108691	487	108204
2052	913191	4680	106717	547	106170	885795	3972	103515	464	103051
2053	913191	4680	101635	521	101114	885795	3972	98586	442	98144
2054	913191	4680	96795	496	96299	885795	3972	93891	421	93470
2055	913191	4680	92186	472	91713	885795	3972	89420	401	89019
2056	913191	4680	87796	450	87346	885795	3972	85162	382	84780
2057	913191	4680	83615	429	83187	885795	3972	81107	364	80743
Total	38696692	32932280	11570354	21882150	-10311796	37535791	29914385	11223244	19883858	-8660614



Appendix 10.28 Calculations of FIRR, EIRR, B/C and NPV (Economic Case B-4)

Year	FIRR= 0.37%		B/C= 0.481		FNPV	EIRR= 0.75%		B/C= 0.513		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	6395	1702864	6090	1621775	-1615685	6203	1582055	5908	1506719	-1500811
2010	12790	1702865	11601	1544549	-1532948	12406	1582056	11253	1434972	-1423719
2011	19185	2199364	16572	1899893	-1883321	18609	2029469	16075	1753131	-1737056
2012	41567	2199364	34197	1809422	-1775225	40320	2029469	33171	1669649	-1636478
2013	63949	2199364	50106	1723259	-1673154	62030	2029469	48603	1590142	-1541539
2014	86331	2199364	64422	1641199	-1576778	83741	2029469	62489	1514421	-1451932
2015	112450	3495311	79916	2484052	-2404136	109077	3110220	77519	2210375	-2132856
2016	913191	3495311	618084	2365764	-1747680	885795	3110220	599541	2105119	-1505578
2017	913191	3495311	588651	2253109	-1664458	885795	3110220	570992	2004875	-1433884
2018	913191	3495311	560620	2145818	-1585198	885795	3110220	543802	1909405	-1365604
2019	913191	3495311	533924	2043636	-1509712	885795	3110220	517906	1818481	-1300575
2020	913191	5148	508499	2867	505632	885795	4369	493244	2433	490811
2021	913191	5148	484285	2730	481555	885795	4369	469756	2317	467439
2022	913191	5148	461224	2600	458623	885795	4369	447387	2207	445180
2023	913191	5148	439261	2476	436784	885795	4369	426083	2102	423981
2024	913191	5148	418343	2358	415985	885795	4369	405793	2002	403791
2025	913191	5148	398422	2246	396176	885795	4369	386470	1906	384563
2026	913191	5148	379450	2139	377311	885795	4369	368066	1816	366251
2027	913191	5148	361381	2037	359343	885795	4369	350539	1729	348810
2028	913191	5148	344172	1940	342232	885795	4369	333847	1647	332200
2029	913191	5148	327783	1848	325935	885795	4369	317949	1568	316381
2030	913191	5148	312174	1760	310414	885795	4369	302809	1494	301315
2031	913191	5148	297309	1676	295633	885795	4369	288390	1423	286967
2032	913191	5148	283151	1596	281555	885795	4369	274657	1355	273302
2033	913191	5148	269668	1520	268148	885795	4369	261578	1290	260288
2034	913191	5148	256827	1448	255379	885795	4369	249122	1229	247893
2035	913191	5148	244597	1379	243218	885795	4369	237259	1170	236088
2036	913191	5148	232949	1313	231636	885795	4369	225961	1115	224846
2037	913191	5148	221856	1251	220606	885795	4369	215201	1062	214139
2038	913191	173008	211292	40030	171262	885795	160576	204953	37154	167799
2039	913191	173008	201230	38124	163106	885795	160576	195193	35384	159809
2040	913191	173008	191648	36309	155339	885795	160576	185898	33699	152199
2041	913191	372548	182522	74462	108060	885795	346263	177046	69208	107838
2042	913191	372548	173830	70916	102914	885795	346263	168615	65913	102703
2043	913191	372548	165553	67539	98013	885795	346263	160586	62774	97812
2044	913191	372548	157669	64323	93346	885795	346263	152939	59785	93154
2045	913191	539968	150161	88790	61371	885795	502060	145656	82557	63100
2046	913191	539968	143011	84562	58449	885795	502060	138720	78625	60095
2047	913191	539968	136201	80535	55665	885795	502060	132115	74881	57233
2048	913191	539968	129715	76700	53015	885795	502060	125823	71315	54508
2049	913191	539968	123538	73048	50490	885795	502060	119832	67920	51912
2050	913191	5148	117655	663	116992	885795	4369	114126	563	113563
2051	913191	5148	112053	632	111421	885795	4369	108691	536	108155
2052	913191	5148	106717	602	106115	885795	4369	103515	511	103005
2053	913191	5148	101635	573	101062	885795	4369	98586	486	98100
2054	913191	5148	96795	546	96250	885795	4369	93891	463	93428
2055	913191	5148	92186	520	91666	885795	4369	89420	441	88979
2056	913191	5148	87796	495	87301	885795	4369	85162	420	84742
2057	913191	5148	83615	471	83144	885795	4369	81107	400	80707
Total	38696692	36225508	11570354	24070365	-12500011	37535791	32905824	11223244	21872244	-10649000

Appendix 10.29 Calculations of FIRR, EIRR, B/C and NPV (Economic Case C-1)

Year	FIRR= 3.26%		B/C= 0.776		FNPV	EIRR= 3.69%		B/C= 0.828		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	9379	1548058	8933	1474341	-1465408	9098	1438232	8665	1369744	-1361080
2010	18758	1548059	17014	1404135	-1387121	18196	1438233	16504	1304520	-1288016
2011	28138	1999422	24306	1727176	-1702869	27293	1844972	23577	1593756	-1570179
2012	60965	1999422	50156	1644929	-1594773	59136	1844972	48651	1517863	-1469212
2013	93792	1999422	73488	1566599	-1493111	90978	1844972	71284	1445584	-1374300
2014	126619	1999422	94485	1491999	-1397514	122820	1844972	91650	1376746	-1285096
2015	164927	3177556	117210	2258229	-2141019	159979	2827472	113694	2009432	-1895738
2016	1339347	3177556	906523	2150695	-1244172	1299167	2827472	879327	1913745	-1034418
2017	1339347	3177556	863355	2048281	-1184926	1299167	2827472	837454	1822614	-985160
2018	1339347	3177556	822243	1950743	-1128501	1299167	2827472	797576	1735823	-938247
2019	1339347	3177556	783088	1857851	-1074762	1299167	2827472	759596	1653165	-893569
2020	1339347	4680	745798	2606	743192	1299167	3972	723425	2212	721213
2021	1339347	4680	710284	2482	707802	1299167	3972	688976	2107	686869
2022	1339347	4680	676461	2364	674097	1299167	3972	656167	2006	654161
2023	1339347	4680	644249	2251	641998	1299167	3972	624921	1911	623011
2024	1339347	4680	613570	2144	611426	1299167	3972	595163	1820	593343
2025	1339347	4680	584353	2042	582311	1299167	3972	566822	1733	565089
2026	1339347	4680	556526	1945	554582	1299167	3972	539831	1651	538180
2027	1339347	4680	530025	1852	528173	1299167	3972	514124	1572	512552
2028	1339347	4680	504786	1764	503022	1299167	3972	489642	1497	488145
2029	1339347	4680	480748	1680	479069	1299167	3972	466326	1426	464900
2030	1339347	4680	457856	1600	456256	1299167	3972	444120	1358	442762
2031	1339347	4680	436053	1524	434529	1299167	3972	422971	1293	421678
2032	1339347	4680	415289	1451	413837	1299167	3972	402830	1232	401598
2033	1339347	4680	395513	1382	394131	1299167	3972	383647	1173	382474
2034	1339347	4680	376679	1316	375363	1299167	3972	365379	1117	364261
2035	1339347	4680	358742	1254	357488	1299167	3972	347980	1064	346916
2036	1339347	4680	341659	1194	340465	1299167	3972	331409	1013	330396
2037	1339347	4680	325389	1137	324252	1299167	3972	315628	965	314663
2038	1339347	157280	309895	36391	273504	1299167	145978	300598	33776	266822
2039	1339347	157280	295138	34658	260480	1299167	145978	286284	32168	254116
2040	1339347	157280	281084	33008	248076	1299167	145978	272651	30636	242015
2041	1339347	338680	267699	67693	200006	1299167	314785	259668	62917	196751
2042	1339347	338680	254951	64469	190482	1299167	314785	247303	59921	187382
2043	1339347	338680	242811	61399	181411	1299167	314785	235526	57067	178459
2044	1339347	338680	231248	58476	172773	1299167	314785	224311	54350	169961
2045	1339347	490880	220236	80718	139518	1299167	456418	213629	75051	138578
2046	1339347	490880	209749	76874	132874	1299167	456418	203456	71478	131979
2047	1339347	490880	199761	73214	126547	1299167	456418	193768	68074	125694
2048	1339347	490880	190248	69727	120521	1299167	456418	184541	64832	119709
2049	1339347	490880	181189	66407	114782	1299167	456418	175753	61745	114008
2050	1339347	4680	172561	603	171958	1299167	3972	167384	512	166872
2051	1339347	4680	164344	574	163770	1299167	3972	159413	487	158926
2052	1339347	4680	156518	547	155971	1299167	3972	151822	464	151358
2053	1339347	4680	149065	521	148544	1299167	3972	144593	442	144151
2054	1339347	4680	141966	496	141470	1299167	3972	137707	421	137286
2055	1339347	4680	135206	472	134734	1299167	3972	131150	401	130749
2056	1339347	4680	128768	450	128318	1299167	3972	124905	382	124523
2057	1339347	4680	122636	429	122207	1299167	3972	118957	364	118593
Total	56755149	32932280	16969853	21882150	-4912297	55052494	29914385	16460757	19883858	-3423100

Appendix 10.30 Calculations of FIRR, EIRR, B/C and NPV (Economic Case C-2)

Year	FIRR= 2.65%		B/C= 0.705		FNPV	EIRR= 3.07%		B/C= 0.753		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	9379	1702864	8933	1621775	-1612842	9098	1582055	8665	1506719	-1498054
2010	18758	1702865	17014	1544549	-1527535	18196	1582056	16504	1434972	-1418468
2011	28138	2199364	24306	1899893	-1875587	27293	2029469	23577	1753131	-1729554
2012	60965	2199364	50156	1809422	-1759266	59136	2029469	48651	1669649	-1620998
2013	93792	2199364	73488	1723259	-1649771	90978	2029469	71284	1590142	-1518858
2014	126619	2199364	94485	1641199	-1546714	122820	2029469	91650	1514421	-1422770
2015	164927	3495311	117210	2484052	-2366842	159979	3110220	113694	2210375	-2096681
2016	1339347	3495311	906523	2365764	-1459241	1299167	3110220	879327	2105119	-1225792
2017	1339347	3495311	863355	2253109	-1389754	1299167	3110220	837454	2004875	-1167421
2018	1339347	3495311	822243	2145818	-1323575	1299167	3110220	797576	1909405	-1111830
2019	1339347	3495311	783088	2043636	-1260548	1299167	3110220	759596	1818481	-1058885
2020	1339347	5148	745798	2867	742932	1299167	4369	723425	2433	720992
2021	1339347	5148	710284	2730	707554	1299167	4369	688976	2317	686659
2022	1339347	5148	676461	2600	673861	1299167	4369	656167	2207	653961
2023	1339347	5148	644249	2476	641773	1299167	4369	624921	2102	622820
2024	1339347	5148	613570	2358	611212	1299167	4369	595163	2002	593161
2025	1339347	5148	584353	2246	582107	1299167	4369	566822	1906	564916
2026	1339347	5148	556526	2139	554387	1299167	4369	539831	1816	538015
2027	1339347	5148	530025	2037	527988	1299167	4369	514124	1729	512395
2028	1339347	5148	504786	1940	502846	1299167	4369	489642	1647	487995
2029	1339347	5148	480748	1848	478901	1299167	4369	466326	1568	464758
2030	1339347	5148	457856	1760	456096	1299167	4369	444120	1494	442626
2031	1339347	5148	436053	1676	434377	1299167	4369	422971	1423	421549
2032	1339347	5148	415289	1596	413692	1299167	4369	402830	1355	401475
2033	1339347	5148	395513	1520	393993	1299167	4369	383647	1290	382357
2034	1339347	5148	376679	1448	375231	1299167	4369	365379	1229	364150
2035	1339347	5148	358742	1379	357363	1299167	4369	347980	1170	346809
2036	1339347	5148	341659	1313	340346	1299167	4369	331409	1115	330295
2037	1339347	5148	325389	1251	324139	1299167	4369	315628	1062	314566
2038	1339347	173008	309895	40030	269865	1299167	160576	300598	37154	263444
2039	1339347	173008	295138	38124	257014	1299167	160576	286284	35384	250899
2040	1339347	173008	281084	36309	244775	1299167	160576	272651	33699	238952
2041	1339347	372548	267699	74462	193237	1299167	346263	259668	69208	190459
2042	1339347	372548	254951	70916	184035	1299167	346263	247303	65913	181390
2043	1339347	372548	242811	67539	175271	1299167	346263	235526	62774	172752
2044	1339347	372548	231248	64323	166925	1299167	346263	224311	59785	164526
2045	1339347	539968	220236	88790	131446	1299167	502060	213629	82557	131073
2046	1339347	539968	209749	84562	125187	1299167	502060	203456	78625	124831
2047	1339347	539968	199761	80535	119226	1299167	502060	193768	74881	118887
2048	1339347	539968	190248	76700	113548	1299167	502060	184541	71315	113226
2049	1339347	539968	181189	73048	108141	1299167	502060	175753	67920	107834
2050	1339347	5148	172561	663	171898	1299167	4369	167384	563	166821
2051	1339347	5148	164344	632	163712	1299167	4369	159413	536	158877
2052	1339347	5148	156518	602	155916	1299167	4369	151822	511	151312
2053	1339347	5148	149065	573	148492	1299167	4369	144593	486	144106
2054	1339347	5148	141966	546	141421	1299167	4369	137707	463	137244
2055	1339347	5148	135206	520	134686	1299167	4369	131150	441	130709
2056	1339347	5148	128768	495	128273	1299167	4369	124905	420	124485
2057	1339347	5148	122636	471	122164	1299167	4369	118957	400	118557
Total	56755149	36225508	16969853	24070365	-7100512	55052494	32905824	16460757	21872244	-5411486

Appendix 10.31 Calculations of FIRR, EIRR, B/C and NPV (Economic Case C-3)

Year	FIRR= 2.59%		B/C= 0.698		FNPV	EIRR= 3.00%		B/C= 0.745		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	8441	1548058	8039	1474341	-1466302	8188	1438232	7798	1369744	-1361946
2010	16883	1548059	15313	1404135	-1388822	16376	1438233	14854	1304520	-1289666
2011	25324	1999422	21876	1727176	-1705300	24564	1844972	21219	1593756	-1572536
2012	54868	1999422	45140	1644929	-1599789	53222	1844972	43786	1517863	-1474077
2013	84413	1999422	66139	1566599	-1500460	81880	1844972	64155	1445584	-1381428
2014	113957	1999422	85036	1491999	-1406963	110538	1844972	82485	1376746	-1294261
2015	148434	3177556	105489	2258229	-2152740	143981	2827472	102325	2009432	-1907107
2016	1205412	3177556	815870	2150695	-1334824	1169250	2827472	791394	1913745	-1122350
2017	1205412	3177556	777019	2048281	-1271261	1169250	2827472	753709	1822614	-1068905
2018	1205412	3177556	740019	1950743	-1210725	1169250	2827472	717818	1735823	-1018005
2019	1205412	3177556	704780	1857851	-1153071	1169250	2827472	683636	1653165	-969528
2020	1205412	4680	671219	2606	668613	1169250	3972	651082	2212	648870
2021	1205412	4680	639256	2482	636774	1169250	3972	620078	2107	617972
2022	1205412	4680	608815	2364	606451	1169250	3972	590551	2006	588544
2023	1205412	4680	579824	2251	577573	1169250	3972	562429	1911	560519
2024	1205412	4680	552213	2144	550069	1169250	3972	535647	1820	533827
2025	1205412	4680	525917	2042	523876	1169250	3972	510140	1733	508407
2026	1205412	4680	500874	1945	498929	1169250	3972	485847	1651	484197
2027	1205412	4680	477023	1852	475171	1169250	3972	462712	1572	461140
2028	1205412	4680	454307	1764	452543	1169250	3972	440678	1497	439181
2029	1205412	4680	432674	1680	430994	1169250	3972	419693	1426	418268
2030	1205412	4680	412070	1600	410470	1169250	3972	399708	1358	398350
2031	1205412	4680	392448	1524	390924	1169250	3972	380674	1293	379381
2032	1205412	4680	373760	1451	372309	1169250	3972	362547	1232	361315
2033	1205412	4680	355962	1382	354580	1169250	3972	345283	1173	344110
2034	1205412	4680	339011	1316	337695	1169250	3972	328841	1117	327724
2035	1205412	4680	322868	1254	321614	1169250	3972	313182	1064	312118
2036	1205412	4680	307493	1194	306299	1169250	3972	298268	1013	297255
2037	1205412	4680	292850	1137	291713	1169250	3972	284065	965	283100
2038	1205412	157280	278905	36391	242514	1169250	145978	270538	33776	236762
2039	1205412	157280	265624	34658	230966	1169250	145978	257655	32168	225488
2040	1205412	157280	252975	33008	219967	1169250	145978	245386	30636	214750
2041	1205412	338680	240929	67693	173236	1169250	314785	233701	62917	170784
2042	1205412	338680	229456	64469	164987	1169250	314785	222572	59921	162652
2043	1205412	338680	218530	61399	157130	1169250	314785	211974	57067	154906
2044	1205412	338680	208123	58476	149648	1169250	314785	201880	54350	147530
2045	1205412	490880	198213	80718	117495	1169250	456418	192266	75051	117215
2046	1205412	490880	188774	76874	111900	1169250	456418	183111	71478	111633
2047	1205412	490880	179785	73214	106571	1169250	456418	174391	68074	106317
2048	1205412	490880	171224	69727	101496	1169250	456418	166087	64832	101255
2049	1205412	490880	163070	66407	96663	1169250	456418	158178	61745	96433
2050	1205412	4680	155305	603	154702	1169250	3972	150646	512	150134
2051	1205412	4680	147909	574	147335	1169250	3972	143472	487	142985
2052	1205412	4680	140866	547	140319	1169250	3972	136640	464	136176
2053	1205412	4680	134158	521	133637	1169250	3972	130133	442	129691
2054	1205412	4680	127770	496	127274	1169250	3972	123937	421	123516
2055	1205412	4680	121685	472	121213	1169250	3972	118035	401	117634
2056	1205412	4680	115891	450	115441	1169250	3972	112414	382	112032
2057	1205412	4680	110372	429	109944	1169250	3972	107061	364	106697
Total	51079634	32932280	15272868	21882150	-6609282	49547245	29914385	14814682	19883858	-5069176

