

ANNEX C

FINANCIAL AND ECONOMIC

FEASIBILITY STUDY FOR MORETELE 2

ANNEX C : FINANCIAL AND ECONOMIC

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Table C.1-1: Construction Costs and Disbursement Schedule for Case A and B

Moretele 2

(Unit: ,000Rand)

Item	Total	1	2	3	4	5
		1998	1999	2000	2001	2002
Case A	87,591	-	-	6,364	38,628	31,633
Bulk	59,418	-	-	20,135	29,530	9,754
- Intake and Pump Station	303	-	-	303	-	-
- Raw Water Pipeline	56	-	-	56	-	-
- WTW and Pump Station	10,290	-	-	5,145	5,145	-
- Bulk Supply Pipelines	46,385	-	-	13,916	23,193	9,277
- Regional Reservoirs	1,600	-	-	480	800	320
- Pump Stations	784	-	-	235	392	157
Retail	28,173	-	-	5,635	16,904	5,635
- Service Reservoir	4,565	-	-	913	2,739	913
- Reticulation Pipelines	22,738	-	-	4,548	13,643	4,548
- Standpipes	870	-	-	174	522	174
Yard Connection	-	-	-	-	-	-
Case B	122,422	-	-	33,096	67,002	22,324
Bulk	61,962	-	-	21,004	30,726	10,232
- Intake and Pump Station	454	-	-	454	-	-
- Raw Water Pipeline	56	-	-	56	-	-
- WTW and Pump Station	10,290	-	-	5,145	5,145	-
- Bulk Supply Pipelines	46,385	-	-	13,916	23,193	9,277
- Regional Reservoirs	3,600	-	-	1,080	1,800	720
- Pump Stations	1,177	-	-	353	589	235
Retail	44,990	-	-	8,998	26,994	8,998
- Service Reservoir	11,320	-	-	2,264	6,792	2,264
- Reticulation Pipelines	32,998	-	-	6,600	19,799	6,600
- Standpipes	672	-	-	134	403	134
Yard Connection	15,470	-	-	3,094	9,282	3,094
Case B-A	34,831	-	-	7,326	20,569	6,936
Bulk	2,544	-	-	869	1,197	479
- Intake and Pump Station	151	-	-	151	-	-
- Raw Water Pipeline	-	-	-	-	-	-
- WTW and Pump Station	-	-	-	-	-	-
- Bulk Supply Pipelines	-	-	-	-	-	-
- Regional Reservoirs	2,000	-	-	600	1,000	400
- Pump Stations	393	-	-	118	197	79
Retail	16,817	-	-	3,363	10,090	3,363
- Service Reservoir	6,755	-	-	1,351	4,053	1,351
- Reticulation Pipelines	10,260	-	-	2,052	6,156	2,052
- Standpipes	(198)	-	-	(40)	(119)	(40)
Yard Connection	15,470	-	-	3,094	9,282	3,094

Table C.1-2 Disbursement and Project Cost for Case A and B : Moretele 2

(Unit: ,000Rand)

Item		Total	1	2	3	4	5
			1998	1999	2000	2001	2002
Case A	Total	213,268	632	4,988	57,198	107,538	42,912
Bulk	(1)Direct Construction Cost	59,418	-	-	20,135	29,530	9,754
	(2)P&G (1)x 15%	8,913	-	-	3,020	4,429	1,463
	(3)Base Cost (1)+(2)	68,331	-	-	23,155	33,959	11,217
	(4)Engineering Fee (3)x 10%	6,833	-	1,708	1,708	1,708	1,708
	(5)Miscellaneous (1)x 2%	1,188	-	594	594	-	-
	(6)Institutional Support (3)x 2.5%	1,708	342	342	342	342	342
	(7)Sub-Total (3)+(4)+(5)+(6)	78,060	342	2,644	25,799	36,009	13,267
	(8)Physical Contingency (3)x 15%	10,250	-	-	3,473	5,094	1,683
	(9)Price Escalation(10%/a) (7)+(8)x	38,481	34	555	9,689	19,076	9,127
	(10)Sub-Total (8)+(9)	48,731	34	555	13,162	24,170	10,809
	Total (7)+(10)	126,791	376	3,199	38,961	60,178	24,076
	VAT 14%	17,751	53	448	5,455	8,425	3,371
	Grand Total	144,542	428	3,647	44,416	68,603	27,447
	Retail	(1)Direct Construction Cost	28,173	-	-	5,635	16,904
(2)P&G (1)x 15%		4,226	-	-	845	2,536	845
(3)Base Cost (1)+(2)		32,399	-	-	6,480	19,439	6,480
(4)Engineering Fee (3)x 10%		3,240	-	810	810	810	810
(5)Miscellaneous		-	-	-	-	-	-
(6)Institutional Development (3)x 2.5%		810	162	162	162	162	162
(7)Sub-Total (3)+(4)+(5)+(6)		36,449	162	972	7,452	20,411	7,452
(8)Physical Contingency (3)x 15%		4,860	-	-	972	2,916	972
(9)Price Escalation(10%/a) (7)+(8)x		18,978	16	204	2,788	10,826	5,143
(10)Sub-Total (8)+(9)		23,837	16	204	3,760	13,742	6,115
Total (7)+(10)		60,286	178	1,176	11,212	34,153	13,566
VAT 14%		8,440	25	165	1,570	4,781	1,899
Grand Total		68,726	203	1,341	12,782	38,935	15,466
Case B		Total	286,360	771	5,944	71,437	149,059
Bulk	(1)Direct Construction Cost	61,962	-	-	21,004	30,726	10,232
	(2)P&G (1)x 15%	9,294	-	-	3,151	4,609	1,535
	(3)Base Cost (1)+(2)	71,256	-	-	24,154	35,335	11,767
	(4)Engineering Fee (3)x 10%	7,126	-	1,781	1,781	1,781	1,781
	(5)Miscellaneous (1)x 2%	1,239	-	620	620	-	-
	(6)Institutional Support (3)x 2.5%	1,781	356	356	356	356	356
	(7)Sub-Total (3)+(4)+(5)+(6)	81,403	356	2,757	26,911	37,473	13,905
	(8)Physical Contingency (3)x 15%	10,688	-	-	3,623	5,300	1,765
	(9)Price Escalation(10%/a) (7)+(8)x	40,139	36	579	10,107	19,851	9,567
	(10)Sub-Total (8)+(9)	50,828	36	579	13,730	25,151	11,332
	Total (7)+(10)	132,230	392	3,336	40,642	62,624	25,237
	VAT 14%	18,512	55	467	5,690	8,767	3,533
	Grand Total	150,742	447	3,803	46,331	71,391	28,770
	Retail	(1)Direct Construction Cost	44,990	-	-	8,998	26,994
(2)P&G (1)x 15%		6,749	-	-	1,350	4,049	1,350
(3)Base Cost (1)+(2)		51,739	-	-	10,348	31,043	10,348
(4)Engineering Fee (3)x 10%		5,174	-	1,293	1,293	1,293	1,293
(5)Miscellaneous		-	-	-	-	-	-
(6)Institutional Development (3)x 2.5%		1,293	259	259	259	259	259
(7)Sub-Total (3)+(4)+(5)+(6)		58,206	259	1,552	11,900	32,595	11,900
(8)Physical Contingency (3)x 15%		7,761	-	-	1,552	4,656	1,552
(9)Price Escalation(10%/a) (7)+(8)x		30,306	26	326	4,453	17,289	8,213
(10)Sub-Total (8)+(9)		38,066	26	326	6,005	21,945	9,765
Total (7)+(10)		96,272	285	1,878	17,905	54,540	21,665
VAT 14%		13,478	40	263	2,507	7,636	3,033
Grand Total		109,750	324	2,141	20,411	62,176	24,698
Yard Connection		(1)Direct Construction Cost	15,470	-	-	3,094	9,282
	(2)Price Escalation(10%/a) (1)x	7,221	-	-	1,024	4,308	1,889
	Total (1)+(2)	22,691	-	-	4,118	13,590	4,983
	VAT 14%	3,177	-	-	577	1,903	698
Grand Total	25,868	-	-	4,695	15,492	5,681	
Case B-A	Bulk	6,201	18	156	1,915	2,788	1,323
	Retail	41,024	121	800	7,630	23,241	9,232
	Yard Connection	25,868	-	-	4,695	15,492	5,681
	Total	73,092	140	956	14,240	41,521	16,236

Table C.1-3 : Annual Operation and Maintenance Cost for Case A and B : North Mankwe (Case A)

Annual Water Production : 1,147,210 kl (Unit: 000Rand)

Item	Bulk Water Supply						Retail Supply	Total
	Raw Water	Electricity	Chemicals	Salaries	Maintenance	Sub-Total	Administration	
Unit Cost	0.013 R/kl	0.15 R/kl	0.04 R/kl	0.025 R/kl	0.015 R/kl		204,900 R/year	
Escalation	0%	3%	0%	0%	0%		0%	
Year								
5	14.91	199.49	45.89	28.68	17.21	306.18	204.90	511.08
6	14.91	205.47	45.89	28.68	17.21	312.16	204.90	517.06
7	14.91	211.64	45.89	28.68	17.21	318.33	204.90	523.23
8	14.91	217.99	45.89	28.68	17.21	324.68	204.90	529.58
9	14.91	224.53	45.89	28.68	17.21	331.22	204.90	536.12
10	14.91	231.26	45.89	28.68	17.21	337.95	204.90	542.85
11	14.91	238.20	45.89	28.68	17.21	344.89	204.90	549.79
12	14.91	245.35	45.89	28.68	17.21	352.04	204.90	556.94
13	14.91	252.71	45.89	28.68	17.21	359.40	204.90	564.30
14	14.91	260.29	45.89	28.68	17.21	366.98	204.90	571.88
15	14.91	268.10	45.89	28.68	17.21	374.79	204.90	579.69
16	14.91	276.14	45.89	28.68	17.21	382.83	204.90	587.73
17	14.91	284.42	45.89	28.68	17.21	391.12	204.90	596.02
18	14.91	292.96	45.89	28.68	17.21	399.65	204.90	604.55
19	14.91	301.75	45.89	28.68	17.21	408.44	204.90	613.34
20	14.91	310.80	45.89	28.68	17.21	417.49	204.90	622.39
21	14.91	320.12	45.89	28.68	17.21	426.81	204.90	631.71
22	14.91	329.73	45.89	28.68	17.21	436.42	204.90	641.32
23	14.91	339.62	45.89	28.68	17.21	446.31	204.90	651.21
24	14.91	349.81	45.89	28.68	17.21	456.50	204.90	661.40
25	14.91	360.30	45.89	28.68	17.21	466.99	204.90	671.89
26	14.91	371.11	45.89	28.68	17.21	477.80	204.90	682.70
27	14.91	382.24	45.89	28.68	17.21	488.93	204.90	693.83
28	14.91	393.71	45.89	28.68	17.21	500.40	204.90	705.30
29	14.91	405.52	45.89	28.68	17.21	512.21	204.90	717.11
30	14.91	417.69	45.89	28.68	17.21	524.38	204.90	729.28

