APPENDIX 3

Details of calculations for maintenance and operation costs

LOMAHASHA WATER SUPPLY SYSTEM

OPTION 1: INTAKE AT NKALASHANE RIVER

ENERGY COSTS: Large Commercial Tariff

ELECTRICITY	Rate	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
Facility Charge	R/Month	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	17 968.56
	1 497.38													
Energy Charge	R/kWh	44 610.39	46 097.41	44 610.39	46 097.41	46 097.41	44 610.39	46 097.41	44 610.39	46 097.41	46 097.41	41 636.37	46 097.41	542 759.80
	0.5415													
Demand Charge	R/kVA													
	90.92	11 028.60	11 028.60	11 028.60	11 028.60	11 028.60	11 028.60	11 028.60	11 028.60	11 028.60	11 028.60	11 028.60	11 028.60	132 343.15
Access Charge	R/kVA													
	40.88	4 958.74	4 958.74	4 958.74	4 958.74	4 958.74	4 958.74	4 958.74	4 958.74	4 958.74	4 958.74	4 958.74	4 958.74	59 504.93
TOTAL		**62 095.11**	**63 582.13**	**62 095.11**	**63 582.13**	**63 582.13**	**62 095.11**	**63 582.13**	**62 095.11**	**63 582.13**	**63 582.13**	**59 121.09**	**63 582.13**	**756 683.24**

Description		April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
	Days	30	31	30	31	31	30	31	30	31	31	28	31	365
Power Requirement (kW)														
Main Pump Station		151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	151.6	
Lomahasha		98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	
Ka-Shewula		24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
Total		274.61	274.61	274.61	274.61	274.61	274.61	274.61	274.61	274.61	274.61	274.61	274.61	
Operating hrs	10hrs/day	10	10	10	10	10	10	10	10	10	10	10	10	
Operating hours/ month		300	310	300	310	310	300	310	300	310	310	280	310	3650
Maximum Demand	kVA	121.3	121.3	121.3	121.3	121.3	121.3	121.3	121.3	121.3	121.3	121.3	121.3	
Energy Use	kW-hr	**82383**	**85129.1**	**82383**	**85129.1**	**85129.1**	**82383**	**85129.1**	**82383**	**85129.1**	**85129.1**	**76890.8**	**85129.1**	**1002326.5**

LOMAHASHA WATER SUPPLY SYSTEM
OPTION 1: INTAKE AT NKALASHANE RIVER

SUMMARY - ADMINISTRATION COSTS

	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
Salary - Operators	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	84 000.00
Salary - Security	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	63 000.00
Salary - Supervisor	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	60 000.00
Transport	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	180 000.00
Tools	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	6 000.00
Stationery/Sundry	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	6 000.00
Chemicals	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	60 000.00
TOTAL	**38 250.00**	**38 250.00**	**38 250.00**	**38 250.00**	**38 250.00**	**38 250.00**	**38 250.00**	**38 250.00**	**38 250.00**	**38 250.00**	**38 250.00**	**38 250.00**	**459 000.00**

	Daily Rate	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
		30	31	30	31	31	30	31	30	31	31	28	31	365
Pump operator		7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	84 000.00
Supervisor		5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	60 000.00
Security		5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	63 000.00
TOTAL		**17 250.00**	**17 250.00**	**17 250.00**	**17 250.00**	**17 250.00**	**17 250.00**	**17 250.00**	**17 250.00**	**17 250.00**	**17 250.00**	**17 250.00**	**17 250.00**	**207 000.00**

LOMAHASHA WATER SUPPLY SYSTEM
OPTION 1: INTAKE AT NKALASHANE RIVER

MAINTENANCE COSTS

Equipment	Life Cyle (Years)	Annual O&M costs as a % of Capital Costs	Estimated Cost	Annual Maintenance Cost
WATER PIPELINES	20	1	R 7 373 900.00	R 73 739.00
CONSTRUCTION OF BALANCING DAM	45	1	R 5 785 650.00	R 57 856.50
CLEAR WATER PUMP HOUSE	50	1	R 325 933.00	R 3 259.33
CLEAR WATER PUMP MECHANICAL & ELECTRICAL	15	5	R 823 050.00	R 41 152.50
BOOSTER PUMP STATION CIVIL WORKS	50	1	R 839 559.00	R 8 395.59
BOOSTER PUMP MECHANICAL AND ELECTRICAL	15	5	R 2 021 050.00	R 101 052.50
WATER TREATMENT WORKS	25	1	R 11 100 000.00	R 111 000.00
CONSTRUCTION OF SUMPS	50	1	R 1 365 931.75	R 13 659.32
STORAGE RESERVOIRS	50	1	R 3 561 220.50	R 35 612.21
				R 445 726.94

LOMAHASHA WATER SUPPLY SYSTEM

OPTION 2: NEW INTAKE AT MBULUZI RIVER

ENERGY COSTS: Large Commercial Tariff

ELECTRICITY	Rate	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
Facility Charge	R/Month	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	17 968.56
	1 497.38													
Energy Charge	R/kWh	74 887.83	77 384.09	74 887.83	77 384.09	77 384.09	74 887.83	77 384.09	74 887.83	77 384.09	77 384.09	69 895.30	77 384.09	911 135.21
	0.5415													
Demand Charge	R/kVA													
	90.92	11 910.52	11 910.52	11 910.52	11 910.52	11 910.52	11 910.52	11 910.52	11 910.52	11 910.52	11 910.52	11 910.52	11 910.52	142 926.24
Access Charge	R/kVA													
	40.88	5 355.28	5 355.28	5 355.28	5 355.28	5 355.28	5 355.28	5 355.28	5 355.28	5 355.28	5 355.28	5 355.28	5 355.28	64 263.36
TOTAL		**93 651.01**	**96 147.27**	**93 651.01**	**96 147.27**	**96 147.27**	**93 651.01**	**96 147.27**	**93 651.01**	**96 147.27**	**96 147.27**	**88 658.48**	**96 147.27**	**1 136 293.37**