Appendix 10.32 Calculations of FIRR, EIRR, B/C and NPV (Economic Case C-4)

Year	FIRR= 2.00%		B/C= 0.635		FNPV	EIRR= 2.40%		B/C= 0.677		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	8441	1702864	8039	1621775	-1613736	8188	1582055	7798	1506719	-1498921
2010	16883	1702865	15313	1544549	-1529236	16376	1582056	14854	1434972	-1420118
2011	25324	2199364	21876	1899893	-1878018	24564	2029469	21219	1753131	-1731912
2012	54868	2199364	45140	1809422	-1764282	53222	2029469	43786	1669649	-1625863
2013	84413	2199364	66139	1723259	-1657120	81880	2029469	64155	1590142	-1525987
2014	113957	2199364	85036	1641199	-1556163	110538	2029469	82485	1514421	-1431935
2015	148434	3495311	105489	2484052	-2378563	143981	3110220	102325	2210375	-2108050
2016	1205412	3495311	815870	2365764	-1549894	1169250	3110220	791394	2105119	-1313725
2017	1205412	3495311	777019	2253109	-1476089	1169250	3110220	753709	2004875	-1251166
2018	1205412	3495311	740019	2145818	-1405799	1169250	3110220	717818	1909405	-1191587
2019	1205412	3495311	704780	2043636	-1338856	1169250	3110220	683636	1818481	-1134845
2020	1205412	5148	671219	2867	668352	1169250	4369	651082	2433	648649
2021	1205412	5148	639256	2730	636526	1169250	4369	620078	2317	617761
2022	1205412	5148	608815	2600	606215	1169250	4369	590551	2207	588344
2023	1205412	5148	579824	2476	577348	1169250	4369	562429	2102	560327
2024	1205412	5148	552213	2358	549855	1169250	4369	535647	2002	533645
2025	1205412	5148	525917	2246	523671	1169250	4369	510140	1906	508234
2026	1205412	5148	500874	2139	498735	1169250	4369	485847	1816	484032
2027	1205412	5148	477023	2037	474985	1169250	4369	462712	1729	460983
2028	1205412	5148	454307	1940	452367	1169250	4369	440678	1647	439031
2029	1205412	5148	432674	1848	430826	1169250	4369	419693	1568	418125
2030	1205412	5148	412070	1760	410310	1169250	4369	399708	1494	398214
2031	1205412	5148	392448	1676	390772	1169250	4369	380674	1423	379252
2032	1205412	5148	373760	1596	372163	1169250	4369	362547	1355	361192
2033	1205412	5148	355962	1520	354441	1169250	4369	345283	1290	343992
2034	1205412	5148	339011	1448	337563	1169250	4369	328841	1229	327612
2035	1205412	5148	322868	1379	321489	1169250	4369	313182	1170	312011
2036	1205412	5148	307493	1313	306180	1169250	4369	298268	1115	297154
2037	1205412	5148	292850	1251	291600	1169250	4369	284065	1062	283003
2038	1205412	173008	278905	40030	238875	1169250	160576	270538	37154	233384
2039	1205412	173008	265624	38124	227500	1169250	160576	257655	35384	222271
2040	1205412	173008	252975	36309	216667	1169250	160576	245386	33699	211687
2041	1205412	372548	240929	74462	166467	1169250	346263	233701	69208	164492
2042	1205412	372548	229456	70916	158540	1169250	346263	222572	65913	156659
2043	1205412	372548	218530	67539	150990	1169250	346263	211974	62774	149200
2044	1205412	372548	208123	64323	143800	1169250	346263	201880	59785	142095
2045	1205412	539968	198213	88790	109423	1169250	502060	192266	82557	109710
2046	1205412	539968	188774	84562	104212	1169250	502060	183111	78625	104485
2047	1205412	539968	179785	80535	99250	1169250	502060	174391	74881	99510
2048	1205412	539968	171224	76700	94523	1169250	502060	166087	71315	94771
2049	1205412	539968	163070	73048	90022	1169250	502060	158178	67920	90258
2050	1205412	5148	155305	663	154642	1169250	4369	150646	563	150083
2051	1205412	5148	147909	632	147278	1169250	4369	143472	536	142936
2052	1205412	5148	140866	602	140264	1169250	4369	136640	511	136129
2053	1205412	5148	134158	573	133585	1169250	4369	130133	486	129647
2054	1205412	5148	127770	546	127224	1169250	4369	123937	463	123473
2055	1205412	5148	121685	520	121166	1169250	4369	118035	441	117594
2056	1205412	5148	115891	495	115396	1169250	4369	112414	420	111994
2057	1205412	5148	110372	471	109901	1169250	4369	107061	400	106661
Total	51079634	36225508	15272868	24070365	-8797497	49547245	32905824	14814682	21872244	-7057562

Appendix 10.33 Calculations of FIRR, EIRR, B/C and NPV (Economic Case D-1)

Year	FIRR= 6.21%		B/C= 1.175		FNPV	EIRR= 6.73%		B/C= 1.254		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	14211	1548058	13534	1474341	-1460807	13785	1438232	13128	1369744	-1356616
2010	28422	1548059	25779	1404135	-1378356	27569	1438233	25006	1304520	-1279514
2011	42633	1999422	36828	1727176	-1690348	41354	1844972	35723	1593756	-1558033
2012	92371	1999422	75994	1644929	-1568936	89600	1844972	73714	1517863	-1444149
2013	142109	1999422	111346	1566599	-1455253	137846	1844972	108006	1445584	-1337578
2014	191847	1999422	143159	1491999	-1348840	186091	1844972	138864	1376746	-1237882
2015	249889	3177556	177591	2258229	-2080638	242392	2827472	172264	2009432	-1837168
2016	2029314	3177556	1373519	2150695	-777175	1968434	2827472	1332314	1913745	-581431
2017	2029314	3177556	1308114	2048281	-740167	1968434	2827472	1268870	1822614	-553744
2018	2029314	3177556	1245822	1950743	-704921	1968434	2827472	1208448	1735823	-527375
2019	2029314	3177556	1186498	1857851	-671353	1968434	2827472	1150903	1653165	-502262
2020	2029314	4680	1129998	2606	1127392	1968434	3972	1096098	2212	1093886
2021	2029314	4680	1076188	2482	1073706	1968434	3972	1043903	2107	1041796
2022	2029314	4680	1024941	2364	1022578	1968434	3972	994193	2006	992187
2023	2029314	4680	976135	2251	973883	1968434	3972	946850	1911	944940
2024	2029314	4680	929652	2144	927508	1968434	3972	901762	1820	899943
2025	2029314	4680	885383	2042	883341	1968434	3972	858821	1733	857088
2026	2029314	4680	843222	1945	841277	1968434	3972	817925	1651	816275
2027	2029314	4680	803068	1852	801216	1968434	3972	778976	1572	777404
2028	2029314	4680	764827	1764	763063	1968434	3972	741882	1497	740385
2029	2029314	4680	728407	1680	726727	1968434	3972	706554	1426	705129
2030	2029314	4680	693721	1600	692121	1968434	3972	672909	1358	671551
2031	2029314	4680	660686	1524	659163	1968434	3972	640866	1293	639572
2032	2029314	4680	629225	1451	627774	1968434	3972	610348	1232	609117
2033	2029314	4680	599262	1382	597880	1968434	3972	581284	1173	580111
2034	2029314	4680	570726	1316	569409	1968434	3972	553604	1117	552487
2035	2029314	4680	543548	1254	542295	1968434	3972	527242	1064	526178
2036	2029314	4680	517665	1194	516471	1968434	3972	502135	1013	501122
2037	2029314	4680	493014	1137	491877	1968434	3972	478224	965	477259
2038	2029314	157280	469537	36391	433146	1968434	145978	455451	33776	421675
2039	2029314	157280	447178	34658	412520	1968434	145978	433763	32168	401595
2040	2029314	157280	425884	33008	392877	1968434	145978	413108	30636	382472
2041	2029314	338680	405604	67693	337911	1968434	314785	393436	62917	330519
2042	2029314	338680	386290	64469	321820	1968434	314785	374701	59921	314780
2043	2029314	338680	367895	61399	306495	1968434	314785	356858	57067	299791
2044	2029314	338680	350376	58476	291900	1968434	314785	339865	54350	285515
2045	2029314	490880	333691	80718	252973	1968434	456418	323681	75051	248629
2046	2029314	490880	317801	76874	240927	1968434	456418	308267	71478	236790
2047	2029314	490880	302668	73214	229454	1968434	456418	293588	68074	225514
2048	2029314	490880	288255	69727	218528	1968434	456418	279608	64832	214775
2049	2029314	490880	274529	66407	208122	1968434	456418	266293	61745	204548
2050	2029314	4680	261456	603	260853	1968434	3972	253612	512	253101
2051	2029314	4680	249006	574	248431	1968434	3972	241536	487	241048
2052	2029314	4680	237148	547	236601	1968434	3972	230034	464	229570
2053	2029314	4680	225856	521	225335	1968434	3972	219080	442	218638
2054	2029314	4680	215100	496	214604	1968434	3972	208647	421	208226
2055	2029314	4680	204858	472	204385	1968434	3972	198712	401	198311
2056	2029314	4680	195102	450	194653	1968434	3972	189249	382	188868
2057	2029314	4680	185812	429	185383	1968434	3972	180238	364	179874
Total	85992649	32932280	25711899	21882150	3829749	83412870	29914385	24940542	19883858	5056684

Appendix 10.34 Calculations of FIRR, EIRR, B/C and NPV (Economic Case D-2)

Year	FIRR= 5.48%		B/C= 1.068		FNPV	EIRR= 5.98%		B/C= 1.140		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	14211	1702864	13534	1621775	-1608241	13785	1582055	13128	1506719	-1493591
2010	28422	1702865	25779	1544549	-1518770	27569	1582056	25006	1434972	-1409966
2011	42633	2199364	36828	1899893	-1863066	41354	2029469	35723	1753131	-1717409
2012	92371	2199364	75994	1809422	-1733429	89600	2029469	73714	1669649	-1595935
2013	142109	2199364	111346	1723259	-1611913	137846	2029469	108006	1590142	-1482136
2014	191847	2199364	143159	1641199	-1498040	186091	2029469	138864	1514421	-1375557
2015	249889	3495311	177591	2484052	-2306461	242392	3110220	172264	2210375	-2038111
2016	2029314	3495311	1373519	2365764	-992245	1968434	3110220	1332314	2105119	-772805
2017	2029314	3495311	1308114	2253109	-944995	1968434	3110220	1268870	2004875	-736005
2018	2029314	3495311	1245822	2145818	-899995	1968434	3110220	1208448	1909405	-700957
2019	2029314	3495311	1186498	2043636	-857138	1968434	3110220	1150903	1818481	-667578
2020	2029314	5148	1129998	2867	1127131	1968434	4369	1096098	2433	1093665
2021	2029314	5148	1076188	2730	1073458	1968434	4369	1043903	2317	1041585
2022	2029314	5148	1024941	2600	1022341	1968434	4369	994193	2207	991986
2023	2029314	5148	976135	2476	973658	1968434	4369	946850	2102	944749
2024	2029314	5148	929652	2358	927294	1968434	4369	901762	2002	899761
2025	2029314	5148	885383	2246	883137	1968434	4369	858821	1906	856915
2026	2029314	5148	843222	2139	841083	1968434	4369	817925	1816	816109
2027	2029314	5148	803068	2037	801031	1968434	4369	778976	1729	777247
2028	2029314	5148	764827	1940	762887	1968434	4369	741882	1647	740235
2029	2029314	5148	728407	1848	726559	1968434	4369	706554	1568	704986
2030	2029314	5148	693721	1760	691961	1968434	4369	672909	1494	671415
2031	2029314	5148	660686	1676	659010	1968434	4369	640866	1423	639443
2032	2029314	5148	629225	1596	627629	1968434	4369	610348	1355	608993
2033	2029314	5148	599262	1520	597742	1968434	4369	581284	1290	579994
2034	2029314	5148	570726	1448	569278	1968434	4369	553604	1229	552375
2035	2029314	5148	543548	1379	542169	1968434	4369	527242	1170	526071
2036	2029314	5148	517665	1313	516352	1968434	4369	502135	1115	501020
2037	2029314	5148	493014	1251	491764	1968434	4369	478224	1062	477162
2038	2029314	173008	469537	40030	429507	1968434	160576	455451	37154	418298
2039	2029314	173008	447178	38124	409055	1968434	160576	433763	35384	398379
2040	2029314	173008	425884	36309	389576	1968434	160576	413108	33699	379408
2041	2029314	372548	405604	74462	331142	1968434	346263	393436	69208	324227
2042	2029314	372548	386290	70916	315373	1968434	346263	374701	65913	308788
2043	2029314	372548	367895	67539	300355	1968434	346263	356858	62774	294084
2044	2029314	372548	350376	64323	286053	1968434	346263	339865	59785	280080
2045	2029314	539968	333691	88790	244901	1968434	502060	323681	82557	241124
2046	2029314	539968	317801	84562	233240	1968434	502060	308267	78625	229642
2047	2029314	539968	302668	80535	222133	1968434	502060	293588	74881	218707
2048	2029314	539968	288255	76700	211555	1968434	502060	279608	71315	208292
2049	2029314	539968	274529	73048	201481	1968434	502060	266293	67920	198373
2050	2029314	5148	261456	663	260793	1968434	4369	253612	563	253049
2051	2029314	5148	249006	632	248374	1968434	4369	241536	536	240999
2052	2029314	5148	237148	602	236547	1968434	4369	230034	511	229523
2053	2029314	5148	225856	573	225283	1968434	4369	219080	486	218594
2054	2029314	5148	215100	546	214555	1968434	4369	208647	463	208184
2055	2029314	5148	204858	520	204338	1968434	4369	198712	441	198271
2056	2029314	5148	195102	495	194608	1968434	4369	189249	420	188829
2057	2029314	5148	185812	471	185341	1968434	4369	180238	400	179837
Total	85992649	36225508	25711899	24070365	1641534	83412870	32905824	24940542	21872244	3068298

Appendix 10..35 Calculations of FIRR, EIRR, B/C and NPV (Economic Case D-3)