(Case B)

Annual Water Production : 3,059,226 kl (Unit: 000Rand)

Item	Bulk Water Supply						Retail Supply	Total
	Raw Water	Electricity	Chemicals	Salaries	Maintenance	Sub-Total	Administration	
Unit Cost	0.013 R/kl	0.15 R/kl	0.04 R/kl	0.025 R/kl	0.015 R/kl		507,300 R/year	
Escalation	0%	3%	0%	0%	0%		0%	
Year								
5	39.77	531.97	122.37	76.48	45.89	816.48	507.30	1,323.78
6	39.77	547.93	122.37	76.48	45.89	832.44	507.30	1,339.74
7	39.77	564.37	122.37	76.48	45.89	848.88	507.30	1,356.18
8	39.77	581.30	122.37	76.48	45.89	865.81	507.30	1,373.11
9	39.77	598.74	122.37	76.48	45.89	883.25	507.30	1,390.55
10	39.77	616.70	122.37	76.48	45.89	901.21	507.30	1,408.51
11	39.77	635.20	122.37	76.48	45.89	919.71	507.30	1,427.01
12	39.77	654.26	122.37	76.48	45.89	938.77	507.30	1,446.07
13	39.77	673.89	122.37	76.48	45.89	958.39	507.30	1,465.69
14	39.77	694.10	122.37	76.48	45.89	978.61	507.30	1,485.91
15	39.77	714.93	122.37	76.48	45.89	999.43	507.30	1,506.73
16	39.77	736.37	122.37	76.48	45.89	1,020.88	507.30	1,528.18
17	39.77	758.47	122.37	76.48	45.89	1,042.97	507.30	1,550.27
18	39.77	781.22	122.37	76.48	45.89	1,065.73	507.30	1,573.03
19	39.77	804.66	122.37	76.48	45.89	1,089.16	507.30	1,596.46
20	39.77	828.80	122.37	76.48	45.89	1,113.39	507.30	1,620.60
21	39.77	853.66	122.37	76.48	45.89	1,138.17	507.30	1,645.47
22	39.77	879.27	122.37	76.48	45.89	1,163.78	507.30	1,671.08
23	39.77	905.65	122.37	76.48	45.89	1,190.16	507.30	1,697.46
24	39.77	932.82	122.37	76.48	45.89	1,217.32	507.30	1,724.62
25	39.77	960.80	122.37	76.48	45.89	1,245.31	507.30	1,752.61
26	39.77	989.63	122.37	76.48	45.89	1,274.13	507.30	1,781.43
27	39.77	1,019.31	122.37	76.48	45.89	1,303.82	507.30	1,811.12
28	39.77	1,049.89	122.37	76.48	45.89	1,334.40	507.30	1,841.70
29	39.77	1,081.39	122.37	76.48	45.89	1,365.90	507.30	1,873.20
30	39.77	1,113.83	122.37	76.48	45.89	1,398.34	507.30	1,905.64

Table C.1-4: Different Local Structure Models (Retail Supply)

Service Level A		
	Structure Model 1	Structure Model 2
Size	<u>Small Community</u> : e.g. 350 Households 2100 People	<u>Medium</u> : e.g. 800 Households 4800 People
Mngt.	Water Committee: - Chair person - Vice Chair - Secretary - Treasurer	Water Committee: - Chair person - Vice Chair - Secretary - Vice Secretary - Treasurer
Staff	Water Bailiff (x 2) • Part-time employee/s. • Functions may be combined.	Bookkeeper / Administrator Water Bailiff (x 2) • Part-time employee/s.
Service Level B		
	Structure Model 3	Structure Model 4
Size	<u>Small Community</u> : e.g. 350 Households 2100 People	<u>Medium</u> : e.g. 800 Households 4800 People
Mngt.	Water Committee: - Chair person - Vice Chair - Secretary - Treasurer	Water Committee: - Chair person - Vice Chair - Secretary - Vice Secretary - Treasurer
Staff	Pipe / Meter Maintenance (x1) Meter Readers / Collection Officers (x 2) • Some permanent positions. • Functions may be combined.	Bookkeeper / Administrator (x1) Pipe / Meter Maintenance (x2) Meter Readers / Collect. Officers (x 2) • Some permanent positions.

Table C.1-5: Costing of Alternative Structure Models / Options

Stipend / Employment Cost per Position		
Role / Position	Cost (R)	
	Monthly	Annually
Water Committee:		
Chairperson	75	900
Vice Chairperson	75	900
Secretary	75	900
Vice Secretary	75	900
Treasurer	75	900
Bookkeeper / Cashier (Part-time)	500	6000
Bookkeeper / Cashier (Full-time)	2000	24000
Operator (Valves, pumps, plant)(Part-time)	450	5400
Maintenance Worker (Part-time)	450	5400
Collections / Water Bailiff (Part-time)	200	2400

Application of Costs per Position to Structure Models		
Organisational Model	Cost (R)	
	Monthly	Annually
Model 1: Service Level A Small Community	700	8,400
Model 2: Service Level A Medium Community	1,275	15,300
Model 3: Service Level B Small Community	1,150	13,800
Model 4: Service Level B Medium Community	3,675	44,100

Table C.1-6 : Administration Cost For Retail Supply : Moretele 2

Settlement/ Community	Calculated Population	Service Level A		Service Level B	
		Cost (R)		Cost (R)	
		Monthly	Annual	Monthly	Annual
1 Lefiso/Mmutlestad	5,440	1,275	15,300	3,675	44,100
2 Lefiswane	5,760	1,275	15,300	3,675	44,100
3 Ramantsho	550	700	8,400	1,150	13,800
4 Semohlase	448	700	8,400	1,150	13,800
5 Moletsi	1,664	700	8,400	1,150	13,800
6 Marapyane	21,504	1,275	15,300	3,675	44,100
7 Opperuimd	1,856	700	8,400	1,150	13,800
8 Ga-Ramantshane	14,720	1,275	15,300	3,675	44,100
9 Kalkfontein	9,600	1,275	15,300	3,675	44,100
Sub-Total of Moretele 2 East	61,542	9,175	110,100	22,975	275,700
10 Lefifi	12,160	1,275	15,300	3,675	44,100
11 Rapotokwane	5,504	1,275	15,300	3,675	44,100
12 Norman	538	700	8,400	1,150	13,800
13 Bamokgoko	9,600	1,275	15,300	3,675	44,100
14 Phake C	2,304	700	8,400	1,150	13,800
15 Phake B	1,280	700	8,400	1,150	13,800
16 Phake A	2,240	700	8,400	1,150	13,800
17 Mantiote	9,600	1,275	15,300	3,675	44,100
Sub-Total of Moretele 2 West	43,226	7,900	94,800	19,300	231,600
TOTAL	104,768	17,075	204,900	42,275	507,300

**Table C.1-7 : Preliminary Tariff Setting for Case A and B
Moretele 2**

Bulk Water Tariff

	Annual Production (KL)	O&M Cost ('000R)	Reserve for Replacement ('000R)	Loan Repayment ('000R)	Total ('000R)	Bulk Tariff (Unit Cost) (R/KL)
	(1)	(2)	(3)	(4)	(5)= (2)+(3)+(4)	(6)=(5)/(1)
Case A	1,147,210	312.16	146.25	0	458.41	0.40
Case B	3,059,226	832.44	411.72	521.67	1765.83	0.58

Retail Water Tariff

	Annual Water Sales (KL)	Bulk Water Purchase ('000R)	O&M Cost ('000R)	Loan Repayment ('000R)	Total ('000R)	Retail Tariff (Unit Cost) (R/KL)
	(7)	(8)=(1)x(6)	(9)	(10)	(11)= (8)+(9)+(10)	(12)=(11)/(12)
Case A	975,128	458.41	204.90	0	663.31	0.68
Case B	2,600,342	1765.83	507.30	5457.39	7730.52	2.97

	Consumption		Monthly Tariff		Share of Income	
	Average (kl/m/hh)	Low-Income (kl/m/hh)	Average (R/m/hh)	Low-Income (R/m/hh)	Average 1,446R/m	Low-Income 337R/m
	(13)	(14)	(15)=(12)x(13)	(16)=(12)x(14)	(15)/1,446	(16)/337
Case A	4.80	4.80	3.27	3.27	0.2%	1.0%
Case B	13.06	4.80	38.81	14.27	2.7%	4.2%

Reserve for Replacement : Replacement Cost for Pumps, Interest Rate (Deposit)5%, 15years
Loan Repayment : Interest rate 8%, 20years equal repayment

Table C.1-8 : Disbursement Schedule and Project Cost for Case C : North Mankwe

(Unit: 000Rand)

Item	Stage Year	STAGE 1 (Service Level A)					STAGE 2 (Upgrade)					Sub-Total	Sub-Total	Total
		1	2	3	4	5	6	7	8	9	10			
		1998	1999	2000	2001	2002	2003	2004	2005	2006	2007			
Case C Total		632	4988	57,198	107,538	42,912	213,263	225	1,540	22,933	66,870	26,143	117,716	330,984
Bulk														
(1) Direct Construction Cost														
(2) P&G	(1)x 15%			20,135	29,530	9,754	59,418							2,544
(3) Base Cost	(1)+(2)			3,020	4,429	1,463	8,913							382
(4) Engineering Fee	(3)x 10%			23,155	33,959	11,217	68,331							2,926
(5) Miscellaneous	(1)x 2%			1,708	1,708	1,708	6,833							293
(6) Institutional Support	(3)x 2.5%			594	594		1,188							51
(7) Sub-Total	(3)+(4)+(5)+(6)			342	342	342	1,708							73
(8) Physical Contingency	(7)x 15%			25,799	36,009	13,267	78,060							3,342
(9) Price Escalation(10%/a)	(7)+(8)x			3,473	5,094	1,683	10,250							83
(10) Sub-Total	(7)+(8)+(9)			555	9,689	9,127	38,481							4,979
Total	(7)+(10)			376	3,199	38,961	60,178							8,760
VAT				53	448	5,455	17,751							1,226
Grand Total		428	3,647	44,416	68,603	27,447	144,542	30	251	3,085	4,489	2,131	9,986	154,528
Retail														
(1) Direct Construction Cost														
(2) P&G	(1)x 15%			5,635	16,904	5,635	28,173							16,817
(3) Base Cost	(1)+(2)			845	2,536	845	4,226							2,523
(4) Engineering Fee	(3)x 10%			6,480	19,439	6,480	32,399							19,340
(5) Miscellaneous				810	810	810	3,240							1,934
(6) Institutional Development	(3)x 2.5%			162	162	162	810							483
(7) Sub-Total	(3)+(4)+(5)+(6)			162	162	162	810							483
(8) Physical Contingency	(7)x 15%			972	7,452	7,452	36,449							21,757
(9) Price Escalation(10%/a)	(7)+(8)x			204	2,788	5,143	18,978							2,901
(10) Sub-Total	(8)+(9)			204	3,760	6,115	23,837							33,298
Total	(7)+(10)			178	1,176	11,212	34,153							36,199
VAT				25	165	1,570	8,440							57,956
Grand Total		203	1,341	12,782	38,935	15,466	68,726	195	1,289	12,288	37,430	14,868	66,070	134,796
Yard														
(1) Direct Construction Cost														
(2) Price Escalation(10%/a)	(1)x													
Total	(1)+(2)													
VAT														
Grand Total														