Year	FIRR= 5.41%		B/C= 1.058		FNPV	EIRR= 5.90%		B/C= 1.129		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	12790	1548058	12181	1474341	-1462160	12406	1438232	11815	1369744	-1357929
2010	25580	1548059	23201	1404135	-1380934	24812	1438233	22505	1304520	-1282014
2011	38369	1999422	33145	1727176	-1694031	37218	1844972	32151	1593756	-1561605
2012	83134	1999422	68394	1644929	-1576535	80640	1844972	66342	1517863	-1451520
2013	127898	1999422	100211	1566599	-1466388	124061	1844972	97205	1445584	-1348378
2014	172662	1999422	128843	1491999	-1363156	167482	1844972	124978	1376746	-1251768
2015	224900	3177556	159832	2258229	-2098397	218153	2827472	155037	2009432	-1854395
2016	1826382	3177556	1236167	2150695	-914527	1771591	2827472	1199082	1913745	-714662
2017	1826382	3177556	1177302	2048281	-870978	1771591	2827472	1141983	1822614	-680631
2018	1826382	3177556	1121240	1950743	-829503	1771591	2827472	1087603	1735823	-648220
2019	1826382	3177556	1067848	1857851	-790003	1771591	2827472	1035812	1653165	-617352
2020	1826382	4680	1016998	2606	1014392	1771591	3972	986488	2212	984276
2021	1826382	4680	968569	2482	966088	1771591	3972	939512	2107	937406
2022	1826382	4680	922447	2364	920083	1771591	3972	894774	2006	892767
2023	1826382	4680	878521	2251	876270	1771591	3972	852165	1911	850255
2024	1826382	4680	836687	2144	834543	1771591	3972	811586	1820	809766
2025	1826382	4680	796844	2042	794803	1771591	3972	772939	1733	771206
2026	1826382	4680	758900	1945	756955	1771591	3972	736133	1651	734482
2027	1826382	4680	722761	1852	720909	1771591	3972	701079	1572	699507
2028	1826382	4680	688344	1764	686580	1771591	3972	667694	1497	666197
2029	1826382	4680	655566	1680	653886	1771591	3972	635899	1426	634473
2030	1826382	4680	624349	1600	622749	1771591	3972	605618	1358	604260
2031	1826382	4680	594618	1524	593094	1771591	3972	576779	1293	575486
2032	1826382	4680	566303	1451	564851	1771591	3972	549313	1232	548082
2033	1826382	4680	539336	1382	537954	1771591	3972	523156	1173	521983
2034	1826382	4680	513653	1316	512337	1771591	3972	498243	1117	497126
2035	1826382	4680	489193	1254	487940	1771591	3972	474518	1064	473454
2036	1826382	4680	465898	1194	464705	1771591	3972	451922	1013	450908
2037	1826382	4680	443713	1137	442576	1771591	3972	430401	965	429436
2038	1826382	157280	422584	36391	386193	1771591	145978	409906	33776	376130
2039	1826382	157280	402461	34658	367802	1771591	145978	390387	32168	358219
2040	1826382	157280	383296	33008	350288	1771591	145978	371797	30636	341161
2041	1826382	338680	365044	67693	297351	1771591	314785	354092	62917	291176
2042	1826382	338680	347661	64469	283191	1771591	314785	337231	59921	277310
2043	1826382	338680	331105	61399	269706	1771591	314785	321172	57067	264105
2044	1826382	338680	315338	58476	256863	1771591	314785	305878	54350	251528
2045	1826382	490880	300322	80718	219604	1771591	456418	291313	75051	216261
2046	1826382	490880	286021	76874	209147	1771591	456418	277441	71478	205963
2047	1826382	490880	272401	73214	199187	1771591	456418	264229	68074	196155
2048	1826382	490880	259430	69727	189702	1771591	456418	251647	64832	186815
2049	1826382	490880	247076	66407	180669	1771591	456418	239664	61745	177919
2050	1826382	4680	235310	603	234707	1771591	3972	228251	512	227739
2051	1826382	4680	224105	574	223531	1771591	3972	217382	487	216895
2052	1826382	4680	213433	547	212887	1771591	3972	207030	464	206566
2053	1826382	4680	203270	521	202749	1771591	3972	197172	442	196730
2054	1826382	4680	193590	496	193094	1771591	3972	187783	421	187362
2055	1826382	4680	184372	472	183899	1771591	3972	178841	401	178440
2056	1826382	4680	175592	450	175142	1771591	3972	170324	382	169943
2057	1826382	4680	167231	429	166802	1771591	3972	162214	364	161850
Total	77393384	32932280	23140709	21882150	1258559	75071583	29914385	22446487	19883858	2562630



Appendix 10.36 Calculations of FIRR, EIRR, B/C and NPV (Economic Case D-4)

Year	FIRR= 4.72%		B/C= 0.961		FNPV	EIRR= 5.19%		B/C= 1.026		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	12790	1702864	12181	1621775	-1609594	12406	1582055	11815	1506719	-1494904
2010	25580	1702865	23201	1544549	-1521347	24812	1582056	22505	1434972	-1412466
2011	38369	2199364	33145	1899893	-1866748	37218	2029469	32151	1753131	-1720981
2012	83134	2199364	68394	1809422	-1741028	80640	2029469	66342	1669649	-1603307
2013	127898	2199364	100211	1723259	-1623048	124061	2029469	97205	1590142	-1492937
2014	172662	2199364	128843	1641199	-1512356	167482	2029469	124978	1514421	-1389443
2015	224900	3495311	159832	2484052	-2324220	218153	3110220	155037	2210375	-2055338
2016	1826382	3495311	1236167	2365764	-1129597	1771591	3110220	1199082	2105119	-906037
2017	1826382	3495311	1177302	2253109	-1075806	1771591	3110220	1141983	2004875	-862892
2018	1826382	3495311	1121240	2145818	-1024578	1771591	3110220	1087603	1909405	-821802
2019	1826382	3495311	1067848	2043636	-975788	1771591	3110220	1035812	1818481	-782669
2020	1826382	5148	1016998	2867	1014131	1771591	4369	986488	2433	984055
2021	1826382	5148	968569	2730	965839	1771591	4369	939512	2317	937195
2022	1826382	5148	922447	2600	919847	1771591	4369	894774	2207	892567
2023	1826382	5148	878521	2476	876045	1771591	4369	852165	2102	850064
2024	1826382	5148	836687	2358	834328	1771591	4369	811586	2002	809584
2025	1826382	5148	796844	2246	794598	1771591	4369	772939	1906	771033
2026	1826382	5148	758900	2139	756760	1771591	4369	736133	1816	734317
2027	1826382	5148	722761	2037	720724	1771591	4369	701079	1729	699350
2028	1826382	5148	688344	1940	686404	1771591	4369	667694	1647	666047
2029	1826382	5148	655566	1848	653718	1771591	4369	635899	1568	634331
2030	1826382	5148	624349	1760	622589	1771591	4369	605618	1494	604124
2031	1826382	5148	594618	1676	592942	1771591	4369	576779	1423	575357
2032	1826382	5148	566303	1596	564706	1771591	4369	549313	1355	547959
2033	1826382	5148	539336	1520	537816	1771591	4369	523156	1290	521865
2034	1826382	5148	513653	1448	512205	1771591	4369	498243	1229	497015
2035	1826382	5148	489193	1379	487815	1771591	4369	474518	1170	473347
2036	1826382	5148	465898	1313	464585	1771591	4369	451922	1115	450807
2037	1826382	5148	443713	1251	442462	1771591	4369	430401	1062	429340
2038	1826382	173008	422584	40030	382554	1771591	160576	409906	37154	372753
2039	1826382	173008	402461	38124	364337	1771591	160576	390387	35384	355002
2040	1826382	173008	383296	36309	346987	1771591	160576	371797	33699	338098
2041	1826382	372548	365044	74462	290582	1771591	346263	354092	69208	284884
2042	1826382	372548	347661	70916	276744	1771591	346263	337231	65913	271318
2043	1826382	372548	331105	67539	263566	1771591	346263	321172	62774	258398
2044	1826382	372548	315338	64323	251015	1771591	346263	305878	59785	246093
2045	1826382	539968	300322	88790	211532	1771591	502060	291313	82557	208756
2046	1826382	539968	286021	84562	201459	1771591	502060	277441	78625	198815
2047	1826382	539968	272401	80535	191866	1771591	502060	264229	74881	189348
2048	1826382	539968	259430	76700	182730	1771591	502060	251647	71315	180331
2049	1826382	539968	247076	73048	174028	1771591	502060	239664	67920	171744
2050	1826382	5148	235310	663	234647	1771591	4369	228251	563	227688
2051	1826382	5148	224105	632	223473	1771591	4369	217382	536	216846
2052	1826382	5148	213433	602	212832	1771591	4369	207030	511	206520
2053	1826382	5148	203270	573	202697	1771591	4369	197172	486	196686
2054	1826382	5148	193590	546	193045	1771591	4369	187783	463	187320
2055	1826382	5148	184372	520	183852	1771591	4369	178841	441	178400
2056	1826382	5148	175592	495	175097	1771591	4369	170324	420	169904
2057	1826382	5148	167231	471	166759	1771591	4369	162214	400	161814
Total	77393384	36225508	23140709	24070365	-929656	75071583	32905824	22446487	21872244	574244

Appendix 10..37 Calculations of FIRR, EIRR, B/C and NPV (Economic Case E-1)

Year	FIRR= 12.81%		B/C= 2.350		FNPV	EIRR= 13.53%		B/C= 2.509		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	28422	1548058	27068	1474341	-1447273	27569	1438232	26256	1369744	-1343488
2010	56844	1548059	51559	1404135	-1352577	55138	1438233	50012	1304520	-1254508
2011	85265	1999422	73655	1727176	-1653520	82707	1844972	71446	1593756	-1522310
2012	184741	1999422	151987	1644929	-1492942	179199	1844972	147428	1517863	-1370435
2013	284218	1999422	222692	1566599	-1343907	275691	1844972	216011	1445584	-1229572
2014	383694	1999422	286318	1491999	-1205681	372183	1844972	277729	1376746	-1099018
2015	499778	3177556	355183	2258229	-1903046	484785	2827472	344527	2009432	-1664904
2016	4058627	3177556	2747039	2150695	596344	3936868	2827472	2664627	1913745	750883
2017	4058627	3177556	2616227	2048281	567947	3936868	2827472	2537740	1822614	715126
2018	4058627	3177556	2491645	1950743	540902	3936868	2827472	2416896	1735823	681073
2019	4058627	3177556	2372995	1857851	515144	3936868	2827472	2301805	1653165	648641
2020	4058627	4680	2259995	2606	2257389	3936868	3972	2192196	2212	2189984
2021	4058627	4680	2152377	2482	2149895	3936868	3972	2087805	2107	2085699
2022	4058627	4680	2049882	2364	2047519	3936868	3972	1988386	2006	1986380
2023	4058627	4680	1952269	2251	1950018	3936868	3972	1893701	1911	1891790
2024	4058627	4680	1859304	2144	1857160	3936868	3972	1803525	1820	1801705
2025	4058627	4680	1770766	2042	1768724	3936868	3972	1717643	1733	1715910
2026	4058627	4680	1686443	1945	1684499	3936868	3972	1635850	1651	1634200
2027	4058627	4680	1606137	1852	1604285	3936868	3972	1557952	1572	1556381
2028	4058627	4680	1529654	1764	1527890	3936868	3972	1483764	1497	1482267
2029	4058627	4680	1456813	1680	1455133	3936868	3972	1413109	1426	1411683
2030	4058627	4680	1387441	1600	1385841	3936868	3972	1345818	1358	1344460
2031	4058627	4680	1321373	1524	1319849	3936868	3972	1281731	1293	1280438
2032	4058627	4680	1258450	1451	1256999	3936868	3972	1220697	1232	1219465
2033	4058627	4680	1198524	1382	1197142	3936868	3972	1162568	1173	1161395
2034	4058627	4680	1141451	1316	1140135	3936868	3972	1107208	1117	1106091
2035	4058627	4680	1087096	1254	1085843	3936868	3972	1054484	1064	1053420
2036	4058627	4680	1035330	1194	1034136	3936868	3972	1004270	1013	1003257
2037	4058627	4680	986029	1137	984892	3936868	3972	956448	965	955483
2038	4058627	157280	939075	36391	902684	3936868	145978	910903	33776	877126
2039	4058627	157280	894357	34658	859699	3936868	145978	867526	32168	835359
2040	4058627	157280	851769	33008	818761	3936868	145978	826215	30636	795580
2041	4058627	338680	811208	67693	743515	3936868	314785	786872	62917	723955
2042	4058627	338680	772579	64469	708110	3936868	314785	749402	59921	689481
2043	4058627	338680	735790	61399	674390	3936868	314785	713716	57067	656649
2044	4058627	338680	700752	58476	642276	3936868	314785	679729	54350	625380
2045	4058627	490880	667383	80718	586665	3936868	456418	647361	75051	572310
2046	4058627	490880	635603	76874	558728	3936868	456418	616535	71478	545057
2047	4058627	490880	605336	73214	532122	3936868	456418	587176	68074	519102
2048	4058627	490880	576510	69727	506783	3936868	456418	559215	64832	494383
2049	4058627	490880	549058	66407	482651	3936868	456418	532586	61745	470841
2050	4058627	4680	522912	603	522309	3936868	3972	507225	512	506713
2051	4058627	4680	498011	574	497437	3936868	3972	483071	487	482584
2052	4058627	4680	474297	547	473750	3936868	3972	460068	464	459603
2053	4058627	4680	451711	521	451190	3936868	3972	438160	442	437718
2054	4058627	4680	430201	496	429705	3936868	3972	417295	421	416874
2055	4058627	4680	409715	472	409243	3936868	3972	397424	401	397023
2056	4058627	4680	390205	450	389755	3936868	3972	378499	382	378117
2057	4058627	4680	371624	429	371195	3936868	3972	360475	364	360111
Total	171985299	32932280	51423797	21882150	29541647	166825740	29914385	49881083	19883858	29997225

Appendix 10..38 Calculations of FIRR, EIRR, B/C and NPV (Economic Case E-2)

Year	FIRR= 11.74%		B/C= 2.136		FNPV	EIRR= 12.43%		B/C= 2.281		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	28422	1702864	27068	1621775	-1594707	27569	1582055	26256	1506719	-1480463
2010	56844	1702865	51559	1544549	-1492990	55138	1582056	50012	1434972	-1384960
2011	85265	2199364	73655	1899893	-1826238	82707	2029469	71446	1753131	-1681686
2012	184741	2199364	151987	1809422	-1657435	179199	2029469	147428	1669649	-1522221
2013	284218	2199364	222692	1723259	-1500567	275691	2029469	216011	1590142	-1374131
2014	383694	2199364	286318	1641199	-1354881	372183	2029469	277729	1514421	-1236692
2015	499778	3495311	355183	2484052	-2128869	484785	3110220	344527	2210375	-1865848
2016	4058627	3495311	2747039	2365764	381274	3936868	3110220	2664627	2105119	559508
2017	4058627	3495311	2616227	2253109	363119	3936868	3110220	2537740	2004875	532865
2018	4058627	3495311	2491645	2145818	345827	3936868	3110220	2416896	1909405	507491
2019	4058627	3495311	2372995	2043636	329359	3936868	3110220	2301805	1818481	483324
2020	4058627	5148	2259995	2867	2257129	3936868	4369	2192196	2433	2189763
2021	4058627	5148	2152377	2730	2149647	3936868	4369	2087805	2317	2085488
2022	4058627	5148	2049882	2600	2047282	3936868	4369	1988386	2207	1986179
2023	4058627	5148	1952269	2476	1949793	3936868	4369	1893701	2102	1891599
2024	4058627	5148	1859304	2358	1856945	3936868	4369	1803525	2002	1801523
2025	4058627	5148	1770766	2246	1768519	3936868	4369	1717643	1906	1715736
2026	4058627	5148	1686443	2139	1684304	3936868	4369	1635850	1816	1634035
2027	4058627	5148	1606137	2037	1604099	3936868	4369	1557952	1729	1556223
2028	4058627	5148	1529654	1940	1527714	3936868	4369	1483764	1647	1482117
2029	4058627	5148	1456813	1848	1454965	3936868	4369	1413109	1568	1411540
2030	4058627	5148	1387441	1760	1385681	3936868	4369	1345818	1494	1344324
2031	4058627	5148	1321373	1676	1319696	3936868	4369	1281731	1423	1280309
2032	4058627	5148	1258450	1596	1256854	3936868	4369	1220697	1355	1219342
2033	4058627	5148	1198524	1520	1197004	3936868	4369	1162568	1290	1161278
2034	4058627	5148	1141451	1448	1140003	3936868	4369	1107208	1229	1105979
2035	4058627	5148	1087096	1379	1085718	3936868	4369	1054484	1170	1053313
2036	4058627	5148	1035330	1313	1034017	3936868	4369	1004270	1115	1003155
2037	4058627	5148	986029	1251	984778	3936868	4369	956448	1062	955386
2038	4058627	173008	939075	40030	899045	3936868	160576	910903	37154	873749
2039	4058627	173008	894357	38124	856233	3936868	160576	867526	35384	832142
2040	4058627	173008	851769	36309	815460	3936868	160576	826215	33699	792516
2041	4058627	372548	811208	74462	736746	3936868	346263	786872	69208	717663
2042	4058627	372548	772579	70916	701663	3936868	346263	749402	65913	683489
2043	4058627	372548	735790	67539	668250	3936868	346263	713716	62774	650942
2044	4058627	372548	700752	64323	636429	3936868	346263	679729	59785	619945
2045	4058627	539968	667383	88790	578593	3936868	502060	647361	82557	564805
2046	4058627	539968	635603	84562	551041	3936868	502060	616535	78625	537909
2047	4058627	539968	605336	80535	524801	3936868	502060	587176	74881	512295
2048	4058627	539968	576510	76700	499810	3936868	502060	559215	71315	487900
2049	4058627	539968	549058	73048	476010	3936868	502060	532586	67920	464666
2050	4058627	5148	522912	663	522249	3936868	4369	507225	563	506662
2051	4058627	5148	498011	632	497380	3936868	4369	483071	536	482535
2052	4058627	5148	474297	602	473695	3936868	4369	460068	511	459557
2053	4058627	5148	451711	573	451138	3936868	4369	438160	486	437673
2054	4058627	5148	430201	546	429655	3936868	4369	417295	463	416832
2055	4058627	5148	409715	520	409196	3936868	4369	397424	441	396983
2056	4058627	5148	390205	495	389710	3936868	4369	378499	420	378079
2057	4058627	5148	371624	471	371152	3936868	4369	360475	400	360075
Total	171985299	36225508	51423797	24070365	27353432	166825740	32905824	49881083	21872244	28008840

Appendix 10..39 Calculations of FIRR, EIRR, B/C and NPV (Economic Case E-3)

Year	FIRR= 11.63%		B/C= 2.115		FNPV	EIRR= 12.32%		B/C= 2.258		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	25580	1548058	24362	1474341	-1449979	24812	1438232	23631	1369744	-1346114
2010	51159	1548059	46403	1404135	-1357733	49624	1438233	45011	1304520	-1259509
2011	76739	1999422	66290	1727176	-1660886	74437	1844972	64301	1593756	-1529455
2012	166267	1999422	136789	1644929	-1508141	161279	1844972	132685	1517863	-1385178
2013	255796	1999422	200423	1566599	-1366177	248122	1844972	194410	1445584	-1251173
2014	345324	1999422	257686	1491999	-1234313	334965	1844972	249956	1376746	-1126790
2015	449800	3177556	319665	2258229	-1938565	436306	2827472	310075	2009432	-1699357
2016	3652764	3177556	2472335	2150695	321640	3543181	2827472	2398165	1913745	484420
2017	3652764	3177556	2354604	2048281	306324	3543181	2827472	2283966	1822614	461352
2018	3652764	3177556	2242480	1950743	291737	3543181	2827472	2175206	1735823	439383
2019	3652764	3177556	2135696	1857851	277845	3543181	2827472	2071625	1653165	418460
2020	3652764	4680	2033996	2606	2031390	3543181	3972	1972976	2212	1970764
2021	3652764	4680	1937139	2482	1934657	3543181	3972	1879025	2107	1876918
2022	3652764	4680	1844894	2364	1842531	3543181	3972	1789547	2006	1787541
2023	3652764	4680	1757042	2251	1754791	3543181	3972	1704331	1911	1702420
2024	3652764	4680	1673373	2144	1671229	3543181	3972	1623172	1820	1621353
2025	3652764	4680	1593689	2042	1591647	3543181	3972	1545878	1733	1544145
2026	3652764	4680	1517799	1945	1515854	3543181	3972	1472265	1651	1470615
2027	3652764	4680	1445523	1852	1443671	3543181	3972	1402157	1572	1400585
2028	3652764	4680	1376688	1764	1374925	3543181	3972	1335388	1497	1333891
2029	3652764	4680	1311132	1680	1309452	3543181	3972	1271798	1426	1270372
2030	3652764	4680	1248697	1600	1247097	3543181	3972	1211236	1358	1209878
2031	3652764	4680	1189235	1524	1187712	3543181	3972	1153558	1293	1152265
2032	3652764	4680	1132605	1451	1131154	3543181	3972	1098627	1232	1097395
2033	3652764	4680	1078671	1382	1077289	3543181	3972	1046311	1173	1045138
2034	3652764	4680	1027306	1316	1025990	3543181	3972	996487	1117	995370
2035	3652764	4680	978387	1254	977133	3543181	3972	949035	1064	947971
2036	3652764	4680	931797	1194	930603	3543181	3972	903843	1013	902830
2037	3652764	4680	887426	1137	886289	3543181	3972	860803	965	859838
2038	3652764	157280	845167	36391	808776	3543181	145978	819812	33776	786036
2039	3652764	157280	804921	34658	770263	3543181	145978	780774	32168	748606
2040	3652764	157280	766592	33008	733584	3543181	145978	743594	30636	712958
2041	3652764	338680	730087	67693	662394	3543181	314785	708185	62917	645268
2042	3652764	338680	695321	64469	630852	3543181	314785	674462	59921	614541
2043	3652764	338680	662211	61399	600811	3543181	314785	642344	57067	585277
2044	3652764	338680	630677	58476	572201	3543181	314785	611757	54350	557407
2045	3652764	490880	600645	80718	519926	3543181	456418	582625	75051	507574
2046	3652764	490880	572042	76874	495168	3543181	456418	554881	71478	483404
2047	3652764	490880	544802	73214	471589	3543181	456418	528458	68074	460384
2048	3652764	490880	518859	69727	449132	3543181	456418	503294	64832	438461
2049	3652764	490880	494152	66407	427745	3543181	456418	479327	61745	417582
2050	3652764	4680	470621	603	470018	3543181	3972	456502	512	455990
2051	3652764	4680	448210	574	447636	3543181	3972	434764	487	434277
2052	3652764	4680	426867	547	426320	3543181	3972	414061	464	413597
2053	3652764	4680	406540	521	406019	3543181	3972	394344	442	393902
2054	3652764	4680	387181	496	386685	3543181	3972	375565	421	375144
2055	3652764	4680	368744	472	368271	3543181	3972	357681	401	357280
2056	3652764	4680	351184	450	350735	3543181	3972	340649	382	340267
2057	3652764	4680	334461	429	334033	3543181	3972	324428	364	324064
Total	154786769	32932280	46281417	21882150	24399267	150143166	29914385	44892975	19883858	25009117

Appendix 10.40 Calculations of FIRR, EIRR, B/C and NPV (Economic Case E-4)

Year	FIRR= 10.63%		B/C= 1.923		FNPV	EIRR= 11.28%		B/C= 2.053		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	25580	1702864	24362	1621775	-1597414	24812	1582055	23631	1506719	-1483088
2010	51159	1702865	46403	1544549	-1498146	49624	1582056	45011	1434972	-1389961
2011	76739	2199364	66290	1899893	-1833603	74437	2029469	64301	1753131	-1688830
2012	166267	2199364	136789	1809422	-1672634	161279	2029469	132685	1669649	-1536964
2013	255796	2199364	200423	1723259	-1522837	248122	2029469	194410	1590142	-1395732
2014	345324	2199364	257686	1641199	-1383513	334965	2029469	249956	1514421	-1264465
2015	449800	3495311	319665	2484052	-2164388	436306	3110220	310075	2210375	-1900300
2016	3652764	3495311	2472335	2365764	106571	3543181	3110220	2398165	2105119	293046
2017	3652764	3495311	2354604	2253109	101496	3543181	3110220	2283966	2004875	279091
2018	3652764	3495311	2242480	2145818	96663	3543181	3110220	2175206	1909405	265801
2019	3652764	3495311	2135696	2043636	92060	3543181	3110220	2071625	1818481	253144
2020	3652764	5148	2033996	2867	2031129	3543181	4369	1972976	2433	1970543
2021	3652764	5148	1937139	2730	1934409	3543181	4369	1879025	2317	1876708
2022	3652764	5148	1844894	2600	1842294	3543181	4369	1789547	2207	1787341
2023	3652764	5148	1757042	2476	1754566	3543181	4369	1704331	2102	1702229
2024	3652764	5148	1673373	2358	1671015	3543181	4369	1623172	2002	1621171
2025	3652764	5148	1593689	2246	1591443	3543181	4369	1545878	1906	1543972
2026	3652764	5148	1517799	2139	1515660	3543181	4369	1472265	1816	1470450
2027	3652764	5148	1445523	2037	1443486	3543181	4369	1402157	1729	1400428
2028	3652764	5148	1376688	1940	1374748	3543181	4369	1335388	1647	1333741
2029	3652764	5148	1311132	1848	1309284	3543181	4369	1271798	1568	1270230
2030	3652764	5148	1248697	1760	1246937	3543181	4369	1211236	1494	1209742
2031	3652764	5148	1189235	1676	1187559	3543181	4369	1153558	1423	1152136
2032	3652764	5148	1132605	1596	1131009	3543181	4369	1098627	1355	1097272
2033	3652764	5148	1078671	1520	1077151	3543181	4369	1046311	1290	1045021
2034	3652764	5148	1027306	1448	1025858	3543181	4369	996487	1229	995258
2035	3652764	5148	978387	1379	977008	3543181	4369	949035	1170	947865
2036	3652764	5148	931797	1313	930484	3543181	4369	903843	1115	902728
2037	3652764	5148	887426	1251	886175	3543181	4369	860803	1062	859741
2038	3652764	173008	845167	40030	805137	3543181	160576	819812	37154	782659
2039	3652764	173008	804921	38124	766797	3543181	160576	780774	35384	745389
2040	3652764	173008	766592	36309	730283	3543181	160576	743594	33699	709894
2041	3652764	372548	730087	74462	655625	3543181	346263	708185	69208	638976
2042	3652764	372548	695321	70916	624405	3543181	346263	674462	65913	608549
2043	3652764	372548	662211	67539	594671	3543181	346263	642344	62774	579570
2044	3652764	372548	630677	64323	566354	3543181	346263	611757	59785	551972
2045	3652764	539968	600645	88790	511855	3543181	502060	582625	82557	500069
2046	3652764	539968	572042	84562	487481	3543181	502060	554881	78625	476256
2047	3652764	539968	544802	80535	464267	3543181	502060	528458	74881	453577
2048	3652764	539968	518859	76700	442159	3543181	502060	503294	71315	431978
2049	3652764	539968	494152	73048	421104	3543181	502060	479327	67920	411408
2050	3652764	5148	470621	663	469958	3543181	4369	456502	563	455939
2051	3652764	5148	448210	632	447579	3543181	4369	434764	536	434228
2052	3652764	5148	426867	602	426265	3543181	4369	414061	511	413550
2053	3652764	5148	406540	573	405967	3543181	4369	394344	486	393857
2054	3652764	5148	387181	546	386635	3543181	4369	375565	463	375102
2055	3652764	5148	368744	520	368224	3543181	4369	357681	441	357240
2056	3652764	5148	351184	495	350690	3543181	4369	340649	420	340229
2057	3652764	5148	334461	471	333990	3543181	4369	324428	400	324027
Total	154786769	36225508	46281417	24070365	22211052	150143166	32905824	44892975	21872244	23020731

Appendix 10.41 Calculations of FIRR, EIRR, B/C and NPV (Economic Case F-1)

Year	FIRR= 22.44%		B/C= 4.700		FNPV	EIRR= 23.37%		B/C= 5.017		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	56844	1548058	54137	1474341	-1420204	55138	1438232	52513	1369744	-1317232
2010	113687	1548059	103117	1404135	-1301018	110276	1438233	100024	1304520	-1204496
2011	170531	1999422	147311	1727176	-1579865	165415	1844972	142891	1593756	-1450864
2012	369483	1999422	303974	1644929	-1340955	358398	1844972	294855	1517863	-1223007
2013	568435	1999422	445384	1566599	-1121215	551382	1844972	432022	1445584	-1013561
2014	767387	1999422	572636	1491999	-919363	744366	1844972	555457	1376746	-821289
2015	999556	3177556	710366	2258229	-1547863	969570	2827472	689055	2009432	-1320377
2016	8117254	3177556	5494077	2150695	3343382	7873737	2827472	5329255	1913745	3415510
2017	8117254	3177556	5232454	2048281	3184174	7873737	2827472	5075481	1822614	3252867
2018	8117254	3177556	4983290	1950743	3032546	7873737	2827472	4833791	1735823	3097968
2019	8117254	3177556	4745990	1857851	2888139	7873737	2827472	4603611	1653165	2950446
2020	8117254	4680	4519991	2606	4517385	7873737	3972	4384391	2212	4382179
2021	8117254	4680	4304753	2482	4302271	7873737	3972	4175611	2107	4173504
2022	8117254	4680	4099765	2364	4097401	7873737	3972	3976772	2006	3974766
2023	8117254	4680	3904538	2251	3902287	7873737	3972	3787402	1911	3785491
2024	8117254	4680	3718608	2144	3716464	7873737	3972	3607049	1820	3605230
2025	8117254	4680	3541531	2042	3539489	7873737	3972	3435285	1733	3433552
2026	8117254	4680	3372887	1945	3370942	7873737	3972	3271700	1651	3270050
2027	8117254	4680	3212273	1852	3210421	7873737	3972	3115905	1572	3114333
2028	8117254	4680	3059308	1764	3057544	7873737	3972	2967528	1497	2966031
2029	8117254	4680	2913626	1680	2911947	7873737	3972	2826218	1426	2824792
2030	8117254	4680	2774882	1600	2773282	7873737	3972	2691636	1358	2690278
2031	8117254	4680	2642745	1524	2641221	7873737	3972	2563463	1293	2562169
2032	8117254	4680	2516900	1451	2515449	7873737	3972	2441393	1232	2440161
2033	8117254	4680	2397048	1382	2395666	7873737	3972	2325136	1173	2323963
2034	8117254	4680	2282903	1316	2281586	7873737	3972	2214415	1117	2213298
2035	8117254	4680	2174193	1254	2172939	7873737	3972	2108967	1064	2107903
2036	8117254	4680	2070660	1194	2069466	7873737	3972	2008540	1013	2007527
2037	8117254	4680	1972057	1137	1970920	7873737	3972	1912895	965	1911930
2038	8117254	157280	1878150	36391	1841759	7873737	145978	1821805	33776	1788029
2039	8117254	157280	1788714	34658	1754056	7873737	145978	1735052	32168	1702885
2040	8117254	157280	1703537	33008	1670529	7873737	145978	1652431	30636	1621795
2041	8117254	338680	1622416	67693	1554723	7873737	314785	1573744	62917	1510827
2042	8117254	338680	1545158	64469	1480689	7873737	314785	1498804	59921	1438883
2043	8117254	338680	1471579	61399	1410180	7873737	314785	1427432	57067	1370365
2044	8117254	338680	1401504	58476	1343029	7873737	314785	1359459	54350	1305109
2045	8117254	490880	1334766	80718	1254048	7873737	456418	1294723	75051	1219671
2046	8117254	490880	1271206	76874	1194331	7873737	456418	1233069	71478	1161592
2047	8117254	490880	1210672	73214	1137458	7873737	456418	1174352	68074	1106278
2048	8117254	490880	1153021	69727	1083294	7873737	456418	1118430	64832	1053598
2049	8117254	490880	1098115	66407	1031708	7873737	456418	1065172	61745	1003427
2050	8117254	4680	1045824	603	1045221	7873737	3972	1014449	512	1013937
2051	8117254	4680	996023	574	995449	7873737	3972	966142	487	965655
2052	8117254	4680	948593	547	948046	7873737	3972	920135	464	919671
2053	8117254	4680	903422	521	902901	7873737	3972	876319	442	875877
2054	8117254	4680	860402	496	859906	7873737	3972	834590	421	834169
2055	8117254	4680	819430	472	818958	7873737	3972	794848	401	794447
2056	8117254	4680	780410	450	779960	7873737	3972	756998	382	756616
2057	8117254	4680	743248	429	742819	7873737	3972	720950	364	720586
Total	343970598	32932280	102847594	21882150	80965444	333651480	29914385	99762166	19883858	79878308

Appendix 10.42 Calculations of FIRR, EIRR, B/C and NPV (Economic Case F-2)

Year	FIRR= 20.92%		B/C= 4.273		FNPV	EIRR= 21.82%		B/C= 4.561		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	56844	1702864	54137	1621775	-1567638	55138	1582055	52513	1506719	-1454206
2010	113687	1702865	103117	1544549	-1441431	110276	1582056	100024	1434972	-1334948
2011	170531	2199364	147311	1899893	-1752583	165415	2029469	142891	1753131	-1610240
2012	369483	2199364	303974	1809422	-1505448	358398	2029469	294855	1669649	-1374794
2013	568435	2199364	445384	1723259	-1277875	551382	2029469	432022	1590142	-1158120
2014	767387	2199364	572636	1641199	-1068563	744366	2029469	555457	1514421	-958964
2015	999556	3495311	710366	2484052	-1773686	969570	3110220	689055	2210375	-1521320
2016	8117254	3495311	5494077	2365764	3128313	7873737	3110220	5329255	2105119	3224136
2017	8117254	3495311	5232454	2253109	2979346	7873737	3110220	5075481	2004875	3070605
2018	8117254	3495311	4983290	2145818	2837472	7873737	3110220	4833791	1909405	2924386
2019	8117254	3495311	4745990	2043636	2702354	7873737	3110220	4603611	1818481	2785130
2020	8117254	5148	4519991	2867	4517124	7873737	4369	4384391	2433	4381958
2021	8117254	5148	4304753	2730	4302023	7873737	4369	4175611	2317	4173293
2022	8117254	5148	4099765	2600	4097165	7873737	4369	3976772	2207	3974565
2023	8117254	5148	3904538	2476	3902062	7873737	4369	3787402	2102	3785300
2024	8117254	5148	3718608	2358	3716249	7873737	4369	3607049	2002	3605048
2025	8117254	5148	3541531	2246	3539285	7873737	4369	3435285	1906	3433379
2026	8117254	5148	3372887	2139	3370748	7873737	4369	3271700	1816	3269885
2027	8117254	5148	3212273	2037	3210236	7873737	4369	3115905	1729	3114176
2028	8117254	5148	3059308	1940	3057367	7873737	4369	2967528	1647	2965882
2029	8117254	5148	2913626	1848	2911779	7873737	4369	2826218	1568	2824649
2030	8117254	5148	2774882	1760	2773122	7873737	4369	2691636	1494	2690142
2031	8117254	5148	2642745	1676	2641069	7873737	4369	2563463	1423	2562040
2032	8117254	5148	2516900	1596	2515304	7873737	4369	2441393	1355	2440038
2033	8117254	5148	2397048	1520	2395527	7873737	4369	2325136	1290	2323846
2034	8117254	5148	2282903	1448	2281455	7873737	4369	2214415	1229	2213187
2035	8117254	5148	2174193	1379	2172814	7873737	4369	2108967	1170	2107797
2036	8117254	5148	2070660	1313	2069347	7873737	4369	2008540	1115	2007425
2037	8117254	5148	1972057	1251	1970806	7873737	4369	1912895	1062	1911834
2038	8117254	173008	1878150	40030	1838119	7873737	160576	1821805	37154	1784651
2039	8117254	173008	1788714	38124	1750590	7873737	160576	1735052	35384	1699668
2040	8117254	173008	1703537	36309	1667228	7873737	160576	1652431	33699	1618731
2041	8117254	372548	1622416	74462	1547954	7873737	346263	1573744	69208	1504535
2042	8117254	372548	1545158	70916	1474242	7873737	346263	1498804	65913	1432891
2043	8117254	372548	1471579	67539	1404040	7873737	346263	1427432	62774	1364658
2044	8117254	372548	1401504	64323	1337181	7873737	346263	1359459	59785	1299674
2045	8117254	539968	1334766	88790	1245976	7873737	502060	1294723	82557	1212166
2046	8117254	539968	1271206	84562	1186644	7873737	502060	1233069	78625	1154444
2047	8117254	539968	1210672	80535	1130137	7873737	502060	1174352	74881	1099471
2048	8117254	539968	1153021	76700	1076321	7873737	502060	1118430	71315	1047115
2049	8117254	539968	1098115	73048	1025067	7873737	502060	1065172	67920	997252
2050	8117254	5148	1045824	663	1045161	7873737	4369	1014449	563	1013886
2051	8117254	5148	996023	632	995391	7873737	4369	966142	536	965606
2052	8117254	5148	948593	602	947992	7873737	4369	920135	511	919625
2053	8117254	5148	903422	573	902849	7873737	4369	876319	486	875833
2054	8117254	5148	860402	546	859856	7873737	4369	834590	463	834127
2055	8117254	5148	819430	520	818911	7873737	4369	794848	441	794406
2056	8117254	5148	780410	495	779915	7873737	4369	756998	420	756578
2057	8117254	5148	743248	471	742776	7873737	4369	720950	400	720550
Total	343970598	36225508	102847594	24070365	78777229	333651480	32905824	99762166	21872244	77889923