Table C.1-9: Project Cost and Allocation for Case C : Moretele 2

(Unit: ,000Rand)

Item		Project Cost		Stage 1		Stage 2	
				(RDP Grant)		(Loan/Own Fund)	
Total		330,984	100.0%	213,268	100.0%	117,716	100.0%
Bulk Supply	(1)Direct Construction Cost	61,962	(45.7%)	59,418	(46.9%)	2,544	(29.0%)
	(2)P&G	9,294	(6.9%)	8,913	(7.0%)	382	(4.4%)
	(3)Base Cost	71,256	(52.6%)	68,331	(53.9%)	2,926	(33.4%)
	(4)Engineering Fee	7,126	(5.3%)	6,833	(5.4%)	293	(3.3%)
	(5)Miscellaneous	1,239	(0.9%)	1,188	(0.9%)	51	(0.6%)
	(6)Institutional Support	1,781	(1.3%)	1,708	(1.3%)	73	(0.8%)
	(7)Sub-Total	81,403	(60.1%)	78,060	(61.6%)	3,342	(38.2%)
	(8)Physical Contingency	10,688	(7.9%)	10,250	(8.1%)	439	(5.0%)
	(9)Price Escalation(10%/a)	43,460	(32.1%)	38,481	(30.3%)	4,979	(56.8%)
	(10)Sub-Total	54,148	(39.9%)	48,731	(38.4%)	5,418	(61.8%)
	Total	135,551	(100.0%)	126,791	(100.0%)	8,760	(100.0%)
VAT		18,977		17,751		1,226	
Grand Total		154,528	46.7%	144,542	67.8%	9,986	8.5%
Retail Supply	(1)Direct Construction Cost	44,990	(38.0%)	28,173	(46.7%)	16,817	(29.0%)
	(2)P&G	6,749	(5.7%)	4,226	(7.0%)	2,523	(4.4%)
	(3)Base Cost	51,739	(43.8%)	32,399	(53.7%)	19,340	(33.4%)
	(4)Engineering Fee	5,174	(4.4%)	3,240	(5.4%)	1,934	(3.3%)
	(5)Miscellaneous	-	(0.0%)	-	(0.0%)	-	(0.0%)
	(6)Institutional Development	1,293	(1.1%)	810	(1.3%)	483	(0.8%)
	(7)Sub-Total	58,206	(49.2%)	36,449	(60.5%)	21,757	(37.5%)
	(8)Physical Contingency	7,761	(6.6%)	4,860	(8.1%)	2,901	(5.0%)
	(9)Price Escalation(10%/a)	52,275	(44.2%)	18,978	(31.5%)	33,298	(57.5%)
	(10)Sub-Total	60,036	(50.8%)	23,837	(39.5%)	36,199	(62.5%)
	Total	118,242	(100.0%)	60,286	(100.0%)	57,956	(100.0%)
VAT		16,554		8,440		8,114	
Grand Total		134,796	40.7%	68,726	32.2%	66,070	56.1%
Yard Connection	(1)Direct Construction Cost	15,470	(42.3%)	-		15,470	(42.3%)
	(2)Price Escalation(10%/a)	21,074	(57.7%)	-		21,074	(57.7%)
	Total	36,544	(100.0%)	-		36,544	(100.0%)
	VAT	5,116		-		5,116	
Grand Total		41,660	12.6%	-	0.0%	41,660	35.4%

	Project Cost		Stage 1		Stage 2	
			(RDP Grant)		(Loan/Own Fund)	
Bulk Supply	154,528	100.0%	144,542	93.5%	9,986	6.5%
Retail Supply	134,796	100.0%	68,726	51.0%	66,070	49.0%
Yard Connection	41,660	100.0%	-	0.0%	41,660	100.0%
Total	330,984	100.0%	213,268	64.4%	117,716	35.6%

Table C.1-10: Project Costs for Case A and B at 1997 Price : Moretele 2

(Unit: ,000Rand)

Item			Year	1	2	3	4	5
			Total	1998	1999	2000	2001	2002
Case A Total			147,765	574	-1,122	42,973	73,450	26,645
Bulk	(1)Direct Construction Cost		59,418	-	-	20,135	29,530	9,754
	(2)P&G	(1)x 15%	8,913	-	-	3,020	4,429	1,463
	(3)Base Cost	(1)+(2)	68,331	-	-	23,155	33,959	11,217
	(4)Engineering Fee	(3)x 10%	6,833	-	1,708	1,708	1,708	1,708
	(5)Miscellaneous	(1)x 2%	1,188	-	594	594	-	-
	(6)Institutional Support	(3)x 2.5%	1,708	342	342	342	342	342
	(7)Sub-Total	(3)+(4)+(5)+(6)	78,060	342	2,644	25,799	36,009	13,267
	(8)Physical Contingency	(3)x 15%	10,250	-	-	3,473	5,094	1,683
	Total	(7)+(8)	88,310	342	2,644	29,272	41,103	14,949
	VAT	14%	12,363	48	370	4,098	5,754	2,093
Grand Total			100,673	389	3,014	33,370	46,857	17,042
Retail	(1)Direct Construction Cost		28,173	-	-	5,635	16,904	5,635
	(2)P&G	(1)x 15%	4,226	-	-	845	2,536	845
	(3)Base Cost	(1)+(2)	32,399	-	-	6,480	19,439	6,480
	(4)Engineering Fee	(3)x 10%	3,240	-	810	810	810	810
	(5)Miscellaneous		-	-	-	-	-	-
	(6)Institutional Development	(3)x 2.5%	810	162	162	162	162	162
	(7)Sub-Total	(3)+(4)+(5)+(6)	36,449	162	972	7,452	20,411	7,452
	(8)Physical Contingency	(3)x 15%	4,860	-	-	972	2,916	972
	Total	(7)+(8)	41,309	162	972	8,424	23,327	8,424
	VAT	14%	5,783	23	136	1,179	3,266	1,179
Grand Total			47,092	185	1,108	9,603	26,593	9,603
Case B Total			197,821	701	4,913	53,672	101,809	36,726
Bulk	(1)Direct Construction Cost		61,962	-	-	21,004	30,726	10,232
	(2)P&G	(1)x 15%	9,294	-	-	3,151	4,609	1,535
	(3)Base Cost	(1)+(2)	71,256	-	-	24,154	35,335	11,767
	(4)Engineering Fee	(3)x 10%	7,126	-	1,781	1,781	1,781	1,781
	(5)Miscellaneous	(1)x 2%	1,239	-	620	620	-	-
	(6)Institutional Support	(3)x 2.5%	1,781	356	356	356	356	356
	(7)Sub-Total	(3)+(4)+(5)+(6)	81,403	356	2,757	26,911	37,473	13,905
	(8)Physical Contingency	(3)x 15%	10,688	-	-	3,623	5,300	1,765
	Total	(7)+(8)	92,091	356	2,757	30,535	42,773	15,670
	VAT	14%	12,893	50	386	4,275	5,988	2,194
Grand Total			304,984	406	3,143	34,809	48,761	17,864
Retail	(1)Direct Construction Cost		44,990	-	-	8,998	26,994	8,998
	(2)P&G	(1)x 15%	6,749	-	-	1,350	4,049	1,350
	(3)Base Cost	(1)+(2)	51,739	-	-	10,348	31,043	10,348
	(4)Engineering Fee	(3)x 10%	5,174	-	1,293	1,293	1,293	1,293
	(5)Miscellaneous		-	-	-	-	-	-
	(6)Institutional Development	(3)x 2.5%	1,293	259	259	259	259	259
	(7)Sub-Total	(3)+(4)+(5)+(6)	58,206	259	1,552	11,900	32,595	11,900
	(8)Physical Contingency	(3)x 15%	7,761	-	-	1,552	4,656	1,552
	Total	(7)+(8)	65,967	259	1,552	13,452	37,252	13,452
	VAT	14%	9,235	36	217	1,883	5,215	1,883
Grand Total			75,202	295	1,769	15,335	42,467	15,335
Yard Connection	(1)Direct Construction Cost		15,470	-	-	3,094	9,282	3,094
VAT	14%	2,166	-	-	433	1,299	433	
Grand Total			17,636	-	-	3,527	10,581	3,527
Case C (Cost for Up-Grading)			Year	6	7	8	9	10
				2003	2004	2005	2006	2007
Bulk			4,310	17	129	1,439	1,904	822
Retail			28,110	110	661	5,732	15,874	5,732
Yard Connection			17,636	-	-	3,527	10,581	3,527
Total			50,056	127	790	10,698	28,359	10,081

Table C.1-11: Project Cost and Allocation for Case C at 1997 Price : Moretele 2

(Unit: ,000Rand)

Item	Project Cost		Stage 1 (RDP Grant)		Stage 2 (Loan/Own Fund)	
Total	197,821	100.0%	147,765	100.0%	50,056	100.0%
Bulk Supply	(1)Direct Construction Cost	61,962 (67.3%)	59,418 (67.3%)	2,544 (67.3%)		
	(2)P&G	9,294 (10.1%)	8,913 (10.1%)	382 (10.1%)		
	(3)Base Cost	71,256 (77.4%)	68,331 (77.4%)	2,926 (77.4%)		
	(4)Engineering Fee	7,126 (7.7%)	6,833 (7.7%)	293 (7.7%)		
	(5)Miscellaneous	1,239 (1.3%)	1,188 (1.3%)	51 (1.3%)		
	(6)Institutional Support	1,781 (1.9%)	1,708 (1.9%)	73 (1.9%)		
	(7)Sub-Total	81,403 (88.4%)	78,060 (88.4%)	3,342 (88.4%)		
	(8)Physical Contingency	10,688 (11.6%)	10,250 (11.6%)	439 (11.6%)		
	Total	92,091 (100.0%)	88,310 (100.0%)	3,781 (100.0%)		
	VAT	12,893	12,363	529		
	Grand Total	104,984 53.1%	100,673 68.1%	4,310 8.6%		
Retail Supply	(1)Direct Construction Cost	44,990 (68.2%)	28,173 (68.2%)	16,817 (68.2%)		
	(2)P&G	6,749 (10.2%)	4,226 (10.2%)	2,523 (10.2%)		
	(3)Base Cost	51,739 (78.4%)	32,399 (78.4%)	19,340 (78.4%)		
	(4)Engineering Fee	5,174 (7.8%)	3,240 (7.8%)	1,934 (7.8%)		
	(5)Miscellaneous	- (0.0%)	- (0.0%)	- (0.0%)		
	(6)Institutional Development	1,293 (2.0%)	810 (2.0%)	483 (2.0%)		
	(7)Sub-Total	58,206 (88.2%)	36,449 (88.2%)	21,757 (88.2%)		
	(8)Physical Contingency	7,761 (11.8%)	4,860 (11.8%)	2,901 (11.8%)		
	Total	65,967 (100.0%)	41,309 (100.0%)	24,658 (100.0%)		
	VAT	9,235	5,783	3,452		
	Grand Total	75,202 38.0%	47,092 31.9%	28,110 56.2%		
Yard Connection	(1)Direct Construction Cost	15,470	-	15,470		
	VAT	2,166	-	2,166		
	Grand Total	17,636 8.9%	- 0.0%	17,636 35.2%		