Appendix 10.43 Calculations of FIRR, EIRR, B/C and NPV (Economic Case F-3)

Year	FIRR= 20.76%		B/C= 4.230		FNPV	EIRR= 21.66%		B/C= 4.516		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1548058	0	1548058	-1548058	0	1438232	0	1438232	-1438232
2009	51159	1548058	48723	1474341	-1425618	49624	1438232	47261	1369744	-1322483
2010	102318	1548059	92806	1404135	-1311330	99249	1438233	90022	1304520	-1214498
2011	153477	1999422	132580	1727176	-1594596	148873	1844972	128602	1593756	-1465154
2012	332535	1999422	273577	1644929	-1371352	322559	1844972	265370	1517863	-1252493
2013	511592	1999422	400845	1566599	-1165754	496244	1844972	388820	1445584	-1056763
2014	690649	1999422	515373	1491999	-976627	669929	1844972	499912	1376746	-876835
2015	899601	3177556	639329	2258229	-1618900	872613	2827472	620149	2009432	-1389282
2016	7305529	3177556	4944669	2150695	2793975	7086363	2827472	4796329	1913745	2882585
2017	7305529	3177556	4709209	2048281	2660928	7086363	2827472	4567933	1822614	2745319
2018	7305529	3177556	4484961	1950743	2534217	7086363	2827472	4350412	1735823	2614589
2019	7305529	3177556	4271391	1857851	2413540	7086363	2827472	4143250	1653165	2490085
2020	7305529	4680	4067992	2606	4065386	7086363	3972	3945952	2212	3943740
2021	7305529	4680	3874278	2482	3871796	7086363	3972	3758050	2107	3755943
2022	7305529	4680	3689788	2364	3687425	7086363	3972	3579095	2006	3577089
2023	7305529	4680	3514084	2251	3511833	7086363	3972	3408662	1911	3406751
2024	7305529	4680	3346747	2144	3344603	7086363	3972	3246344	1820	3244525
2025	7305529	4680	3187378	2042	3185336	7086363	3972	3091757	1733	3090024
2026	7305529	4680	3035598	1945	3033653	7086363	3972	2944530	1651	2942880
2027	7305529	4680	2891046	1852	2889194	7086363	3972	2804314	1572	2802743
2028	7305529	4680	2753377	1764	2751613	7086363	3972	2670776	1497	2669279
2029	7305529	4680	2622264	1680	2620584	7086363	3972	2543596	1426	2542170
2030	7305529	4680	2497394	1600	2495794	7086363	3972	2422472	1358	2421114
2031	7305529	4680	2378471	1524	2376947	7086363	3972	2307116	1293	2305823
2032	7305529	4680	2265210	1451	2263759	7086363	3972	2197254	1232	2196022
2033	7305529	4680	2157343	1382	2155961	7086363	3972	2092623	1173	2091450
2034	7305529	4680	2054612	1316	2053296	7086363	3972	1992974	1117	1991857
2035	7305529	4680	1956774	1254	1955520	7086363	3972	1898070	1064	1897006
2036	7305529	4680	1863594	1194	1862400	7086363	3972	1807686	1013	1806673
2037	7305529	4680	1774851	1137	1773714	7086363	3972	1721606	965	1720641
2038	7305529	157280	1690335	36391	1653944	7086363	145978	1639625	33776	1605849
2039	7305529	157280	1609842	34658	1575184	7086363	145978	1561547	32168	1529380
2040	7305529	157280	1533183	33008	1500176	7086363	145978	1487188	30636	1456552
2041	7305529	338680	1460175	67693	1392482	7086363	314785	1416369	62917	1353453
2042	7305529	338680	1390642	64469	1326173	7086363	314785	1348923	59921	1289002
2043	7305529	338680	1324421	61399	1263022	7086363	314785	1284689	57067	1227621
2044	7305529	338680	1261354	58476	1202878	7086363	314785	1223513	54350	1169163
2045	7305529	490880	1201289	80718	1120571	7086363	456418	1165251	75051	1090199
2046	7305529	490880	1144085	76874	1067211	7086363	456418	1109762	71478	1038285
2047	7305529	490880	1089605	73214	1016391	7086363	456418	1056917	68074	988843
2048	7305529	490880	1037719	69727	967991	7086363	456418	1006587	64832	941755
2049	7305529	490880	988304	66407	921897	7086363	456418	958655	61745	896910
2050	7305529	4680	941242	603	940639	7086363	3972	913004	512	912493
2051	7305529	4680	896421	574	895846	7086363	3972	869528	487	869041
2052	7305529	4680	853734	547	853187	7086363	3972	828122	464	827658
2053	7305529	4680	813080	521	812559	7086363	3972	788687	442	788245
2054	7305529	4680	774362	496	773866	7086363	3972	751131	421	750710
2055	7305529	4680	737487	472	737015	7086363	3972	715363	401	714962
2056	7305529	4680	702369	450	701919	7086363	3972	681298	382	680916
2057	7305529	4680	668923	429	668494	7086363	3972	648855	364	648491
Total	309573538	32932280	92562835	21882150	70680685	300286332	29914385	89785950	19883858	69902092



Appendix 10.44 Calculations of FIRR, EIRR, B/C and NPV (Economic Case F-4)

Year	FIRR= 19.31%		B/C= 3.846		FNPV	EIRR= 20.18%		B/C= 4.105		ENPV
	Gross		Net			Gross		Net		
	Benefit	Cost	Benefit	Cost		Benefit	Cost	Benefit	Cost	
2008	0	1702864	0	1702864	-1702864	0	1582055	0	1582055	-1582055
2009	51159	1702864	48723	1621775	-1573052	49624	1582055	47261	1506719	-1459458
2010	102318	1702865	92806	1544549	-1451743	99249	1582056	90022	1434972	-1344950
2011	153477	2199364	132580	1899893	-1767314	148873	2029469	128602	1753131	-1624529
2012	332535	2199364	273577	1809422	-1535845	322559	2029469	265370	1669649	-1404279
2013	511592	2199364	400845	1723259	-1322414	496244	2029469	388820	1590142	-1201322
2014	690649	2199364	515373	1641199	-1125827	669929	2029469	499912	1514421	-1014509
2015	899601	3495311	639329	2484052	-1844723	872613	3110220	620149	2210375	-1590226
2016	7305529	3495311	4944669	2365764	2578905	7086363	3110220	4796329	2105119	2691210
2017	7305529	3495311	4709209	2253109	2456100	7086363	3110220	4567933	2004875	2563057
2018	7305529	3495311	4484961	2145818	2339143	7086363	3110220	4350412	1909405	2441007
2019	7305529	3495311	4271391	2043636	2227755	7086363	3110220	4143250	1818481	2324769
2020	7305529	5148	4067992	2867	4065125	7086363	4369	3945952	2433	3943519
2021	7305529	5148	3874278	2730	3871548	7086363	4369	3758050	2317	3755732
2022	7305529	5148	3689788	2600	3687188	7086363	4369	3579095	2207	3576888
2023	7305529	5148	3514084	2476	3511608	7086363	4369	3408662	2102	3406560
2024	7305529	5148	3346747	2358	3344389	7086363	4369	3246344	2002	3244343
2025	7305529	5148	3187378	2246	3185132	7086363	4369	3091757	1906	3089850
2026	7305529	5148	3035598	2139	3033459	7086363	4369	2944530	1816	2942715
2027	7305529	5148	2891046	2037	2889009	7086363	4369	2804314	1729	2802585
2028	7305529	5148	2753377	1940	2751437	7086363	4369	2670776	1647	2669129
2029	7305529	5148	2622264	1848	2620416	7086363	4369	2543596	1568	2542028
2030	7305529	5148	2497394	1760	2495634	7086363	4369	2422472	1494	2420979
2031	7305529	5148	2378471	1676	2376794	7086363	4369	2307116	1423	2305694
2032	7305529	5148	2265210	1596	2263614	7086363	4369	2197254	1355	2195899
2033	7305529	5148	2157343	1520	2155823	7086363	4369	2092623	1290	2091332
2034	7305529	5148	2054612	1448	2053164	7086363	4369	1992974	1229	1991745
2035	7305529	5148	1956774	1379	1955395	7086363	4369	1898070	1170	1896900
2036	7305529	5148	1863594	1313	1862281	7086363	4369	1807686	1115	1806571
2037	7305529	5148	1774851	1251	1773601	7086363	4369	1721606	1062	1720544
2038	7305529	173008	1690335	40030	1650304	7086363	160576	1639625	37154	1602471
2039	7305529	173008	1609842	38124	1571719	7086363	160576	1561547	35384	1526163
2040	7305529	173008	1533183	36309	1496875	7086363	160576	1487188	33699	1453488
2041	7305529	372548	1460175	74462	1385712	7086363	346263	1416369	69208	1347161
2042	7305529	372548	1390642	70916	1319726	7086363	346263	1348923	65913	1283010
2043	7305529	372548	1324421	67539	1256882	7086363	346263	1284689	62774	1221915
2044	7305529	372548	1261354	64323	1197031	7086363	346263	1223513	59785	1163728
2045	7305529	539968	1201289	88790	1112499	7086363	502060	1165251	82557	1082694
2046	7305529	539968	1144085	84562	1059523	7086363	502060	1109762	78625	1031137
2047	7305529	539968	1089605	80535	1009070	7086363	502060	1056917	74881	982035
2048	7305529	539968	1037719	76700	961019	7086363	502060	1006587	71315	935272
2049	7305529	539968	988304	73048	915256	7086363	502060	958655	67920	890735
2050	7305529	5148	941242	663	940578	7086363	4369	913004	563	912441
2051	7305529	5148	896421	632	895789	7086363	4369	869528	536	868992
2052	7305529	5148	853734	602	853132	7086363	4369	828122	511	827611
2053	7305529	5148	813080	573	812507	7086363	4369	788687	486	788201
2054	7305529	5148	774362	546	773816	7086363	4369	751131	463	750668
2055	7305529	5148	737487	520	736968	7086363	4369	715363	441	714922
2056	7305529	5148	702369	495	701874	7086363	4369	681298	420	680878
2057	7305529	5148	668923	471	668451	7086363	4369	648855	400	648455
Total	309573538	36225508	92562835	24070365	68492470	300286332	32905824	89785950	21872244	67913706

Appendix 10..45 Repayment Schedule by TWWC (Financial Case A-1)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	1548058	0	0	0	0	1548058	1548058
2008	1548058	0	11610	11610	11610	3096116	3096116
2009	1548059	0	23221	23221	34831	4644175	4644175
2010	1999422	0	34831	34831	69663	6643597	6643597
2011	1999422	0	49827	49827	119490	8643019	8643019
2012	1999422	0	64823	64823	184312	10642441	10642441
2013	1999422	0	79818	79818	264131	12641862	12641862
2014	3177556	0	94814	94814	358945	15819418	15819418
2015	3177556	0	118646	118646	477590	18996973	18996973
2016	3177556	0	142477	142477	620067	22174529	22174529
2017	3177556	51602	166309	217911	837978	25352084	25300483
2018	3177556	103204	190141	293344	1131323	28478038	28374834
2019	0	154806	213585	368391	1499714	28374834	28220028
2020	0	221453	212811	434264	1933978	28220028	27998575
2021	0	288101	211650	499751	2433729	27998575	27710475
2022	0	354748	209989	564737	2998467	27710475	27355726
2023	0	421395	207829	629224	3627691	27355726	26934331
2024	0	527314	205168	732482	4360172	26934331	26407017
2025	0	633232	202007	835240	5195412	26407017	25773785
2026	0	739151	198053	937204	6132616	25773785	25034634
2027	0	845069	193303	1038373	7170989	25034634	24189564
2028	0	950988	187760	1138748	8309737	24189564	23238576
2029	0	950988	181422	1132410	9442146	23238576	22287588
2030	0	950988	174289	1125277	10567424	22287588	21336600
2031	0	950988	167157	1118145	11685569	21336600	20385612
2032	0	950988	160025	1111013	12796581	20385612	19434624
2033	0	950988	152892	1103880	13900461	19434624	18483636
2034	0	950988	145760	1096748	14997209	18483636	17532648
2035	0	950988	138627	1089615	16086824	17532648	16581660
2036	0	950988	131495	1082483	17169307	16581660	15630672
2037	0	950988	124362	1075350	18244657	15630672	14679684
2038	0	950988	117230	1068218	19312876	14679684	13728696
2039	0	950988	110098	1061086	20373961	13728696	12777708
2040	0	950988	102965	1053953	21427914	12777708	11826720
2041	0	950988	95833	1046821	22474735	11826720	10875732
2042	0	950988	88700	1039688	23514424	10875732	9924744
2043	0	950988	81568	1032556	24546980	9924744	8973756
2044	0	950988	74436	1025424	25572403	8973756	8022768
2045	0	950988	67303	1018291	26590694	8022768	7071780
2046	0	950988	60171	1011159	27601853	7071780	6120792
2047	0	899386	53038	952424	28554277	6120792	5221406
2048	0	847784	45906	893690	29447968	5221406	4373622
2049	0	796182	39161	835343	30283310	4373622	3577440
2050	0	729535	32802	762337	31045647	3577440	2847905
2051	0	662887	26831	689718	31735365	2847905	2185018
2052	0	596240	21359	617599	32352965	2185018	1588778
2053	0	529593	16388	545980	32898945	1588778	1059185
2054	0	423674	11916	435590	33334535	1059185	635511
2055	0	317756	7944	325699	33660234	635511	317756
2056	0	211837	4766	216603	33876838	317756	105919
2057	0	105919	2383	108302	33985139	105919	0
Total	28529640	28529640	5455499	33985139	33985139	0	0

Appendix 10.46 Repayment Schedule by TWWC (Financial Case A-2)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	1548058	0	0	0	0	1548058	1548058
2008	1548058	0	30961	30961	30961	3096116	3096116
2009	1548059	0	61922	61922	92883	4644175	4644175
2010	1999422	0	92884	92884	185767	6643597	6643597
2011	1999422	0	132872	132872	318639	8643019	8643019
2012	1999422	0	172860	172860	491499	10642441	10642441
2013	1999422	0	212849	212849	704348	12641862	12641862
2014	3177556	0	252837	252837	957185	15819418	15819418
2015	3177556	0	316388	316388	1273574	18996973	18996973
2016	3177556	0	379939	379939	1653513	22174529	22174529
2017	3177556	77403	443491	520893	2174407	25352084	25274682
2018	3177556	154806	507042	661847	2836254	28452237	28297431
2019	0	232209	569045	801254	3637508	28297431	28065223
2020	0	332180	565949	898128	4535636	28065223	27733043
2021	0	432151	561304	993455	5529092	27733043	27300892
2022	0	532122	554661	1086783	6615874	27300892	26768770
2023	0	632093	546018	1178111	7793985	26768770	26136677
2024	0	790971	535375	1326346	9120332	26136677	25345706
2025	0	949849	522734	1472582	10592914	25345706	24395857
2026	0	1108726	506914	1615641	12208554	24395857	23287131
2027	0	1267604	487917	1755521	13964076	23287131	22019526
2028	0	1426482	465743	1892225	15856300	22019526	20593044
2029	0	1426482	440391	1866873	17723173	20593044	19166562
2030	0	1426482	411861	1838343	19561516	19166562	17740080
2031	0	1426482	383331	1809813	21371329	17740080	16313598
2032	0	1426482	354802	1781284	23152613	16313598	14887116
2033	0	1426482	326272	1752754	24905367	14887116	13460634
2034	0	1426482	297742	1724224	26629591	13460634	12034152
2035	0	1426482	269213	1695695	28325286	12034152	10607670
2036	0	1426482	240683	1667165	29992451	10607670	9181188
2037	0	1349079	212153	1561233	31553683	9181188	7832109
2038	0	1271676	183624	1455300	33008983	7832109	6560433
2039	0	1194273	156642	1350915	34359899	6560433	5366160
2040	0	1094302	131209	1225511	35585409	5366160	4271858
2041	0	994331	107323	1101654	36687064	4271858	3277527
2042	0	894360	85437	979797	37666861	3277527	2383167
2043	0	794389	65551	859939	38526800	2383167	1588778
2044	0	635511	47663	683174	39209975	1588778	953267
2045	0	476633	31776	508409	39718384	953267	476633
2046	0	317756	19065	336821	40055204	476633	158878
2047	0	158878	9533	168410	40223615	158878	0
2048	0	0	3178	3178	40226792	0	0
2049	0	0	0	0	40226792	0	0
2050	0	0	0	0	40226792	0	0
2051	0	0	0	0	40226792	0	0
2052	0	0	0	0	40226792	0	0
2053	0	0	0	0	40226792	0	0
2054	0	0	0	0	40226792	0	0
2055	0	0	0	0	40226792	0	0
2056	0	0	0	0	40226792	0	0
2057	0	0	0	0	40226792	0	0
Total	28529640	28529640	11697152	40226792	40226792	0	0

Appendix 10..47 Repayment Schedule by TWWC (Financial Case A-3)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	1548058	0	0	0	0	1548058	1548058
2008	1548058	0	77403	77403	77403	3096116	3096116
2009	1548059	0	154806	154806	232209	4644175	4644175
2010	1999422	0	232209	232209	464417	6643597	6643597
2011	1999422	0	332180	332180	796597	8643019	8643019
2012	1999422	103204	432151	535355	1331952	10642441	10539237
2013	1999422	206408	532122	738530	2070482	12538659	12332251
2014	3177556	309612	626933	936545	3007026	15509806	15200195
2015	3177556	442906	775490	1218397	4225423	18377750	17934844
2016	3177556	576201	918888	1495089	5720512	21112399	20536198
2017	3177556	709496	1055620	1765116	7485628	23713753	23004257
2018	3177556	842791	1185688	2028479	9514107	26181813	25339022
2019	0	1054628	1309091	2363719	11877825	25339022	24284394
2020	0	1266465	1266951	2533416	14411241	24284394	23017929
2021	0	1478302	1214220	2692522	17103763	23017929	21539627
2022	0	1690139	1150896	2841035	19944798	21539627	19849488
2023	0	1901976	1076981	2978957	22923756	19849488	17947512
2024	0	1901976	992474	2894450	25818206	17947512	16045536
2025	0	1901976	897376	2799352	28617558	16045536	14143560
2026	0	1901976	802277	2704253	31321810	14143560	12241584
2027	0	1798772	707178	2505950	33827761	12241584	10442812
2028	0	1695568	612079	2307647	36135408	10442812	8747244
2029	0	1592364	522141	2114505	38249913	8747244	7154880
2030	0	1459070	437362	1896432	40146345	7154880	5695810
2031	0	1325775	357744	1683519	41829863	5695810	4370035
2032	0	1192480	284791	1477270	43307134	4370035	3177556
2033	0	1059185	218502	1277687	44584821	3177556	2118370
2034	0	847348	158878	1006226	45591047	2118370	1271022
2035	0	635511	105919	741430	46332476	1271022	635511
2036	0	423674	63551	487225	46819702	635511	211837
2037	0	211837	31776	243613	47063314	211837	0
2038	0	0	10592	10592	47073906	0	0
2039	0	0	0	0	47073906	0	0
2040	0	0	0	0	47073906	0	0
2041	0	0	0	0	47073906	0	0
2042	0	0	0	0	47073906	0	0
2043	0	0	0	0	47073906	0	0
2044	0	0	0	0	47073906	0	0
2045	0	0	0	0	47073906	0	0
2046	0	0	0	0	47073906	0	0
2047	0	0	0	0	47073906	0	0
2048	0	0	0	0	47073906	0	0
2049	0	0	0	0	47073906	0	0
2050	0	0	0	0	47073906	0	0
2051	0	0	0	0	47073906	0	0
2052	0	0	0	0	47073906	0	0
2053	0	0	0	0	47073906	0	0
2054	0	0	0	0	47073906	0	0
2055	0	0	0	0	47073906	0	0
2056	0	0	0	0	47073906	0	0
2057	0	0	0	0	47073906	0	0
Total	28529640	28529640	18544266	47073906	47073906	0	0

Appendix 10..48 Repayment Schedule by TWWC (Financial Case B-1)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
	1389512	0	0	0	0	1389512	1389512
2008	1389512	0	10421	10421	10421	2779024	2779024
2009	1389513	0	20843	20843	31264	4168537	4168537
2010	1684337	0	31264	31264	62528	5852874	5852874
2011	1684337	0	43897	43897	106425	7537211	7537211
2012	1684337	0	56529	56529	162954	9221548	9221548
2013	1684337	0	69162	69162	232115	10905884	10905884
2014	1697081	0	81794	81794	313909	12602966	12602966
2015	1697081	0	94522	94522	408432	14300047	14300047
2016	1697081	0	107250	107250	515682	15997129	15997129
2017	1697081	46317	119978	166296	681978	17694210	17647893
2018	1697081	92634	132707	225341	907318	19344975	19252340
2019	0	138951	145087	284039	1191357	19252340	19113389
2020	0	195096	144393	339488	1530845	19113389	18918293
2021	0	251240	143350	394591	1925436	18918293	18667053
2022	0	307385	141887	449272	2374708	18667053	18359668
2023	0	363529	140003	503532	2878240	18359668	17996139
2024	0	420099	137698	557796	3436037	17996139	17576040
2025	0	476668	134971	611639	4047676	17576040	17099372
2026	0	533238	131820	665058	4712734	17099372	16566134
2027	0	589807	128245	718052	5430786	16566134	15976327
2028	0	646376	124246	770622	6201409	15976327	15329951
2029	0	646376	119822	766199	6967608	15329951	14683574
2030	0	646376	114975	761351	7728959	14683574	14037198
2031	0	646376	110127	756503	8485462	14037198	13390821
2032	0	646376	105279	751655	9237117	13390821	12744445
2033	0	646376	100431	746808	9983925	12744445	12098069
2034	0	646376	95583	741960	10725884	12098069	11451692
2035	0	646376	90736	737112	11462996	11451692	10805316
2036	0	646376	85888	732264	12195260	10805316	10158939
2037	0	646376	81040	727416	12922677	10158939	9512563
2038	0	646376	76192	722568	13645245	9512563	8866187
2039	0	646376	71344	717721	14362966	8866187	8219810
2040	0	646376	66496	712873	15075838	8219810	7573434
2041	0	646376	61649	708025	15783863	7573434	6927057
2042	0	646376	56801	703177	16487041	6927057	6280681
2043	0	646376	51953	698329	17185370	6280681	5634305
2044	0	646376	47105	693481	17878851	5634305	4987928
2045	0	646376	42257	688634	18567485	4987928	4341552
2046	0	646376	37409	683786	19251271	4341552	3695176
2047	0	600059	32562	632621	19883892	3695176	3095116
2048	0	553742	27714	581456	20465348	3095116	2541374
2049	0	507425	23213	530639	20995986	2541374	2033949
2050	0	451281	19060	470341	21466327	2033949	1582668
2051	0	395136	15255	410391	21876718	1582668	1187532
2052	0	338991	11870	350861	22227579	1187532	848541
2053	0	282847	8906	291753	22519333	848541	565694
2054	0	226278	6364	232642	22751974	565694	339416
2055	0	169708	4243	173951	22925925	339416	169708
2056	0	113139	2546	115684	23041610	169708	56569
2057	0	56569	1273	57842	23099452	56569	0
Total	19391292	19391292	3708160	23099452	23099452	0	0

Appendix 10..49 Repayment Schedule by TWWC (Financial Case B-2)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	1389512	0	0	0	0	1389512	1389512
2008	1389512	0	27790	27790	27790	2779024	2779024
2009	1389513	0	55580	55580	83371	4168537	4168537
2010	1684337	0	83371	83371	166741	5852874	5852874
2011	1684337	0	117057	117057	283799	7537211	7537211
2012	1684337	0	150744	150744	434543	9221548	9221548
2013	1684337	0	184431	184431	618974	10905884	10905884
2014	1697081	0	218118	218118	837092	12602966	12602966
2015	1697081	0	252059	252059	1089151	14300047	14300047
2016	1697081	0	286001	286001	1375152	15997129	15997129
2017	1697081	69476	319943	389418	1764570	17694210	17624735
2018	1697081	138951	353884	492835	2257406	19321816	19182865
2019	0	208427	386436	594863	2852269	19182865	18974438
2020	0	292644	383657	676301	3528570	18974438	18681794
2021	0	376861	379489	756349	4284919	18681794	18304934
2022	0	461077	373636	834713	5119632	18304934	17843856
2023	0	545294	366099	911393	6031025	17843856	17298562
2024	0	630148	356877	987025	7018051	17298562	16668414
2025	0	715002	345971	1060974	8079024	16668414	15953411
2026	0	799856	333368	1133225	9212249	15953411	15153555
2027	0	884711	319068	1203779	10416028	15153555	14268845
2028	0	969565	303071	1272636	11688663	14268845	13299280
2029	0	969565	285377	1254941	12943605	13299280	12329715
2030	0	969565	265986	1235550	14179155	12329715	11360151
2031	0	969565	246594	1216159	15395314	11360151	10390586
2032	0	969565	227203	1196768	16592082	10390586	9421022
2033	0	969565	207812	1177376	17769458	9421022	8451457
2034	0	969565	188420	1157985	18927443	8451457	7481892
2035	0	969565	169029	1138594	20066037	7481892	6512328
2036	0	969565	149638	1119202	21185239	6512328	5542763
2037	0	900089	130247	1030336	22215575	5542763	4642674
2038	0	830613	110855	941469	23157043	4642674	3812061
2039	0	761138	92853	853991	24011034	3812061	3050923
2040	0	676921	76241	753162	24764197	3050923	2374002
2041	0	592704	61018	653723	25417919	2374002	1781298
2042	0	508487	47480	555967	25973886	1781298	1272811
2043	0	424270	35626	459896	26433783	1272811	848541
2044	0	339416	25456	364873	26798655	848541	509124
2045	0	254562	16971	271533	27070188	509124	254562
2046	0	169708	10182	179891	27250079	254562	84854
2047	0	84854	5091	89945	27340024	84854	0
2048	0	0	1697	1697	27341721	0	0
2049	0	0	0	0	27341721	0	0
2050	0	0	0	0	27341721	0	0
2051	0	0	0	0	27341721	0	0
2052	0	0	0	0	27341721	0	0
2053	0	0	0	0	27341721	0	0
2054	0	0	0	0	27341721	0	0
2055	0	0	0	0	27341721	0	0
2056	0	0	0	0	27341721	0	0
2057	0	0	0	0	27341721	0	0
Total	19391292	19391292	7950430	27341721	27341721	0	0

Appendix 10..50 Repayment Schedule by TWWC (Financial Case B-3)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	1389512	0	0	0	0	1389512	1389512
2008	1389512	0	69476	69476	69476	2779024	2779024
2009	1389513	0	138951	138951	208427	4168537	4168537
2010	1684337	0	208427	208427	416854	5852874	5852874
2011	1684337	0	292644	292644	709497	7537211	7537211
2012	1684337	92634	376861	469495	1178992	9221548	9128913
2013	1684337	185268	461077	646346	1825338	10813250	10627982
2014	1697081	277902	540663	818565	2643903	12325063	12047161
2015	1697081	390192	616253	1006445	3650347	13744242	13354051
2016	1697081	502481	687212	1189693	4840040	15051132	14548652
2017	1697081	614770	752557	1367326	6207367	16245733	15630963
2018	1697081	727059	812287	1539346	7746712	17328045	16600986
2019	0	840198	866402	1706600	9453312	16600986	15760788
2020	0	953336	830049	1783386	11236698	15760788	14807451
2021	0	1066475	788039	1854515	13091213	14807451	13740976
2022	0	1179614	740373	1919987	15011199	13740976	12561362
2023	0	1292753	687049	1979802	16991001	12561362	11268609
2024	0	1292753	628068	1920821	18911822	11268609	9975857
2025	0	1292753	563430	1856183	20768005	9975857	8683104
2026	0	1292753	498793	1791546	22559551	8683104	7390351
2027	0	1200119	434155	1634274	24193824	7390351	6190232
2028	0	1107485	369518	1477002	25670827	6190232	5082748
2029	0	1014850	309512	1324362	26995188	5082748	4067898
2030	0	902561	254137	1156699	28151887	4067898	3165336
2031	0	790272	203395	993667	29145554	3165336	2375064
2032	0	677983	158267	836250	29981804	2375064	1697081
2033	0	565694	118753	684447	30666251	1697081	1131388
2034	0	452555	84854	537409	31203660	1131388	678833
2035	0	339416	56569	395986	31599646	678833	339416
2036	0	226278	33942	260219	31859865	339416	113139
2037	0	113139	16971	130110	31989974	113139	0
2038	0	0	5657	5657	31995631	0	0
2039	0	0	0	0	31995631	0	0
2040	0	0	0	0	31995631	0	0
2041	0	0	0	0	31995631	0	0
2042	0	0	0	0	31995631	0	0
2043	0	0	0	0	31995631	0	0
2044	0	0	0	0	31995631	0	0
2045	0	0	0	0	31995631	0	0
2046	0	0	0	0	31995631	0	0
2047	0	0	0	0	31995631	0	0
2048	0	0	0	0	31995631	0	0
2049	0	0	0	0	31995631	0	0
2050	0	0	0	0	31995631	0	0
2051	0	0	0	0	31995631	0	0
2052	0	0	0	0	31995631	0	0
2053	0	0	0	0	31995631	0	0
2054	0	0	0	0	31995631	0	0
2055	0	0	0	0	31995631	0	0
2056	0	0	0	0	31995631	0	0
2057	0	0	0	0	31995631	0	0
Total	19391292	19391292	12604340	31995631	31995631	0	0

Appendix 10..51 Repayment Schedule by TWWC (Financial Case C-1)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	790870	0	0	0	0	790870	790870
2008	790870	0	5932	5932	5932	1581740	1581740
2009	790870	0	11863	11863	17795	2372611	2372611
2010	799307	0	17795	17795	35589	3171917	3171917
2011	799307	0	23789	23789	59379	3971224	3971224
2012	799307	0	29784	29784	89163	4770531	4770531
2013	799307	0	35779	35779	124942	5569838	5569838
2014	826116	0	41774	41774	166715	6395954	6395954
2015	826116	0	47970	47970	214685	7222070	7222070
2016	826116	0	54166	54166	268851	8048186	8048186
2017	826116	26362	60361	86724	355574	8874303	8847940
2018	826116	52725	66557	119282	474856	9674056	9621332
2019	0	79087	72555	151642	626499	9621332	9542245
2020	0	105731	72160	177891	804389	9542245	9436514
2021	0	132374	71567	203941	1008330	9436514	9304140
2022	0	159018	70774	229792	1238122	9304140	9145122
2023	0	185661	69781	255442	1493564	9145122	8959461
2024	0	213198	68588	281787	1775351	8959461	8746263
2025	0	240736	67196	307932	2083283	8746263	8505527
2026	0	268273	65597	333870	2417153	8505527	8237254
2027	0	295810	63791	359602	2776754	8237254	7941444
2028	0	323347	61779	385127	3161881	7941444	7618097
2029	0	323347	59561	382908	3544789	7618097	7294749
2030	0	323347	57136	380483	3925272	7294749	6971402
2031	0	323347	54711	378058	4303330	6971402	6648055
2032	0	323347	52286	375633	4678963	6648055	6324707
2033	0	323347	49860	373208	5052170	6324707	6001360
2034	0	323347	47435	370783	5422953	6001360	5678013
2035	0	323347	45010	368357	5791311	5678013	5354666
2036	0	323347	42585	365932	6157243	5354666	5031318
2037	0	323347	40160	363507	6520750	5031318	4707971
2038	0	323347	37735	361082	6881832	4707971	4384624
2039	0	323347	35310	358657	7240489	4384624	4061276
2040	0	323347	32885	356232	7596721	4061276	3737929
2041	0	323347	30460	353807	7950528	3737929	3414582
2042	0	323347	28034	351382	8301910	3414582	3091235
2043	0	323347	25609	348957	8650867	3091235	2767887
2044	0	323347	23184	346532	8997398	2767887	2444540
2045	0	323347	20759	344106	9341505	2444540	2121193
2046	0	323347	18334	341681	9683186	2121193	1797845
2047	0	296985	15909	312894	9996080	1797845	1500860
2048	0	270623	13484	284106	10280186	1500860	1230238
2049	0	244260	11256	255517	10535703	1230238	985978
2050	0	217617	9227	226843	10762547	985978	768361
2051	0	190973	7395	198368	10960915	768361	577388
2052	0	164330	5763	170092	11131007	577388	413058
2053	0	137686	4330	142016	11273023	413058	275372
2054	0	110149	3098	113247	11386270	275372	165223
2055	0	82612	2065	84677	11470947	165223	82612
2056	0	55074	1239	56314	11527261	82612	27537
2057	0	27537	620	28157	11555417	27537	0
Total	9700419	9700419	1854999	11555417	11555417	0	0