	Project Cost		Stage 1 (RDP Grant)		Stage 2 (Loan/Own Fund)	
Bulk Supply	104,984	100.0%	100,673	95.9%	4,310	4.1%
Retail Supply	75,202	100.0%	47,092	62.6%	28,110	37.4%
Yard Connection	17,636	100.0%	-	0.0%	17,636	100.0%
Total	197,821	100.0%	147,765	74.7%	50,056	25.3%

Stage 1	Bulk Supply	1st Tier	100,673	68.1%	50.9%		
	Retail Supply	1st Tier	47,092	31.9%	23.8%		
	Total		147,765	100.0%	74.7%	147,765	74.7%
Stage 2	Bulk Supply	2nd Tier	4,310	8.6%	2.2%	4,310	2.2%
	Retail Supply	3rd Tier	28,110	56.2%	14.2%	4,310	2.2%
	Yard Connection	3rd Tier	17,636	35.2%	8.9%	4,310	2.2%
	Total		50,056	100.0%	25.3%	45,746	23.1%
Total			197,821		100.0%		

Table C.2-1: Cash Flow Analysis for Bulk Supply (Case C) at 1997 Price : Moretele 2

Water Demand and Tariff Forecast	Year														
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Service Level A															
A. Service Level															
B. Water Demand						61,542	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768
b-1) Population												80	LCD		
b-2) Consumption						3,143	3,143	3,143	3,143	3,143	3,143	8,381	8,381	8,381	8,381
b-3) Water Demand (AADD)						1,846	3,143	3,143	3,143	3,143	3,143	12,572	12,572	12,572	12,572
b-4) Water Demand (SPDD)						2,769	4,715	4,715	4,715	4,715	4,715	3,059,226	3,059,226	3,059,226	3,059,226
b-5) Annual Water Production						673,885	1,147,210	1,147,210	1,147,210	1,147,210	1,147,210				
Service Level B															
C. Bulk Water Tariff						0.39	0.39	0.39	0.39	0.39	0.39	0.57	0.57	0.57	0.57
Income Statements															
(1,000R)															
D. Revenue						263	447	447	447	447	447	1,744	1,744	1,744	1,744
d-1) Water Sales						263	447	447	447	447	447	1,744	1,744	1,744	1,744
d-2) Revenue Total						263	447	447	447	447	447	1,744	1,744	1,744	1,744
E. Expenses															
e-1) Raw Water Cost						9	15	15	15	15	15	40	40	40	40
-Power						171	303	310	310	316	323	880	899	919	939
-Chemical						117	205	218	218	225	231	635	654	674	694
-Salaries						27	46	46	46	46	46	122	122	122	122
-Maintenance Cost and other						17	29	29	29	29	29	76	76	76	76
e-3) Expenses Total						180	312	318	325	331	338	920	939	958	979
Net Operating Income						83	135	129	123	116	109	824	805	785	765
Cash Flow Statements															
(1,000R)															
F. Inflow															
f-1) Net Operating Income						83	135	129	123	116	109	824	805	785	765
f-2) Grant (RDP Fund)						17,042									
f-3) Loan							17	129	1,439	1,904	822				
f-4) Interest Generated							4	11	18	25	32	39	56	73	90
f-5) Inflow Total						369	5,014	33,370	46,857	17,125	2,045	863	861	859	855
G. Outflow															
g-1) CAPEX+Replacement						17,042									
g-2) Loan Repayment (CAPEX)															
g-3) Short Term Loan Interest															
g-4) Outflow Total						369	3,014	33,370	46,857	17,042	822				
Surplus cum.						0	0	0	0	0	0	142	340	337	334
Loan outstanding						0	0	0	0	0	83	1,128	1,468	1,805	2,139
Principal						17	147	1,598	3,630	4,742					
Interest						1	12	128	290	379					
Total						18	159	1,726	3,920	5,121					

Table C.2-1: Cash Flow Analysis for Bulk (Case C) at 1997 Price: Moretele 2 (cont'd)

	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Water Demand and Tariff Forecast	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
A. Service Level	Service Level B															
B. Water Demand	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768
b-1) Population																
b-2) Consumption	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381
b-3) Water Demand (AADD)	12,572	12,572	12,572	12,572	12,572	12,572	12,572	12,572	12,572	12,572	12,572	12,572	12,572	12,572	12,572	12,572
b-4) Water Demand (SPDD)	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226
b-5) Annual Water Production																
C. Bulk Water Tariff	0.57	0.59	0.59	0.59	0.59	0.59	0.62	0.62	0.62	0.62	0.62	0.64	0.64	0.64	0.64	0.64
Income Statements																
(1,000R)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
D. Revenue																
d-1) Water Sales	1,744	1,805	1,805	1,805	1,805	1,805	1,897	1,897	1,897	1,897	1,897	1,958	1,958	1,958	1,958	1,958
d-2) Revenue Total	1,744	1,805	1,805	1,805	1,805	1,805	1,897	1,897	1,897	1,897	1,897	1,958	1,958	1,958	1,958	1,958
E. Expenses																
e-1) Raw Water Cost	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
e-2) O&M Cost	960	981	1,003	1,026	1,049	1,074	1,098	1,124	1,150	1,178	1,206	1,234	1,264	1,295	1,326	1,359
-Power	715	736	758	781	805	829	854	879	906	933	961	990	1,019	1,050	1,081	1,114
-Chemical	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
-Salaries	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
-Maintenance Cost and other	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
e-3) Expenses Total	999	1,021	1,043	1,066	1,089	1,113	1,138	1,164	1,190	1,217	1,245	1,274	1,304	1,334	1,366	1,398
Net Operating Income	744	784	762	739	716	692	759	733	707	679	651	684	654	624	592	560
Cash Flow Statements																
(1,000R)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
F. Inflow																
f-1) Net Operating Income	744	784	762	739	716	692	759	733	707	679	651	684	654	624	592	560
f-2) Grant (RDP Fund)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f-3) Loan	107	123	143	162	181	200	108	126	143	159	175	-	-	5	10	14
f-4) Interest Generated	851	908	905	901	897	891	867	859	849	838	826	884	654	628	602	574
f-5) Inflow Total																
G. Outflow																
g-1) CAPEX--Replacement	522	522	522	522	522	522	522	522	522	522	522	522	522	522	522	522
g-2) Loan Repayment (CAPEX)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
g-3) Short Term Loan Interest	522	522	522	522	522	522	522	522	522	522	522	522	522	522	522	522
g-4) Outflow Total	330	386	383	380	375	382	345	337	328	317	307	319	306	297	285	272
Surplus	2,469	2,855	3,238	3,617	3,992	2,168	2,514	2,851	3,178	3,495	-182	-53	97	204	285	357
Loan outstanding																
Principal																
Interest																
Total																

Table C.2-2: Cash Flow Analysis for Retail Supply (Case C-1) at 1997 Price: Moretele 2

Water Demand and Tariff Forecast	Year														
	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
A. Service Level															
B. Water Demand															
b-1) Population						61,542	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768
b-2) No. of Household						9,616	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370
b-3) No. of Yard Connection															
b-4) Consumption						30	30	30	30	30	30	30	30	30	30
b-5) Water Demand						1,846	3,143	3,143	3,143	3,143	3,143	3,143	3,143	3,143	3,143
b-6) Unaccounted for water Ratio						15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
b-7) Water Bulled						1,569	2,672	2,672	2,672	2,672	2,672	2,672	2,672	2,672	2,672
b-8) Annual Water Production						673,885	1,147,210	1,147,210	1,147,210	1,147,210	1,147,210	1,147,210	1,147,210	1,147,210	1,147,210
b-9) Annual Water Sales						572,802	975,128	975,128	975,128	975,128	975,128	975,128	975,128	975,128	975,128
C. Retail Water Tariff															
c-1) Retail Water Tariff						0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
c-2) Flat Rate Tariff						3.22	3.22	3.22	3.22	3.22	3.22	3.22	3.22	3.22	3.22
c-3) Reserve for Upgrading						19.40	19.40	19.40	19.40	19.40	19.40	19.40	19.40	19.40	19.40
Income Statements (1,000R)															
D. Revenue															
d-1) Water Sales (Cost Portion)						418	652	652	652	652	652	652	652	652	652
d-2) Reserve Fund / Amortisation						1,981	3,431	3,431	3,431	3,431	3,431	3,431	3,431	3,431	3,431
d-3) Revenue Total						2,399	4,083	4,083	4,083	4,083	4,083	4,083	4,083	4,083	4,083
E. Expenses															
e-1) Bulk Water Tariff						0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
e-2) Bulk Water Purchase						263	447	447	447	447	447	447	447	447	447
e-3) Maintenance & Admn. Cost						155	205	205	205	205	205	205	205	205	205
e-4) Expenses Total						418	652	652	652	652	652	652	652	652	652
Net Operating Income						1,981	3,431	3,431	3,431	3,431	3,431	3,431	3,431	3,431	3,431
Cash Flow Statements (1,000R)															
F. Inflow															
f-1) Net Operating Income						1,981	3,431	3,431	3,431	3,431	3,431	3,431	3,431	3,431	3,431
f-2) Grant (RDP Fund)	185	1,108		9,603	26,593	9,603									
f-3) Loan									5,792	15,874	5,792				
f-4) Interest Generated							99	270	422	438	103				
f-5) Inflow Total	185	1,108		9,603	26,593	11,584	3,550	3,701	9,585	19,743	7,221				
G. Outflow															
g-1) CAPEX*Replacement	185	1,108		9,603	26,593	9,603	110	661	9,259	26,455	9,259				
g-2) Loan Repayment (CAPEX)															
g-3) Short Term Loan Interest							110	661	9,259	26,455	9,259				
g-4) Outflow Total	185	1,108		9,603	26,593	9,603	110	661	9,259	26,455	9,259				
Surplus cum.	0	0	0	0	0	1,981	3,420	3,839	326	6,712	3,008	12	13	13	14
	0	0	0	0	0	1,981	5,400	8,440	8,765	2,054	45	57	70	83	97

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Loan outstanding															
CAPEX									5,732	22,065	29,562				
Principal									459	1,765	2,365				
Interest									6,191	23,830	31,927				
Affordability												60%			
												100%			
Monthly Expenditure															
Average						22.62	22.62	22.62	22.62	22.62	22.62	27.68	27.68	27.68	27.68
Lower Income						22.62	22.62	22.62	22.62	22.62	22.62	10.18	10.18	10.18	10.18
Inflation															
Economic Growth Rate															
Average															
Household Income															
Lower Income															
Average Income	337	337	337	337	337	337	337	337	337	337	337	337	337	337	337
	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466
Water Purchase/Income (Affordability Check)															
Lower Income	0.0%	0.0%	0.0%	0.0%	0.0%	6.7%	6.7%	6.7%	6.7%	6.7%	6.7%	3.0%	3.0%	3.0%	3.0%
Average Income	0.0%	0.0%	0.0%	0.0%	0.0%	1.5%	1.5%	1.5%	1.5%	1.5%	1.5%	1.9%	1.9%	1.9%	1.9%

Table C.2-2: Cash Flow Analysis for Retail Supply (Case C-1) at 1997 Price : Moretele 2 (cont'd)

Water Demand and Tariff Forecast	Service Level B																
	Year	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
B. Water Demand		104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768
b-1) Population		16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370
b-2) No. of Household		14,733	14,733	14,733	14,733	14,733	14,733	14,733	14,733	14,733	14,733	14,733	14,733	14,733	14,733	14,733	14,733
b-3) No. of Yard Connection		80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
b-4) Consumption		8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381
b-5) Water Demand		15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
b-6) Unaccounted for water Ratio		7.124	7.124	7.124	7.124	7.124	7.124	7.124	7.124	7.124	7.124	7.124	7.124	7.124	7.124	7.124	7.124
b-7) Water Billed		3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226
b-8) Annual Water Production		2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342
b-9) Annual Water Sales		2.12	2.14	2.14	2.14	2.14	2.14	2.18	2.18	2.18	2.18	2.18	2.20	2.20	2.20	2.20	2.20
C. Retail Water Tariff																	
c-1) Retail Water Tariff																	
c-2) Flat Rate Tariff																	
c-3) Reserve for Upgrading																	
Income Statements																	
(1,000R)																	
D. Revenue																	
d-1) Water Sales (Cost Portion)		2,251	2,312	2,312	2,312	2,312	2,312	2,404	2,404	2,404	2,404	2,404	2,465	2,465	2,465	2,465	2,465
d-2) Reserve Fund / Amortisation		3,252	3,252	3,252	3,252	3,252	3,252	3,265	3,265	3,265	3,265	3,265	3,256	3,256	3,256	3,256	3,256
d-3) Revenue Total		5,513	5,565	5,565	5,565	5,565	5,565	5,669	5,669	5,669	5,669	5,669	5,721	5,721	5,721	5,721	5,721
E. Expenses																	
e-1) Bulk Water Tariff		0.57	0.59	0.59	0.59	0.59	0.59	0.62	0.62	0.62	0.62	0.62	0.64	0.64	0.64	0.64	0.64
e-2) Bulk Water Purchase		1,744	1,805	1,805	1,805	1,805	1,805	1,897	1,897	1,897	1,897	1,897	1,958	1,958	1,958	1,958	1,958
e-3) Maintenance & Admin. Cost		507	507	507	507	507	507	507	507	507	507	507	507	507	507	507	507
e-4) Expenses Total		2,251	2,312	2,312	2,312	2,312	2,312	2,404	2,404	2,404	2,404	2,404	2,465	2,465	2,465	2,465	2,465
Net Operating Income		3,262	3,252	3,252	3,252	3,252	3,252	3,265	3,265	3,265	3,265	3,265	3,256	3,256	3,256	3,256	3,256
Cash Flow Statements																	
(1,000R)																	
F. Inflow																	
f-1) Net Operating Income		3,262	3,252	3,252	3,252	3,252	3,252	3,265	3,265	3,265	3,265	3,265	3,256	3,256	3,256	3,256	3,256
f-2) Grant (RDP Fund)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f-3) Loan		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f-4) Interest Generated	5%	5	6	6	6	7	7	7	8	9	11	12	13	14	15	16	17
f-5) Inflow Total		3,267	3,258	3,259	3,259	3,259	3,259	3,272	3,273	3,274	3,275	3,276	3,268	3,269	3,270	3,271	3,272
G. Outflow																	
g-1) CAPEX-Replacement		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
g-2) Loan Repayment (CAPEX)		3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252
g-3) Short Term Loan Interest	7%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
g-4) Outflow Total		3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252	3,252
Surplus		15	6	7	7	7	8	20	21	22	23	25	17	18	18	19	20
curr.		112	118	125	132	139	147	167	188	211	234	259	276	293	312	331	351

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Loan outstanding
 CAPEX 20
 Principal 8%
 Interest

Year	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Affordability	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027
Monthly Expenditure																
Average	27.68	27.94	27.94	27.94	27.94	27.94	28.46	28.46	28.46	28.46	28.46	28.72	28.72	28.72	28.72	28.72
Lower Income	10.18	10.27	10.27	10.27	10.27	10.27	10.46	10.46	10.46	10.46	10.46	10.56	10.56	10.56	10.56	10.56
Economic Growth Rate																
Average	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
Household Income																
Lower Income	337	337	337	337	337	337	337	337	337	337	337	337	337	337	337	337
Average Income	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466
Water Purchase/Income (Affordability Ch)																
Lower Income	3.0%	3.0%	3.0%	3.0%	3.0%	3.0%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%	3.1%
Average Income	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	2.0%	2.0%	2.0%	2.0%	2.0%

Table C.2-3: Cash Flow Analysis for Retail Supply (Case C-2) at 1997 Price: Moretele 2

Water Demand and Tariff Forecast	(1,45)															
	Year	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
A. Service Level																
B. Water Demand																
b-1) Population																
b-2) No. of Household																
b-3) No. of Yard Connection																
b-4) Consumption																
b-5) Water Demand																
b-6) Unaccounted for water Ratio																
b-7) Water Billied																
b-8) Annual Water Production																
b-9) Annual Water Sales																
C. Retail Water Tariff																
c-1) Retail Water Tariff																
c-2) Flat Rate Tariff																
c-3) Reserve for Upgrading																
Income Statements (1,000R)																
D. Revenue																
d-1) Water Sales (Cost Portion)																
d-2) Reserve Fund / Amortisation																
d-3) Revenue Total																
E. Expenses																
e-1) Bulk Water Tariff																
e-2) Bulk Water Purchase																
e-3) Maintenance & Admin. Cost																
e-4) Expenses Total																
Net Operating Income																
Cash Flow Statements (1,000K)																
F. Inflow																
f-1) Net Operating Income																
f-2) Grant (RDP Fund)																
f-3) Loan																
f-4) Interest Generated																
f-5) Inflow Total																
G. Outflow																
g-1) CAPEX+Replacement																
g-2) Loan Repayment (CAPEX)																
g-3) Short Term Loan Interest																
g-4) Outflow Total																
Surplus																
curr.																

	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Affordability	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Loan outstanding							110	780	10,102	37,365	49,614				
CAPEX							9	62	808	2,989	3,969				
Principal							119	843	10,910	40,354	53,583				
Interest															
20 years															
8%															
100%															
100%															
(2/4)															
Monthly Expenditure															
Average	68LCD	R/HH/M					3.22	3.22	3.22	3.22	3.22	3.22	3.22	3.22	3.22
Lower Income	25LCD	R/HH/M					3.22	3.22	3.22	3.22	3.22	3.22	3.22	3.22	3.22
Economic Growth Rate															
Average	337	337	337	337	337	337	337	337	337	337	337	337	337	337	337
Household Income															
Lower Income	1466	1466	1466	1466	1466	1466	1466	1466	1466	1466	1466	1466	1466	1466	1466
Average Income															
Water Purchase/Income (Affordability Check)															
Lower Income	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.0%	1.0%	1.0%	1.0%	1.0%	4.2%	4.2%	4.2%	4.2%
Average Income	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.2%	0.2%	0.2%	0.2%	0.2%	2.6%	2.6%	2.6%	2.6%

Table C.2-3: Cash Flow Analysis for Retail Supply (Case C-2) at 1997 Price : Moretele 2 (cont'd)

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Water Demand and Tariff Forecast	Year	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
A. Service Level																	
B. Water Demand																	
b-1) Population		104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768	104,768
b-2) No. of Household		16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370	16,370
b-3) No. of Yard Connection		15,198	15,198	15,198	15,198	15,198	15,198	15,198	15,198	15,198	15,198	15,198	15,198	15,198	15,198	15,198	15,198
b-4) Consumption		80	80	80	80	80	80	80	80	80	80	80	80	80	80	80	80
b-5) Water Demand		8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381	8,381
b-6) Unaccounted for water Ratio		15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%	15.0%
b-7) Water Bill		7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124	7,124
b-8) Annual Water Production		3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226	3,059,226
b-9) Annual Water Sales		2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342	2,600,342
C. Retail Water Tariff																	
c-1) Retail Water Tariff		2.97	2.99	2.99	2.99	2.99	2.99	3.03	3.03	3.03	3.03	3.03	3.05	3.05	3.05	3.05	3.05
c-2) Flat Rate Tariff																	
c-3) Reserve for Upgrading																	
Income Statements (1,000R)	Year	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
D. Revenue																	
d-1) Water Sales (Cost Portion)		2,251	2,312	2,312	2,312	2,312	2,312	2,404	2,404	2,404	2,404	2,404	2,465	2,465	2,465	2,465	2,465
d-2) Reserve Fund / Amortisation		5,472	5,463	5,463	5,463	5,463	5,463	5,475	5,475	5,475	5,475	5,475	5,466	5,466	5,466	5,466	5,466
d-3) Revenue Total		7,723	7,775	7,775	7,775	7,775	7,775	7,879	7,879	7,879	7,879	7,879	7,931	7,931	7,931	7,931	7,931
E. Expenses																	
e-1) Bulk Water Tariff		0.57	0.59	0.59	0.59	0.59	0.59	0.62	0.62	0.62	0.62	0.62	0.64	0.64	0.64	0.64	0.64
e-2) Bulk Water Purchase		1,744	1,805	1,805	1,805	1,805	1,805	1,897	1,897	1,897	1,897	1,897	1,958	1,958	1,958	1,958	1,958
e-3) Maintenance & Admin. Cost		507	507	507	507	507	507	507	507	507	507	507	507	507	507	507	507
e-4) Expenses Total		2,231	2,312	2,312	2,312	2,312	2,312	2,404	2,404	2,404	2,404	2,404	2,465	2,465	2,465	2,465	2,465
Net Operating Income		5,472	5,463	5,463	5,463	5,463	5,463	5,475	5,475	5,475	5,475	5,475	5,466	5,466	5,466	5,466	5,466
Cash Flow Statements (1,000R)																	
F. Inflow																	
f-1) Net Operating Income		5,472	5,463	5,463	5,463	5,463	5,463	5,475	5,475	5,475	5,475	5,475	5,466	5,466	5,466	5,466	5,466
f-2) Grant (RDP Fund)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f-3) Loan		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
f-4) Interest Generated	5%	0	1	2	2	2	3	3	4	5	6	7	9	9	10	11	12
f-5) Inflow Total		5,472	5,464	5,464	5,465	5,465	5,465	5,478	5,479	5,480	5,481	5,482	5,474	5,475	5,476	5,477	5,478
G. Outflow																	
g-1) CAPEX+Replacement		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
g-2) Loan Repayment (CAPEX)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
g-3) Short Term Loan Interest	7%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
g-4) Outflow Total		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Surplus		15	6	7	7	7	8	20	21	23	24	25	17	19	20	20	21
cum.		24	30	37	44	52	60	80	102	124	148	175	190	207	226	246	266