Appendix 10..52 Repayment Schedule by TWWC (Financial Case C-2)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	50000	0	0	0	0	50000	50000
2008	50000	0	1000	1000	1000	100000	100000
2009	50000	0	2000	2000	3000	150000	150000
2010	175000	0	3000	3000	6000	325000	325000
2011	175000	0	6500	6500	12500	500000	500000
2012	175000	0	10000	10000	22500	675000	675000
2013	175000	0	13500	13500	36000	850000	850000
2014	1258000	0	17000	17000	53000	2108000	2108000
2015	1258000	0	42160	42160	95160	3366000	3366000
2016	1258000	0	67320	67320	162480	4624000	4624000
2017	1258000	2500	92480	94980	257460	5882000	5879500
2018	1258000	5000	117640	122640	380100	7137500	7132500
2019	0	7500	142750	150250	530350	7132500	7125000
2020	0	16250	142650	158900	689250	7125000	7108750
2021	0	25000	142500	167500	856750	7108750	7083750
2022	0	33750	142175	175925	1032675	7083750	7050000
2023	0	42500	141675	184175	1216850	7050000	7007500
2024	0	105400	141000	246400	1463250	7007500	6902100
2025	0	168300	140150	308450	1771700	6902100	6733800
2026	0	231200	138042	369242	2140942	6733800	6502600
2027	0	294100	134676	428776	2569718	6502600	6208500
2028	0	357000	130052	487052	3056770	6208500	5851500
2029	0	357000	124170	481170	3537940	5851500	5494500
2030	0	357000	117030	474030	4011970	5494500	5137500
2031	0	357000	109890	466890	4478860	5137500	4780500
2032	0	357000	102750	459750	4938610	4780500	4423500
2033	0	357000	95610	452610	5391220	4423500	4066500
2034	0	357000	88470	445470	5836690	4066500	3709500
2035	0	357000	81330	438330	6275020	3709500	3352500
2036	0	357000	74190	431190	6706210	3352500	2995500
2037	0	354500	67050	421550	7127760	2995500	2641000
2038	0	352000	59910	411910	7539670	2641000	2289000
2039	0	349500	52820	402320	7941990	2289000	1939500
2040	0	340750	45780	386530	8328520	1939500	1598750
2041	0	332000	38790	370790	8699310	1598750	1266750
2042	0	323250	31975	355225	9054535	1266750	943500
2043	0	314500	25335	339835	9394370	943500	629000
2044	0	251600	18870	270470	9664840	629000	377400
2045	0	188700	12580	201280	9866120	377400	188700
2046	0	125800	7548	133348	9999468	188700	62900
2047	0	62900	3774	66674	10066142	62900	0
2048	0	0	1258	1258	10067400	0	0
2049	0	0	0	0	10067400	0	0
2050	0	0	0	0	10067400	0	0
2051	0	0	0	0	10067400	0	0
2052	0	0	0	0	10067400	0	0
2053	0	0	0	0	10067400	0	0
2054	0	0	0	0	10067400	0	0
2055	0	0	0	0	10067400	0	0
2056	0	0	0	0	10067400	0	0
2057	0	0	0	0	10067400	0	0
Total	7140000	7140000	2927400	10067400	10067400	0	0

Appendix 10..53 Repayment Schedule by TWWC (Financial Case C-3)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	50000	0	0	0	0	50000	50000
2008	50000	0	2500	2500	2500	100000	100000
2009	50000	0	5000	5000	7500	150000	150000
2010	175000	0	7500	7500	15000	325000	325000
2011	175000	0	16250	16250	31250	500000	500000
2012	175000	3333	25000	28333	59583	675000	671667
2013	175000	6667	33750	40417	100000	846667	840000
2014	1258000	10000	42333	52333	152333	2098000	2088000
2015	1258000	21667	104900	126567	278900	3346000	3324333
2016	1258000	33333	167300	200633	479533	4582333	4549000
2017	1258000	45000	229117	274117	753650	5807000	5762000
2018	1258000	56667	290350	347017	1100667	7020000	6963333
2019	0	140533	351000	491533	1592200	6963333	6822800
2020	0	224400	348167	572567	2164767	6822800	6598400
2021	0	308267	341140	649407	2814173	6598400	6290133
2022	0	392133	329920	722053	3536227	6290133	5898000
2023	0	476000	314507	790507	4326733	5898000	5422000
2024	0	476000	294900	770900	5097633	5422000	4946000
2025	0	476000	271100	747100	5844733	4946000	4470000
2026	0	476000	247300	723300	6568033	4470000	3994000
2027	0	472667	223500	696167	7264200	3994000	3521333
2028	0	469333	199700	669033	7933233	3521333	3052000
2029	0	466000	176067	642067	8575300	3052000	2586000
2030	0	454333	152600	606933	9182233	2586000	2131667
2031	0	442667	129300	571967	9754200	2131667	1689000
2032	0	431000	106583	537583	10291783	1689000	1258000
2033	0	419333	84450	503783	10795567	1258000	838667
2034	0	335467	62900	398367	11193933	838667	503200
2035	0	251600	41933	293533	11487467	503200	251600
2036	0	167733	25160	192893	11680360	251600	83867
2037	0	83867	12580	96447	11776807	83867	0
2038	0	0	4193	4193	11781000	0	0
2039	0	0	0	0	11781000	0	0
2040	0	0	0	0	11781000	0	0
2041	0	0	0	0	11781000	0	0
2042	0	0	0	0	11781000	0	0
2043	0	0	0	0	11781000	0	0
2044	0	0	0	0	11781000	0	0
2045	0	0	0	0	11781000	0	0
2046	0	0	0	0	11781000	0	0
2047	0	0	0	0	11781000	0	0
2048	0	0	0	0	11781000	0	0
2049	0	0	0	0	11781000	0	0
2050	0	0	0	0	11781000	0	0
2051	0	0	0	0	11781000	0	0
2052	0	0	0	0	11781000	0	0
2053	0	0	0	0	11781000	0	0
2054	0	0	0	0	11781000	0	0
2055	0	0	0	0	11781000	0	0
2056	0	0	0	0	11781000	0	0
2057	0	0	0	0	11781000	0	0
Total	7140000	7140000	4641000	11781000	11781000	0	0

Appendix 10..54 Repayment Schedule by TWWC (Financial Case D-1)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0
2036	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0
2038	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	0
2040	0	0	0	0	0	0	0
2041	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0
2047	0	0	0	0	0	0	0
2048	0	0	0	0	0	0	0
2049	0	0	0	0	0	0	0
2050	0	0	0	0	0	0	0
2051	0	0	0	0	0	0	0
2052	0	0	0	0	0	0	0
2053	0	0	0	0	0	0	0
2054	0	0	0	0	0	0	0
2055	0	0	0	0	0	0	0
2056	0	0	0	0	0	0	0
2057	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Appendix 10..55 Repayment Schedule by TWWC (Financial Case D-2)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0
2036	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0
2038	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	0
2040	0	0	0	0	0	0	0
2041	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0
2047	0	0	0	0	0	0	0
2048	0	0	0	0	0	0	0
2049	0	0	0	0	0	0	0
2050	0	0	0	0	0	0	0
2051	0	0	0	0	0	0	0
2052	0	0	0	0	0	0	0
2053	0	0	0	0	0	0	0
2054	0	0	0	0	0	0	0
2055	0	0	0	0	0	0	0
2056	0	0	0	0	0	0	0
2057	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Appendix 10..56 Repayment Schedule by TWWC (Financial Case D-3)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0
2036	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0
2038	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	0
2040	0	0	0	0	0	0	0
2041	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0
2047	0	0	0	0	0	0	0
2048	0	0	0	0	0	0	0
2049	0	0	0	0	0	0	0
2050	0	0	0	0	0	0	0
2051	0	0	0	0	0	0	0
2052	0	0	0	0	0	0	0
2053	0	0	0	0	0	0	0
2054	0	0	0	0	0	0	0
2055	0	0	0	0	0	0	0
2056	0	0	0	0	0	0	0
2057	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Appendix 10..57 Repayment Schedule by Central Government (Financial Case A)

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	0	0	0	0	0	0	0
2008	0	0	0	0	0	0	0
2009	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0
2017	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0
2019	0	0	0	0	0	0	0
2020	0	0	0	0	0	0	0
2021	0	0	0	0	0	0	0
2022	0	0	0	0	0	0	0
2023	0	0	0	0	0	0	0
2024	0	0	0	0	0	0	0
2025	0	0	0	0	0	0	0
2026	0	0	0	0	0	0	0
2027	0	0	0	0	0	0	0
2028	0	0	0	0	0	0	0
2029	0	0	0	0	0	0	0
2030	0	0	0	0	0	0	0
2031	0	0	0	0	0	0	0
2032	0	0	0	0	0	0	0
2033	0	0	0	0	0	0	0
2034	0	0	0	0	0	0	0
2035	0	0	0	0	0	0	0
2036	0	0	0	0	0	0	0
2037	0	0	0	0	0	0	0
2038	0	0	0	0	0	0	0
2039	0	0	0	0	0	0	0
2040	0	0	0	0	0	0	0
2041	0	0	0	0	0	0	0
2042	0	0	0	0	0	0	0
2043	0	0	0	0	0	0	0
2044	0	0	0	0	0	0	0
2045	0	0	0	0	0	0	0
2046	0	0	0	0	0	0	0
2047	0	0	0	0	0	0	0
2048	0	0	0	0	0	0	0
2049	0	0	0	0	0	0	0
2050	0	0	0	0	0	0	0
2051	0	0	0	0	0	0	0
2052	0	0	0	0	0	0	0
2053	0	0	0	0	0	0	0
2054	0	0	0	0	0	0	0
2055	0	0	0	0	0	0	0
2056	0	0	0	0	0	0	0
2057	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0

Appendix 10..58 Repayment Schedule by Central Government (Financial Case B)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	158546	0	0	0	0	158546	158546
2008	158546	0	1189	1189	1189	317092	317092
2009	158546	0	2378	2378	3567	475638	475638
2010	315085	0	3567	3567	7135	790723	790723
2011	315085	0	5930	5930	13065	1105808	1105808
2012	315085	0	8294	8294	21359	1420893	1420893
2013	315085	0	10657	10657	32015	1735978	1735978
2014	1480474	0	13020	13020	45035	3216452	3216452
2015	1480474	0	24123	24123	69158	4696926	4696926
2016	1480474	0	35227	35227	104385	6177400	6177400
2017	1480474	5285	46331	51615	156001	7657874	7652589
2018	1480474	10570	57434	68004	224005	9133064	9122494
2019	0	15855	68498	84353	308357	9122494	9106639
2020	0	26357	68419	94776	403133	9106639	9080282
2021	0	36860	68300	105160	508293	9080282	9043421
2022	0	47363	68102	115465	623759	9043421	8996058
2023	0	57866	67826	125692	749450	8996058	8938192
2024	0	107215	67470	174686	924136	8938192	8830977
2025	0	156564	67036	223601	1147736	8830977	8674413
2026	0	205913	66232	272146	1419882	8674413	8468500
2027	0	255262	65058	320321	1740203	8468500	8213237
2028	0	304612	63514	368125	2108328	8213237	7908626
2029	0	304612	61599	366211	2474539	7908626	7604014
2030	0	304612	59315	363926	2838465	7604014	7299403
2031	0	304612	57030	361642	3200107	7299403	6994791
2032	0	304612	54746	359357	3559464	6994791	6690179
2033	0	304612	52461	357073	3916537	6690179	6385568
2034	0	304612	50176	354788	4271324	6385568	6080956
2035	0	304612	47892	352503	4623828	6080956	5776344
2036	0	304612	45607	350219	4974047	5776344	5471733
2037	0	304612	43323	347934	5321981	5471733	5167121
2038	0	304612	41038	345650	5667630	5167121	4862510
2039	0	304612	38753	343365	6010995	4862510	4557898
2040	0	304612	36469	341080	6352076	4557898	4253286
2041	0	304612	34184	338796	6690872	4253286	3948675
2042	0	304612	31900	336511	7027383	3948675	3644063
2043	0	304612	29615	334227	7361610	3644063	3339452
2044	0	304612	27330	331942	7693552	3339452	3034840
2045	0	304612	25046	329657	8023209	3034840	2730228
2046	0	304612	22761	327373	8350582	2730228	2425617
2047	0	299327	20477	319803	8670386	2425617	2126290
2048	0	294042	18192	312234	8982620	2126290	1832248
2049	0	288757	15947	304704	9287324	1832248	1543491
2050	0	278254	13742	291996	9579320	1543491	1265237
2051	0	267751	11576	279328	9858647	1265237	997486
2052	0	257249	9489	266738	10125385	997486	740237
2053	0	246746	7481	254227	10379612	740237	493491
2054	0	197397	5552	202948	10582560	493491	296095
2055	0	148047	3701	151749	10734309	296095	148047
2056	0	98698	2221	100919	10835228	148047	49349
2057	0	49349	1110	50459	10885687	49349	0
Total	9138348	9138348	1747339	10885687	10885687	0	0

Appendix 10..59 Repayment Schedule by Central Government (Financial Case C)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	757188	0	0	0	0	757188	757188
2008	757188	0	5679	5679	5679	1514376	1514376
2009	757189	0	11358	11358	17037	2271565	2271565
2010	1200115	0	17037	17037	34073	3471680	3471680
2011	1200115	0	26038	26038	60111	4671794	4671794
2012	1200115	0	35038	35038	95150	5871909	5871909
2013	1200115	0	44039	44039	139189	7072024	7072024
2014	2351439	0	53040	53040	192229	9423464	9423464
2015	2351439	0	70676	70676	262905	11774903	11774903
2016	2351439	0	88312	88312	351217	14126342	14126342
2017	2351439	25240	105948	131187	482404	16477782	16452542
2018	2351439	50479	123583	174063	656466	18803982	18753502
2019	0	75719	141030	216749	873215	18753502	18677784
2020	0	115723	140651	256374	1129589	18677784	18562061
2021	0	155726	140083	295810	1425399	18562061	18406335
2022	0	195730	139215	334946	1760345	18406335	18210604
2023	0	235734	138048	373782	2134126	18210604	17974870
2024	0	314115	136580	450695	2584821	17974870	17660755
2025	0	392497	134812	527308	3112130	17660755	17268258
2026	0	470878	132456	603334	3715463	17268258	16797380
2027	0	549259	129512	678771	4394235	16797380	16248120
2028	0	627641	125980	753621	5147856	16248120	15620480
2029	0	627641	121861	749502	5897357	15620480	14992839
2030	0	627641	117154	744794	6642152	14992839	14365198
2031	0	627641	112446	740087	7382239	14365198	13737558
2032	0	627641	107739	735380	8117618	13737558	13109917
2033	0	627641	103032	730672	8848291	13109917	12482276
2034	0	627641	98324	725965	9574256	12482276	11854635
2035	0	627641	93617	721258	10295514	11854635	11226995
2036	0	627641	88910	716550	11012064	11226995	10599354
2037	0	627641	84202	711843	11723907	10599354	9971713
2038	0	627641	79495	707136	12431043	9971713	9344073
2039	0	627641	74788	702429	13133472	9344073	8716432
2040	0	627641	70081	697721	13831193	8716432	8088791
2041	0	627641	65373	693014	14524207	8088791	7461150
2042	0	627641	60666	688307	15212514	7461150	6833510
2043	0	627641	55959	683599	15896113	6833510	6205869
2044	0	627641	51251	678892	16575005	6205869	5578228
2045	0	627641	46544	674185	17249190	5578228	4950588
2046	0	627641	41837	669477	17918667	4950588	4322947
2047	0	602401	37129	639531	18558198	4322947	3720546
2048	0	577162	32422	609584	19167781	3720546	3143384
2049	0	551922	27904	579826	19747607	3143384	2591462
2050	0	511918	23575	535493	20283101	2591462	2079544
2051	0	471914	19436	491350	20774451	2079544	1607630
2052	0	431910	15597	447507	21221958	1607630	1175720
2053	0	391907	12057	403964	21625922	1175720	783813
2054	0	313525	8818	322343	21948265	783813	470288
2055	0	235144	5879	241023	22189287	470288	235144
2056	0	156763	3527	160290	22349577	235144	78381
2057	0	78381	1764	80145	22429722	78381	0
Total	18829221	18829221	3600501	22429722	22429722	0	0



Appendix 10..60 Repayment Schedule by Central Government (Financial Case D)

Unit: USD

Year	Loan	Repayment				Balance	
		Annual Payment		Total	Accumulated Repayment	Opening Balance	Closing Balance
		Princial Repayment	Interest (Charge)				
2007	1548058	0	0	0	0	1548058	1548058
2008	1548058	0	11610	11610	11610	3096116	3096116
2009	1548059	0	23221	23221	34831	4644175	4644175
2010	1999422	0	34831	34831	69663	6643597	6643597
2011	1999422	0	49827	49827	119490	8643019	8643019
2012	1999422	0	64823	64823	184312	10642441	10642441
2013	1999422	0	79818	79818	264131	12641862	12641862
2014	3177556	0	94814	94814	358945	15819418	15819418
2015	3177556	0	118646	118646	477590	18996973	18996973
2016	3177556	0	142477	142477	620067	22174529	22174529
2017	3177556	51602	166309	217911	837978	25352084	25300483
2018	3177556	103204	190141	293344	1131323	28478038	28374834
2019	0	154806	213585	368391	1499714	28374834	28220028
2020	0	221453	212811	434264	1933978	28220028	27998575
2021	0	288101	211650	499751	2433729	27998575	27710475
2022	0	354748	209989	564737	2998467	27710475	27355726
2023	0	421395	207829	629224	3627691	27355726	26934331
2024	0	527314	205168	732482	4360172	26934331	26407017
2025	0	633232	202007	835240	5195412	26407017	25773785
2026	0	739151	198053	937204	6132616	25773785	25034634
2027	0	845069	193303	1038373	7170989	25034634	24189564
2028	0	950988	187760	1138748	8309737	24189564	23238576
2029	0	950988	181422	1132410	9442146	23238576	22287588
2030	0	950988	174289	1125277	10567424	22287588	21336600
2031	0	950988	167157	1118145	11685569	21336600	20385612
2032	0	950988	160025	1111013	12796581	20385612	19434624
2033	0	950988	152892	1103880	13900461	19434624	18483636
2034	0	950988	145760	1096748	14997209	18483636	17532648
2035	0	950988	138627	1089615	16086824	17532648	16581660
2036	0	950988	131495	1082483	17169307	16581660	15630672
2037	0	950988	124362	1075350	18244657	15630672	14679684
2038	0	950988	117230	1068218	19312876	14679684	13728696
2039	0	950988	110098	1061086	20373961	13728696	12777708
2040	0	950988	102965	1053953	21427914	12777708	11826720
2041	0	950988	95833	1046821	22474735	11826720	10875732
2042	0	950988	88700	1039688	23514424	10875732	9924744
2043	0	950988	81568	1032556	24546980	9924744	8973756
2044	0	950988	74436	1025424	25572403	8973756	8022768
2045	0	950988	67303	1018291	26590694	8022768	7071780
2046	0	950988	60171	1011159	27601853	7071780	6120792
2047	0	899386	53038	952424	28554277	6120792	5221406
2048	0	847784	45906	893690	29447968	5221406	4373622
2049	0	796182	39161	835343	30283310	4373622	3577440
2050	0	729535	32802	762337	31045647	3577440	2847905
2051	0	662887	26831	689718	31735365	2847905	2185018
2052	0	596240	21359	617599	32352965	2185018	1588778
2053	0	529593	16388	545980	32898945	1588778	1059185
2054	0	423674	11916	435590	33334535	1059185	635511
2055	0	317756	7944	325699	33660234	635511	317756
2056	0	211837	4766	216603	33876838	317756	105919
2057	0	105919	2383	108302	33985139	105919	0
Total	28529640	28529640	5455499	33985139	33985139	0	0

# APPENDIX-11

## Public Relations and Museum

<b>1. Citizen's manual in case of earthquake</b>	<b>A-11.2</b>
<b>1-1 Just after an earthquake occurs</b>	<b>A-11.2</b>
<b>1-2 10 points to remember when an earthquake occurs</b>	<b>A-11.4</b>
<b>1-3 10 points to keep in mind when you are stranded in the city</b>	<b>A-11.6</b>
<b>2. Examples of exhibition objects (materials)</b>	<b>A-11.7</b>
<b>2-1 Tokyo Historical Water Museum</b>	<b>A-11.7</b>
<b>2-2 Tokyo Water Science Museum</b>	<b>A-11.12</b>
<b>2-3 Yokohama Water Memorial Museum</b>	<b>A-11.14</b>
<b>2-4 Museum for Water Supply Engineering , Yokohama</b>	<b>A-11.15</b>
<b>2-5 Water Science Museum of Kobe</b>	<b>A-11.17</b>

**1. Citizen's manual in case of earthquake**

**1-1 Just after an earthquake occurs**

No. 1 Protect the safety of yourself and family members !