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Loan outstanding
 CAPEX 20
 Principal 8%
 Interest

Affordability	Year	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Monthly Expenditure																	
Average	68LCD	38.78	39.04	39.04	39.04	39.04	39.04	39.56	39.56	39.56	39.56	39.56	39.82	39.82	39.82	39.82	39.82
Lower Income	25LCD	14.26	14.35	14.35	14.35	14.35	14.35	14.54	14.54	14.54	14.54	14.54	14.64	14.64	14.64	14.64	14.64
<p style="text-align: center;">Inflation 0% Economic Growth Rate 0%</p>																	
Household Income	Average	337	337	337	337	337	337	337	337	337	337	337	337	337	337	337	337
Lower Income																	
Average Income		1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466	1,466
Water Purchase/Income (Affordability Ch)																	
Lower Income (25LCD)		4.2%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%	4.3%
Average Income (68LCD)		2.6%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%	2.7%

Table C.3-1 : NPV and FIRR Analysis for Loan (Case C-1) : Moretele 2

(Unit: 000R)

Year	Cost				Benefit			Net Benefit (9)=(8)-(4)	Real Interest Rate and NPV		
	Loan for Bulk CAPEX (1)	Loan for Retail (2)	Bulk O&M Cost (3)	Retail Admin. Cost (4)	Total Cost (5)=(1)+(2)+(3)+(4)	Annual Water Demand (KL) (6)	Tariff (R/KL) (7)		Benefit (8)=(6)x(7)	i=3%	i=5%
									NPV	NPV	NPV
0 1997							0	0			
1 1998				0	0		0	0			
2 1999				0	0		0	0			
3 2000				0	0		0	0			
4 2001				0	0		0	0			
5 2002			180	155	335	572.802	0.67	384	49	42	38
6 2003	17		312	205	534	975.128	0.67	653	120	100	89
7 2004	129		318	205	652	975.128	0.67	653	1	1	1
8 2005	1,439	5,732	325	205	7,701	975.128	0.67	653	-7,047	-5,563	-4,770
9 2006	1,904	15,874	331	205	18,314	975.128	0.67	653	-17,661	-13,535	-11,384
10 2007	822	5,732	338	205	7,096	975.128	0.67	653	-6,443	-4,794	-3,956
11 2008			920	507	1,427	2,600.342	2.12	5,513	4,086	2,952	2,389
12 2009			939	507	1,446	2,600.342	2.12	5,513	4,067	2,852	2,264
13 2010			958	507	1,466	2,600.342	2.12	5,513	4,047	2,756	2,146
14 2011			979	507	1,486	2,600.342	2.12	5,513	4,027	2,662	2,034
15 2012			999	507	1,507	2,600.342	2.12	5,513	4,006	2,571	1,927
16 2013			1,021	507	1,528	2,600.342	2.14	5,565	4,037	2,515	1,849
17 2014			1,043	507	1,550	2,600.342	2.14	5,565	4,014	2,429	1,751
18 2015			1,066	507	1,573	2,600.342	2.14	5,565	3,992	2,345	1,659
19 2016			1,089	507	1,596	2,600.342	2.14	5,565	3,968	2,263	1,570
20 2017	2,194		1,113	507	3,814	2,600.342	2.14	5,565	1,750	969	660
21 2018			1,138	507	1,645	2,600.342	2.18	5,669	4,023	2,163	1,444
22 2019			1,164	507	1,671	2,600.342	2.18	5,669	3,998	2,086	1,367
23 2020			1,190	507	1,697	2,600.342	2.18	5,669	3,971	2,012	1,293
24 2021			1,217	507	1,725	2,600.342	2.18	5,669	3,944	1,940	1,223
25 2022	3,982		1,245	507	5,735	2,600.342	2.18	5,669	-66	-31	-10
26 2023			1,274	507	1,781	2,600.342	2.20	5,721	3,939	1,827	1,108
27 2024			1,304	507	1,811	2,600.342	2.20	5,721	3,910	1,760	1,047
28 2025			1,334	507	1,842	2,600.342	2.20	5,721	3,879	1,695	990
29 2026			1,366	507	1,873	2,600.342	2.20	5,721	3,848	1,633	935
30 2027			1,398	507	1,906	2,600.342	2.20	5,721	3,815	1,572	883
Total	10,486	27,338	24,562	11,326	73,712			115,985	42,273	17,221	8,537

Sensitivity Analysis

- 1. Tariff Collection Factor FIRR**
 60% N.A
 70% 2.0%
 80% 4.7%
 90% 7.1%
 100% 9.3%

2. Capital Cost(Loan) FIRR

- 1.0 9.3%
 1.1 8.0%
 1.2 6.9%

3. O&M Cost FIRR

- 0.9 9.9%
 1.0 9.3%
 1.2 7.9%
 1.5 5.7%

4. Water Demand FIRR

- 0.8 5.8%
 0.9 7.6%
 1.0 9.3%

FIRR= 9.3%

Table C.3-2 : NPV and FIRR Analysis for Loan (Case C-2) : Moretele 2

(Unit: 000R)

Year	Cost				Benefit			Net Benefit (9)=(8)-(4)	Real Interest Rate and NPV			
	Loan for Bulk CAPEX (1)	Loan for Retail (2)	Bulk O&M Cost (3)	Retail Admin. Cost (4)	Total Cost (5)=(1)+(2)+(3)+(4)	Annual Water Demand (KL) (6)	Tariff (R/KL) (7)		Benefit (8)=(6)x(7)	i=3%	i=5%	i=8%
0 1997						0	0.00	0				
1 1998			0	0	0	0	0.00	0				
2 1999			0	0	0	0	0.00	0				
3 2000			0	0	0	0	0.00	0				
4 2001			0	0	0	0	0.00	0				
5 2002			180	155	335	572,802	0.67	384	49	42	38	33
6 2003	17	110	312	205	644	975,128	0.67	653	9	8	7	6
7 2004	129	661	318	205	1,314	975,128	0.67	653	-660	-537	-469	-385
8 2005	1,439	9,259	325	205	11,228	975,128	0.67	653	-10,575	-8,348	-7,157	-5,713
9 2006	1,904	26,455	331	205	28,895	975,128	0.67	653	-28,242	-21,645	-18,205	-14,128
10 2007	822	9,259	338	205	10,624	975,128	0.67	653	-9,970	-7,419	-6,121	-4,618
11 2008			920	507	1,427	2,600,342	2.97	7,723	6,296	4,548	3,681	2,700
12 2009			939	507	1,446	2,600,342	2.97	7,723	6,277	4,403	3,495	2,493
13 2010			938	507	1,466	2,600,342	2.97	7,723	6,257	4,261	3,318	2,301
14 2011			979	507	1,486	2,600,342	2.97	7,723	6,237	4,123	3,150	2,123
15 2012			999	507	1,507	2,600,342	2.97	7,723	6,216	3,990	2,990	1,960
16 2013			1,021	507	1,528	2,600,342	2.99	7,775	6,247	3,893	2,862	1,823
17 2014			1,043	507	1,550	2,600,342	2.99	7,775	6,225	3,766	2,716	1,682
18 2015			1,066	507	1,573	2,600,342	2.99	7,775	6,202	3,643	2,577	1,552
19 2016			1,089	507	1,596	2,600,342	2.99	7,775	6,179	3,524	2,445	1,432
20 2017	2,194		1,113	507	3,814	2,600,342	2.99	7,775	3,961	2,193	1,493	850
21 2018			1,138	507	1,645	2,600,342	3.03	7,879	6,234	3,951	2,237	1,238
22 2019			1,164	507	1,671	2,600,342	3.03	7,879	6,208	3,240	2,122	1,142
23 2020			1,190	507	1,697	2,600,342	3.03	7,879	6,182	3,132	2,013	1,053
24 2021			1,217	507	1,725	2,600,342	3.03	7,879	6,154	3,028	1,908	971
25 2022	3,982		1,245	507	5,735	2,600,342	3.03	7,879	2,144	1,024	693	313
26 2023			1,274	507	1,781	2,600,342	3.05	7,931	6,150	2,852	1,739	831
27 2024			1,304	507	1,811	2,600,342	3.05	7,931	6,120	2,755	1,639	766
28 2025			1,334	507	1,842	2,600,342	3.05	7,931	6,089	2,662	1,553	706
29 2026			1,366	507	1,873	2,600,342	3.05	7,931	6,058	2,571	1,472	650
30 2027			1,398	507	1,906	2,600,342	3.05	7,931	6,025	2,482	1,394	599
Total	70,486	45,745	24,562	11,320	92,119			160,191	68,072	27,541	13,522	2,580

Sensitivity Analysis

1. Tariff Collection

Factor	FIRR
60%	0.7%
70%	3.2%
80%	5.4%
90%	7.3%
100%	9.1%

2. Capital Cost(Loan)

Factor	FIRR
1.0	9.1%
1.1	7.9%
1.2	6.9%

3. O&M Cost

Factor	FIRR
0.9	9.6%
1.0	9.1%
1.2	8.3%
1.5	7.0%

4. Water Demand

Factor	FIRR
0.8	6.0%
0.9	7.6%
1.0	9.1%

FIRR= 9.1%

C.4 Economic Analysis

I. Conversion Factor and Calculated Project Cost

Project cost which is use for economic analysis must be based on the economic price, which under perfect market circumstance without any transfer expenses such as tax.

Unskilled labour cost and fuel is assumed to be differing from the economic price in the project cost.

1. Labour Conversion Factor (LCF)

$$\text{LCF} = 30\%$$

(1) Unemployment Rate

	Economic Active Population	Unemployment	Unemployment Rate				
			Total	Black	Coloured	Indians	White
North West	973,000	325,000	33.4%	37.4%	17.6%	12.6%	7.9%
Mpmalanga	1,147,000	376,000	32.8%	35.8%	27.8%	4.4%	6.0%

"Source: 1995 October Household Survey (OHS), CSS"

(2) Wage of Labour 1303 R/month

(1997 Feb. Current Price. Average Salaries and Wages and Bonuses per Month)

"Source: Labour Statistics. Employment and salaries and wages, CSS P0242.1, June 1997"

(3) Shadow Wage (Opportunity Cost) of Unskilled Labour

Labour intensive construction, as RDP project will maximise community Labour resources. Under this high unemployment circumstance, marginal cost of labour is assumed very low.

Opportunity cost of labour is estimated by economic value of domestic work as below.

Domestic Work Salaries 550R/month

Unemployed is assumed to do economic activity 5days out of 7days

$$550 \times 5/7 = 392.86 \text{ R/month}$$

(4) Labour Conversion Factor (LCF)

LCF is calculated as below

$$\text{Shadow Wage} / \text{Nominal Wage}$$

$$392.86/1303 = 30\%$$

2. Fuel Conversion Factor (FCF)

Nominal Fuel Cost including tax duty and levy and it is estimated 30% of consumer prices.

Fuel Conversion Factor (FCF) which convert nominal price to the economic price is calculated as below

$$\text{FCF} = 70\%$$

Calculated project cost is estimated preliminary following the manner as below.

- 1) Breakdown Direct Construction Cost of each infrastructural component into four components as a) Labour, b) Material, c) Plant and d) Fuel in the same process of price adjustment formula of civil (RDP) contract.
- 2) Convert cost of unskilled labour and fuel using LCF and FCF respectively.
- 3) Calculate project cost with the multiplier.

2. Economic Benefit

Under the principle of "With" and "Without" project applied in the economic analysis, an economic benefit for Case C is measured as saving of cost for labour to be required for water cartage between residence and standpipe. In the level of yard-connection, a beneficiary is planned to consume 73 ltr or 467 liters per day per household consisting of 6.8 members on the average. Usually, community people use a polyethylene container with capacity of 20 liters and wheelbarrow for water cartage. Assuming two containers can be loaded in a wheelbarrow, it requires about 12 times round trip with average distance of 100 meters, requiring 15 minutes per trip or 180 minutes (3 hours) per day. On the other hand, it is reported that a daily unskilled labour costs around R4 to 5 per hour in rural communities, which is converted as the economic value at R1.2 to 1.5 per hour applying the labour conversion factor (LCF) as mentioned in the above. Thus, the economic benefit of the project can be worked out R3.6 per day or R108 per month per beneficial household.

Table C.4-1 : Direct Construction Cost Breakdown and Converted Cost : Moretele 2

Direct Cost Breakdown

(Unit: ,000Rand)

Item	Total	Labour				Materials		Plant		Fuel	
		amount	%	(Skilled)	Unskilled	amount	%	amount	%	amount	%
Case A	87,591	22,206				17,783		40,901		6,702	
Bulk	59,418	14,933				13,557		25,634		3,293	
- Intake and Pump Station	303	76	25%	61	15	45	15%	167	55%	15	5%
- Raw Water Pipeline	56	14	25%	11	3	14	25%	22	40%	6	10%
- WTW and Pump Station	10,290	2,573	25%	2,058	515	1,544	15%	5,660	55%	515	5%
- Bulk Supply Pipelines	46,385	11,596	25%	4,639	6,958	11,596	25%	18,554	40%	4,639	10%
- Regional Reservoirs	1,600	480	30%	384	96	240	15%	800	50%	80	5%
- Pump Stations	784	196	25%	157	39	118	15%	431	55%	39	5%
Retail	28,173	7,272				4,226		15,267		1,409	
- Service Reservoir	4,565	1,370	30%	1,096	274	685	15%	2,283	50%	228	5%
- Reticulation Pipelines	22,738	5,685	25%	1,137	4,548	3,411	15%	12,506	55%	1,137	5%
- Standpipes	870	218	25%	44	174	131	15%	479	55%	44	5%
Yard Connection											
Case B	119,870	31,352				23,007		59,620		8,443	
Bulk	61,962	15,671				13,938		26,933		3,420	
- Intake and Pump Station	454	114	25%	91	23	68	15%	250	55%	23	5%
- Raw Water Pipeline	56	14	25%	11	3	14	25%	22	40%	6	10%
- WTW and Pump Station	10,290	2,573	25%	2,058	515	1,544	15%	5,660	55%	515	5%
- Bulk Supply Pipelines	46,385	11,596	25%	4,639	6,958	11,596	25%	18,554	40%	4,639	10%
- Regional Reservoirs	3,600	1,080	30%	864	216	540	15%	1,800	50%	180	5%
- Pump Stations	1,177	294	25%	235	59	177	15%	647	55%	59	5%
Retail	42,438	11,814				6,749		24,179		2,250	
- Service Reservoir	11,320	3,396	30%	2,717	679	1,698	15%	5,660	50%	566	5%
- Reticulation Pipelines	32,998	8,250	25%	1,650	6,600	4,950	15%	18,149	55%	1,650	5%
- Standpipes	672	168	25%	34	134	101	15%	370	55%	34	5%
Yard Connection	15,470	3,868	25%	774	3,094	2,321	15%	8,509	55%	774	5%

Converted Direct Cost

Item	Total	Labour				Materials		Plant		Fuel	
		amount	%	(Skilled)	Unskilled	amount	%	amount	%	amount	%
Conversion Factor				100%	30%	100%		100%		70%	
Case A	76,746	13,371				17,783		40,901		4,691	
Bulk	52,492	9,597				13,557		25,634		3,705	
- Intake and Pump Station	288	65	25%	61	5	45	15%	167	55%	11	5%
- Raw Water Pipeline	52	12	25%	11	1	14	25%	22	40%	4	10%
- WTW and Pump Station	9,776	2,212	25%	2,058	154	1,544	15%	5,660	55%	360	5%
- Bulk Supply Pipelines	40,123	6,726	25%	4,639	2,087	11,596	25%	18,554	40%	3,247	10%
- Regional Reservoirs	1,509	413	30%	384	29	240	15%	800	50%	56	5%
- Pump Stations	745	169	25%	157	12	118	15%	431	55%	27	5%
Retail	24,254	3,775				4,226		15,267		986	
- Service Reservoir	4,305	1,178	30%	1,096	82	685	15%	2,283	50%	160	5%
- Reticulation Pipelines	19,214	2,501	25%	1,137	1,364	3,411	15%	12,506	55%	796	5%
- Standpipes	735	96	25%	44	52	131	15%	479	55%	30	5%
Yard Connection											
Case B	107,093	18,556				23,007		59,620		5,910	
Bulk	54,895	10,230				13,938		26,933		3,794	
- Intake and Pump Station	431	98	25%	91	7	68	15%	250	55%	16	5%
- Raw Water Pipeline	52	12	25%	11	1	14	25%	22	40%	4	10%
- WTW and Pump Station	9,776	2,212	25%	2,058	154	1,544	15%	5,660	55%	360	5%
- Bulk Supply Pipelines	40,123	6,726	25%	4,639	2,087	11,596	25%	18,554	40%	3,247	10%
- Regional Reservoirs	3,395	929	30%	864	65	540	15%	1,800	50%	126	5%
- Pump Stations	1,118	253	25%	235	18	177	15%	647	55%	41	5%
Retail	39,126	6,624				6,749		24,179		1,575	
- Service Reservoir	10,675	2,921	30%	2,717	204	1,698	15%	5,660	50%	396	5%
- Reticulation Pipelines	27,883	3,630	25%	1,650	1,980	4,950	15%	18,149	55%	1,155	5%
- Standpipes	568	74	25%	34	40	101	15%	370	55%	24	5%
Yard Connection	13,072	1,702	25%	774	928	2,321	15%	8,509	55%	541	5%

Table C.4-2 : Calculated Project Cost at 1997 Constant Price : Moretele 2 (1/2)

(Unit: 000Rand)

Item	total	1	2	3	4	5	
		1998	1999	2000	2001	2002	
Case A Total	113,379	441	3,173	33,315	56,379	20,271	
Bulk							
(1)Direct Calculated Cost	52,492	-	-	17,941	26,076	8,475	
(2)P&G (1)x 15%	7,874	-	-	2,691	3,911	1,271	
(3)Base Cost (1)+(2)	60,366	-	-	20,632	29,987	9,747	
(4)Engineering Fee (3)x 10%	6,037	-	1,509	1,509	1,509	1,509	
(5)Miscellaneous (1)x 2%	1,050	-	525	525	-	-	
(6)Institutional Developme (3)x 2.5%	1,509	302	302	302	302	302	
(7)Sub-Total (3)+(4)+(5)+(6)	68,962	302	2,336	22,968	31,798	11,558	
(8)Physical Contingency (3)x 15%	9,055	-	-	3,095	4,498	1,462	
Grand Total	78,017	302	2,336	26,063	36,297	13,020	
Retail							
(1)Direct Calculated Cost	24,254	-	-	4,851	14,552	4,851	
(2)P&G (1)x 15%	3,638	-	-	728	2,183	728	
(3)Base Cost (1)+(2)	27,892	-	-	5,578	16,735	5,578	
(4)Engineering Fee (3)x 10%	2,789	-	697	697	697	697	
(5)Miscellaneous	-	-	-	-	-	-	
(6)Institutional Support (3)x 2.5%	697	139	139	139	139	139	
(7)Sub-Total (3)+(4)+(5)+(6)	31,378	139	837	6,415	17,572	6,415	
(8)Physical Contingency (3)x 15%	4,184	-	-	837	2,510	837	
Grand Total	35,562	139	837	7,252	20,082	7,252	
Case B Total	152,028	541	3,793	41,569	78,113	28,013	
Bulk							
(1)Direct Calculated Cost	54,895	-	-	18,762	27,206	8,927	
(2)P&G (1)x 15%	8,234	-	-	2,814	4,081	1,339	
(3)Base Cost (1)+(2)	63,129	-	-	21,577	31,287	10,266	
(4)Engineering Fee (3)x 10%	6,313	-	1,578	1,578	1,578	1,578	
(5)Miscellaneous (1)x 2%	1,098	-	549	549	-	-	
(6)Institutional Developme (3)x 2.5%	1,578	316	316	316	316	316	
(7)Sub-Total (3)+(4)+(5)+(6)	72,118	316	2,443	24,019	33,180	12,160	
(8)Physical Contingency (3)x 15%	9,469	-	-	3,236	4,693	1,540	
Grand Total	81,588	316	2,443	27,256	37,873	13,700	
Retail							
(1)Direct Calculated Cost	39,126	-	-	7,825	23,476	7,825	
(2)P&G (1)x 15%	5,869	-	-	1,174	3,521	1,174	
(3)Base Cost (1)+(2)	44,995	-	-	8,999	26,997	8,999	
(4)Engineering Fee (3)x 10%	4,499	-	1,125	1,125	1,125	1,125	
(5)Miscellaneous	-	-	-	-	-	-	
(6)Institutional Support (3)x 2.5%	1,125	225	225	225	225	225	
(7)Sub-Total (3)+(4)+(5)+(6)	50,619	225	1,350	10,349	28,347	10,349	
(8)Physical Contingency (3)x 15%	6,749	-	-	1,350	4,050	1,350	
Grand Total	57,368	225	1,350	11,699	32,396	11,699	
Yard Connection							
(1)Direct Calculated Cost	13,072	-	-	2,614	7,843	2,614	
Grand Total	13,072	-	-	2,614	7,843	2,614	
Level B-A							
Bulk		3,571	14	107	1,193	1,577	680
Retail		21,807	86	513	4,447	12,314	4,447
Yard Connection		13,072	-	-	2,614	7,843	2,614
Total		38,450	99	620	8,254	21,734	7,742