Strong vibrations will last about 1 minute. Protect your head by hiding under a durable table.

No. 2 If you feel a vibration, turn off any heat sources. If a fire breaks out, extinguish it quickly !



The proper extinguishing of fires will prevent large-scale disasters. Get into the habit of turning off heat sources even during small earthquake.

No. 3 Do not rush outside !



It is dangerous to go outside without thinking. It is important to comprehend the situation around you and act calmly.

No. 4 Ensure an exit by opening doors !



Especially in concrete condominiums, a door's shape can become distorted due to vibrations and people can become trapped in their homes. Ensure an exit by opening doors.

No. 5 When outside, protect your head and avoid hazardous materials !



If you are outside when an earthquake occurs, there are dangers such as collapsing brick walls, falling windows and signs. Evacuate to a safe building or somewhere with open space.

No. 6 If in a place such as a department store or a theater, listen to the staff and follow their orders !



In places where many people assemble, there is the danger of people panicking. In order to avoid being caught up in the panic, take actions calmly.

No. 7 If in an automobile, park on the left-hand side. Driving is prohibited in restricted areas !



Selfish conduct will add to the confusion. Listen to the car radio and take appropriate actions.

No. 8 Watch for falling rocks, landslides and tsunami (tidal waves) !



In areas where there is a danger of falling rocks, landslides and tsunamis, evacuate immediately.

No. 9 Evacuate on foot, carrying only what you need.



Driving could cause traffic jams or block the passage of fire fighting or rescue vehicles. When evacuating, do so on foot, and carry only what you need.





No. 10 Do not be fooled by groundless rumors. Take the proper action by following the correct information.



Follow the information from the news media, municipalities, fire departments and police.

## 1-2 10 points to remember when an earthquake occurs

When an earthquake occurs, proper procedure will differ according to the time passed since the occurrence. Here we explain the different procedures which should be taken according to how much time has passed since the disaster, and the countermeasures which should be taken beforehand.

	Earthquake Strikes! 0-2 minutes	Immediately following an earthquake 2-5 minutes	5-10 minutes after the earthquake
<b>Situation</b>	<p><b>First, ensure your own safety!</b></p> <p>When vibrations are felt, protect yourself from falling objects. Hide under a table, and stay away from furniture.</p>  <p>Always check the safety of your home. Stabilizing your furniture can be done quite easily.</p>	<p><b>It is vital to extinguish fires completely! Prevent fire out-breaks!</b></p> <p>You have 3 chances to dispose of a fire.</p> <ol style="list-style-type: none"> <li>1 When you feel the earthquake</li> <li>2 After the vibrations stop</li> <li>3 When the fire breaks out</li> </ol>  <p>Cut the breaker when evacuating!</p> <p>Do not panic, and act calmly.</p>	<p><b>After extinguishing fires, ensure the safety of your family!</b></p> <p>After protecting your own safety, ensure the safety of family members.</p> 
	<b>Countermeasures</b>	<p>Take an earthquake resistance test.</p> <p>Take preventive measures against falling light fixtures.</p> <p>Check concrete-block walls.</p> <p>Stabilize bookshelves.</p> <p>Stabilize pianos and refrigerators, etc.</p> <p>Stabilize drawer cabinets.</p> <p><b>Let's check your home's safety!</b></p> <ol style="list-style-type: none"> <li>1 Conduct a safety inspection of the building, and improve its resistance. (refer to p.30 for earthquake-resistance test information) Replace brick yard walls with hedges. (municipalities may provide financial support)</li> <li>2 Stabilize furniture and avoid placing objects on them. Especially in the bedroom, a safe space should be established.</li> <li>3 Take appropriate precautions for maintaining and storing heating appliances such as oil stoves and other hazardous objects.</li> </ol>	<p>In order to dispose of fires confidently, get involved with training on a regular basis.</p>  <p>Store water in a bathtub or other containers.</p>

**10 minutes to a half day after the earthquake strikes**

**Confirm the safety of your neighbors and help each other!**

There is a limit to what one person can do. Let's cooperate with our neighbors and perform emergency measures together.



- In order to inform one another of our safety, learn how to use the Emergency Voice mail Service.
- When recording a message  
Dial 171-1-(000)000-0000  
(The telephone number for the damaged district)
- When playing message  
Dial 171-2-(000)000-0000
- It will be relatively impossible to call out from a damaged district. Call faraway relatives/friends and inform them of your well-being and ask them to relay the message to other relatives.

**Half a day to 3 days after the earthquake strikes**

**Have essentials for surviving 2-3 days on your own.**

Following an earthquake, there will be an interruption of lifeline services including water, gas, electricity, telephone and food supplies. Make preparations to be able to survive on your own for 2-3 days.



Days needed for the total restoration of services after the Great Hanshin-Awaji Earthquake Disaster (January 17, 1995)

Water	Electrical Power	City Gas
Completely restored on April 17 90 days	Completely restored on January 23 7 days	Completely restored on April 11 84 days

**3 days after the earthquake**

**Full-scale restoration measures will begin.**

Disaster prevention organizations will step up their emergency and recovery steps, and a full-scale restoration of the lifelines will begin.

Volunteer work will also begin. Residents, companies and city administrations work as one to start the rebuilding of the city.



Let's establish cooperation system with neighbors to prepare for an emergency.



- 1 Discuss possible situations.
- 2 Get involved with a citizens' disaster prevention team.
- 3 Get involved with disaster prevention drills.



Make preparations to "Ensure our Livelihood."



- Emergency supplies
- 1 Drinking water
  - 2 Food supplies and powdered milk for babies
  - 3 Emergency medical supplies (Don't forget daily medicines.)
  - 4 Portable radio, flashlight, batteries
  - 5 Cash, valuables, insurance cards, telephone lists
  - 6 Underwear, towels, tissue paper, spare glasses, and other necessities according to your family's needs!



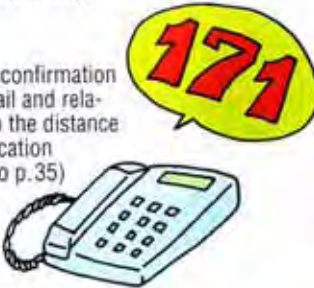


Make emergency supplies according to your family's needs!

Let's all work together.

### 1-3 10 points to keep in mind when you are stranded in the city

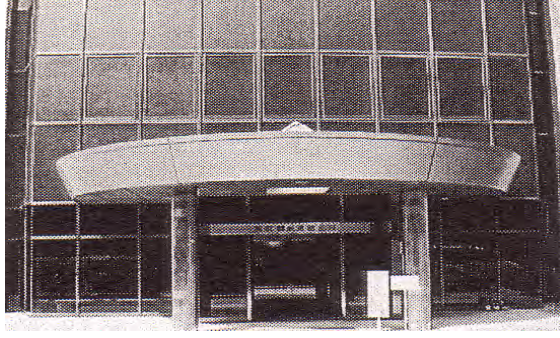




**10 points to keep in mind when you're stranded in the city**

- ① Do not panic. Do not rush. Confirm the situation.
- ② Keep a portable radio in your pocket.  

- ③ Prepare a map to return home.
- ④ Keep sneakers in your locker. (Disaster-prevention goods)  

- ⑤ Keep chocolates and caramels in your desk drawer. (Simple food supplies)
- ⑥ Inform family members beforehand. (communication methods, assembly location)
- ⑦ Make a safety confirmation using voice mail and relatives/friends in the distance as a communication center. (refer to p.35)  

- ⑧ Practice walking home.
- ⑨ Cold/hot weather preparation. (portable body warmers, towels, etc.)
- ⑩ Cooperate by lending a helping hand.

## 2. Examples of exhibition objects (materials)

### 2-1 Tokyo Historical Water Museum

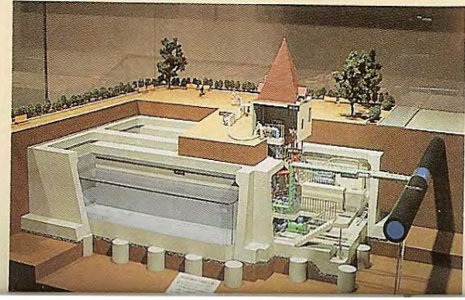
Ground Floor: Modern Water Supply Section ( after 1868 year)

	
<p>T01. Appearance of Museum</p>	<p>T02. Intake tower shaped gate</p>
	
<p>T03 Dragonhead public fountain</p>	<p>T04.Public Fountain for Cattle</p>
	
<p>T05.Record disk for PR</p>	<p>T06 Comparison between old &amp; new plant sites</p>

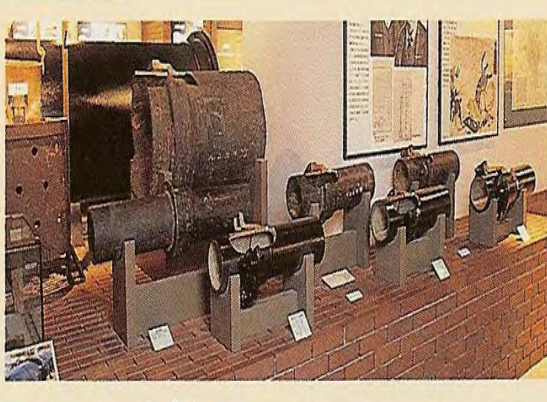




**T07** Ogochi reservoir



**T08** Emergency water tank



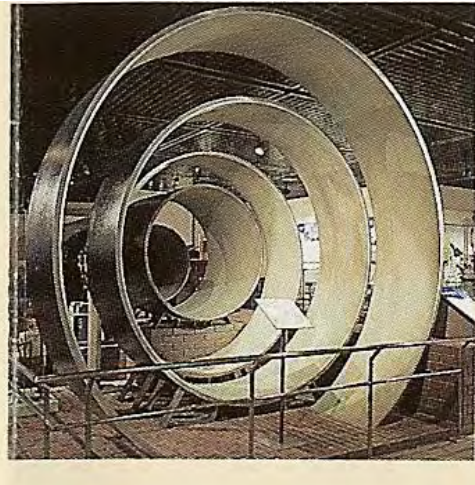
**T09** Various types of distribution pipe



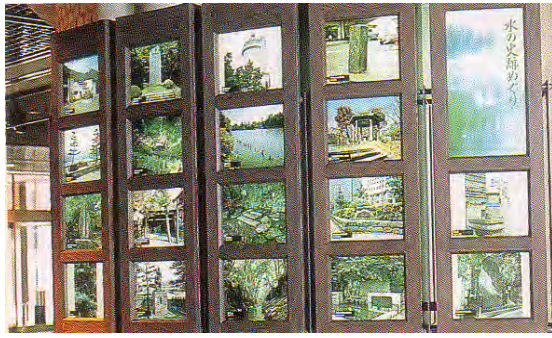
**T10** Water travel from rain to taps



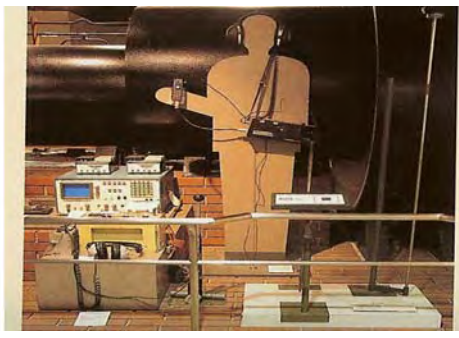
**T11** Advanced treatment plant in Kanamachi



**T12** Various size cast iron pipes



T13 Pilgrimage to historic sites



T14 Devices of leak control



T15 Visual display corner



T16 Theater



T17 Utilization of rainwater



T18 Damages by earthquake in 1923



T19 Emergency water supply by defense forces  
in 1964 drought

1<sup>st</sup> Floor: Premodern Water Supply Section



T20 Map of Edo



T21 Stone aqueduct used for more than 200 years



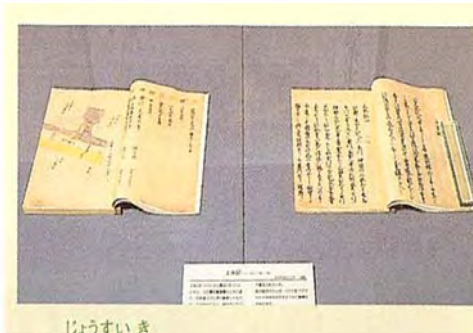
T22 Water conveyed above the river by Bridge aqueduct



T23 Model of typical citizen's house in Edo focused on water supply



T24 Wells & wooden pipes



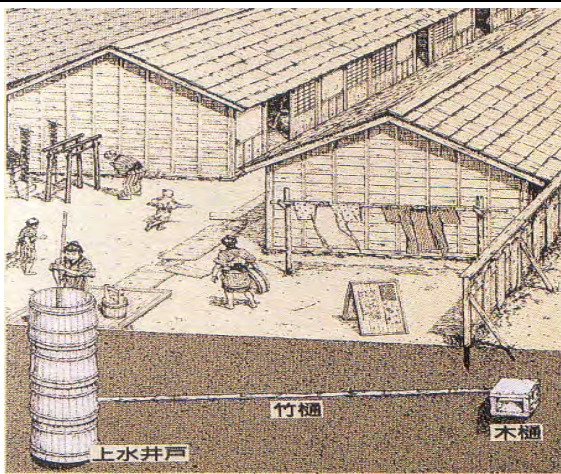
T25 Official report of aqueduct construction



T26 Story of aqueduct construction by using puppets



T27 Excavated old wooden water supply system in Edo



T28 Drawing of water supply system in Edo



T29 Monument of stone aqueduct moved and preserved next to museum in a park



T29-1 Water vendor in Edo



T29-2 Restored stone aqueduct

## 2-2 Water Science Museum of Tokyo

Ground Floor-2<sup>nd</sup> Floor



T30 Appearance of Museum



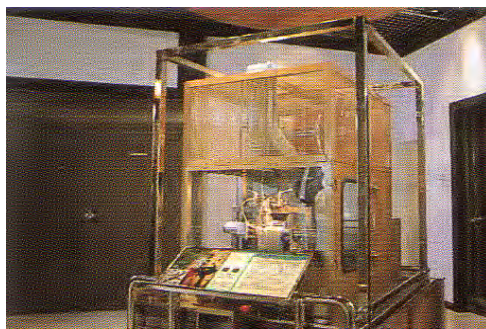
T31 Entrance Space



T32 Aqua Garden



T33 Aqua Laboratory



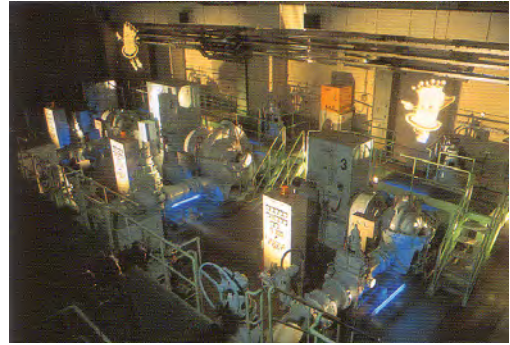
T34 Aqua Technology



T35 Aqua Planet



**T36** Aqua Lounge



**T37** Aqua tour guided course for visitors



**T38** Demonstration room