Table C.4-2 : Calculated Project Cost at 1997 Constant Price : Moretele 2 (2/2)

(Unit: ,000Rand)

Item		Total	6	7	8	9	10
			2003	2004	2005	2006	2007
Case B-A(Higher Service Portion)		38,450	99	620	8,254	21,734	7,742
Bulk	(1)Direct Calculated Cost	2,403	-	-	821	1,130	452
	(2)P&G (1)x 15%	360	-	-	123	169	68
	(3)Base Cost (1)+(2)	2,763	-	-	944	1,299	520
	(4)Engineering Fee (3)x 10%	276	-	69	69	69	69
	(5)Miscellaneous	48	-	24	24	-	-
	(6)Institutional Developme (3)x 2.5%	69	14	14	14	14	14
	(7)Sub-Total (3)+(4)+(5)+(6)	3,157	14	107	1,051	1,382	603
	(8)Physical Contingency (3)x 15%	414	-	-	142	195	78
Grand Total	3,571	14	107	1,193	1,577	680	
Retail	(1)Direct Calculated Cost	14,872	-	-	2,974	8,923	2,974
	(2)P&G (1)x 15%	2,231	-	-	446	1,339	446
	(3)Base Cost (1)+(2)	17,103	-	-	3,421	10,262	3,421
	(4)Engineering Fee (3)x 10%	1,710	-	428	428	428	428
	(5)Miscellaneous	-	-	-	-	-	-
	(6)Institutional Support (3)x 2.5%	428	86	86	86	86	86
	(7)Sub-Total (3)+(4)+(5)+(6)	19,241	86	513	3,934	10,775	3,934
	(8)Physical Contingency (3)x 15%	2,565	-	-	513	1,539	513
Grand Total	21,807	86	513	4,447	12,314	4,447	
Yard Connection	(1)Direct Calculated Cost	13,072	-	-	2,614	7,843	2,614
Grand Total	13,072	-	-	2,614	7,843	2,614	

Table C.4-3 : EIRR Analysis (Case C) : Moretele 2

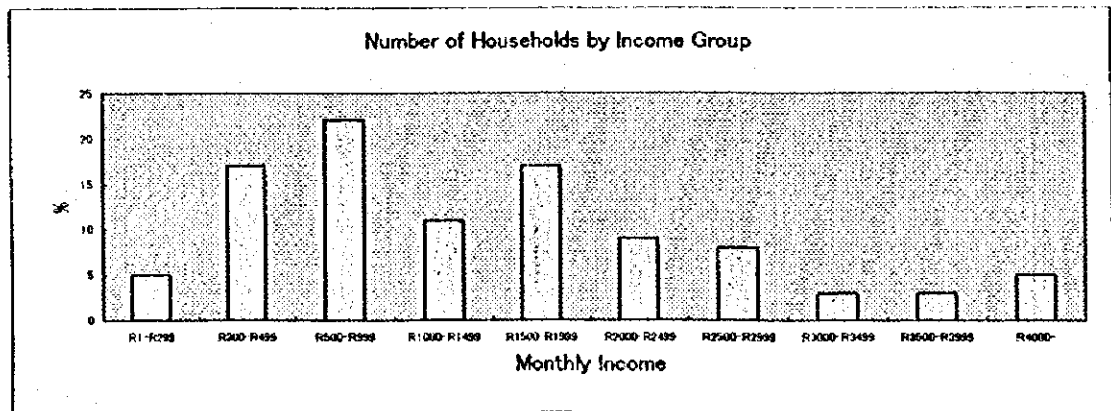
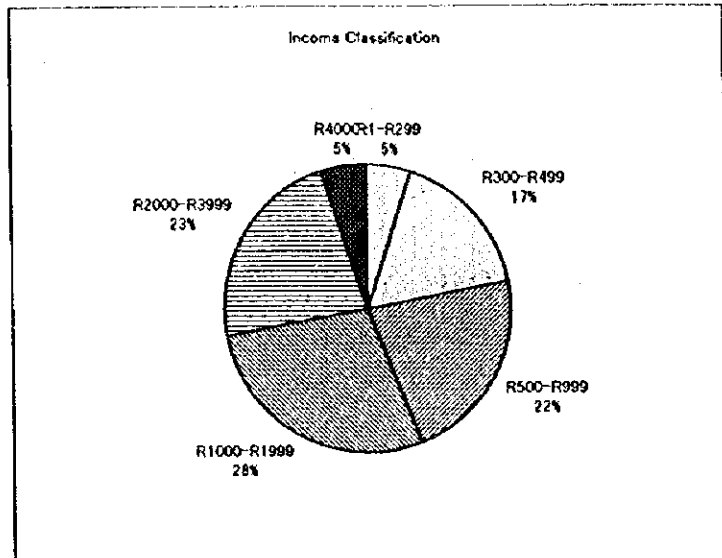
(Unit: 000R)

Year	Calculated Cost				Benefit			Net Benefit	Real Interest Rate and NPV		
	CAPEX (1)	Bulk O&M Cost (2)	Retail Admin. Cost (3)	Total Cost (4)=(1)+(2)+(3)	Higher Service Beneficiaries (Household) (5)	Economic Value of Cartage (R/month) (6)	Benefit (8)=(5)x(6)x12m		i=3%	i=5%	i=8%
0 1997					0	108	0	0			
1 1998	441	0	0	441	0	108	0	(441)	(428)	(409)	
2 1999	3,173	0	0	3,173	0	108	0	(3,173)	(2,991)	(2,720)	
3 2000	33,315	0	0	33,315	0	108	0	(33,315)	(30,488)	(26,446)	
4 2001	56,379	0	0	56,379	0	108	0	(56,379)	(50,092)	(41,440)	
5 2002	20,271	0	0	20,271	0	108	0	(20,271)	(17,486)	(13,796)	
6 2003	99	0	0	99	0	108	0	(99)	(83)	(63)	
7 2004	620	0	0	620	0	108	0	(620)	(504)	(362)	
8 2005	8,254	0	0	8,254	0	108	0	(8,254)	(6,516)	(4,460)	
9 2006	21,734	0	0	21,734	0	108	0	(21,734)	(16,658)	(10,873)	
10 2007	7,742	0	0	7,742	0	108	0	(7,742)	(5,761)	(3,886)	
11 2008		920	507	1,427	14,733	108	19,094	17,667	12,763	10,330	
12 2009		939	507	1,446	14,733	108	19,094	17,648	12,378	9,827	
13 2010		958	507	1,466	14,733	108	19,094	17,628	12,004	9,349	
14 2011		979	507	1,486	14,733	108	19,094	17,608	11,641	8,893	
15 2012		999	507	1,507	14,733	108	19,094	17,587	11,289	8,460	
16 2013		1,021	507	1,528	14,733	108	19,094	17,566	10,946	8,047	
17 2014		1,043	507	1,550	14,733	108	19,094	17,544	10,614	7,654	
18 2015		1,066	507	1,573	14,733	108	19,094	17,521	10,292	7,280	
19 2016		1,089	507	1,596	14,733	108	19,094	17,498	9,979	6,924	
20 2017		1,113	507	1,621	14,733	108	19,094	17,473	9,675	6,586	
21 2018		1,138	507	1,645	14,733	108	19,094	17,449	9,379	6,263	
22 2019		1,164	507	1,671	14,733	108	19,094	17,423	9,093	5,956	
23 2020		1,190	507	1,697	14,733	108	19,094	17,397	8,815	5,664	
24 2021		1,217	507	1,725	14,733	108	19,094	17,369	8,545	5,386	
25 2022		1,245	507	1,753	14,733	108	19,094	17,341	8,282	5,121	
26 2023		1,274	507	1,781	14,733	108	19,094	17,313	8,028	4,869	
27 2024		1,304	507	1,811	14,733	108	19,094	17,283	7,781	4,629	
28 2025		1,334	507	1,842	14,733	108	19,094	17,252	7,541	4,401	
29 2026		1,366	507	1,873	14,733	108	19,094	17,221	7,308	4,184	
30 2027		1,398	507	1,906	14,733	108	19,094	17,188	7,081	3,977	
Total	152,028	22,758	10,146	184,933			381,879	196,947	62,426	14,592	
										(24,525)	

Figure C.5-1: Income Classification :Moretele 2

1. Monthly Household Income

Income	%	Average (R/month)
R1-R299	5%	146
R300-R499	17%	393
Lower	22%	337
R500-R999	22%	710
R1000-R1995	28%	1,530
Middle	50%	1179
R2000-R3995	23%	2,583
R4000-	5%	4,260
Higher	28%	2,882
Total	100%	1,466



2. Household Income by Occupation

Income	Total	Employee	Dom. Work	Worker	Self Empl.	Gen. Lab	Teacher	Pensioner	Other
R1-R299	5	1	1	0	1	0		0	2
R300-R499	17	1	1	1	2	0		12	0
Lower	22	2	2	1	3	0	0	12	2
R500-R999	22	4	2	2	2	0		10	2
R1000-R1995	28	22	0	2	3	1	0		
Middle	50	26	2	4	5	1	0	10	2
R2000-R3995	23	14		2		5	2		
R4000-	5	4				1	0		
Higher	28	18	0	2	0	6	2	0	0
Total	100	46	4	7	8	7	2	22	4

Source: Questioner Survey by JICA Study Team (1997)

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