Description		April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
	Days	30	31	30	31	31	30	31	30	31	31	28	31	365
Power Requirement (kW)														
Raw water Pump		29.36	29.36	29.36	29.36	29.36	29.36	29.36	29.36	29.36	29.36	29.36	29.36	
Main Pump Station		164.12	164.12	164.12	164.12	164.12	164.12	164.12	164.12	164.12	164.12	164.12	164.12	
Nduma Station		144.5	144.5	144.5	144.5	144.5	144.5	144.5	144.5	144.5	144.5	144.5	144.5	
Lomahasha		98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	
Ka-Shewula		24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
Total		460.99	460.99	460.99	460.99	460.99	460.99	460.99	460.99	460.99	460.99	460.99	460.99	
Operating hrs	10hrs/day	10	10	10	10	10	10	10	10	10	10	10	10	
Operating hours/ month		300	310	300	310	310	300	310	300	310	310	280	310	3650
Maximum Demand	kVA	131	131	131	131	131	131	131	131	131	131	131	131	
Energy Use	kW-hr	**138297**	**142906.9**	**138297**	**142906.9**	**142906.9**	**138297**	**142906.9**	**138297**	**142906.9**	**142906.9**	**129077.2**	**142906.9**	**1682613.5**

LOMAHASHA WATER SUPPLY SYSTEM

OPTION 2: NEW INTAKE AT MBULUZI RIVER

SUMMARY - ADMINISTRATION COSTS

	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
Salary - Operators	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	84 000.00
Salary - Security	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	84 000.00
Salary - Supervisor	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	60 000.00
Transport	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	180 000.00
Tools	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	6 000.00
Stationery/Sundry	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	6 000.00
Chemicals	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	60 000.00
TOTAL	**40 000.00**	**40 000.00**	**40 000.00**	**40 000.00**	**40 000.00**	**40 000.00**	**40 000.00**	**40 000.00**	**40 000.00**	**40 000.00**	**40 000.00**	**40 000.00**	**480 000.00**

	Daily Rate	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
		30	31	30	31	31	30	31	30	31	31	28	31	365
Pump operator		7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	84 000.00
Supervisor		3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	45 600.00
Security		5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	60 000.00
TOTAL		**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**189 600.00**

LOMAHASHA WATER SUPPLY SYSTEM
OPTION 2: NEW INTAKE AT MBULUZI RIVER

MAINTENAANCE COSTS

Equipment	Life Cyle Years	Annual O&M costs as a % of Capital Costs	Estimated Cost	Annual Maintenance Cost
SECTION 3: WATER PIPELINES	25	1	R 11 061 000.00	R 110 610.00
SECTION 5: RAW WATER INTAKE	15	1	R 1 056 300.00	R 10 563.00
HOUSE	15	1	R 325 933.00	R 3 259.33
SECTION 7: CLEAR WATER PUMPS	25	5	R 823 050.00	R 41 152.50
STATION CIVIL WORKS	25	1	R 839 559.00	R 8 395.59
SECTION 9: BOOSTER PUMPS	25	5	R 2 521 050.00	R 126 052.50
WORKS		1	R 11 100 000.00	R 111 000.00
SUMPS		1	R 1 365 931.75	R 13 659.32
RESERVOIRS		1	R 3 561 220.50	R 35 612.21
TOTAL				R 460 304.44

LOMAHASHA WATER SUPPLY SYSTEM

OPTION 3: CONNECTION TO EXISTING SYSTEM IN SIMUNYE

ENERGY COSTS: Large Commercial Tariff

ELECTRICITY	Rate	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
Facility Charge	R/Month	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	1 497.38	17 968.56
	1 497.38													
Energy Charge	R/kWh	70 911.05	73 274.75	70 911.05	73 274.75	73 274.75	70 911.05	73 274.75	70 911.05	73 274.75	73 274.75	66 183.65	73 274.75	862 751.10
	0.5415													
Demand Charge	R/kVA													
	90.92	12 274.20	12 274.20	12 274.20	12 274.20	12 274.20	12 274.20	12 274.20	12 274.20	12 274.20	12 274.20	12 274.20	12 274.20	147 290.40
Access Charge	R/kVA													
	40.88	5 518.80	5 518.80	5 518.80	5 518.80	5 518.80	5 518.80	5 518.80	5 518.80	5 518.80	5 518.80	5 518.80	5 518.80	66 225.60
TOTAL		**90 201.43**	**92 565.13**	**90 201.43**	**92 565.13**	**92 565.13**	**90 201.43**	**92 565.13**	**90 201.43**	**92 565.13**	**92 565.13**	**85 474.03**	**92 565.13**	**1 094 235.66**

Description		April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
	Days	30	31	30	31	31	30	31	30	31	31	28	31	365
Power Requirement (kW)														
Nduma Station		144.5	144.5	144.5	144.5	144.5	144.5	144.5	144.5	144.5	144.5	144.5	144.5	
Lomahasha Station		98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	98.24	
Ka-Shewula Station		24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	24.77	
Increase on existing system		169.00	169.00	169.00	169.00	169.00	169.00	169.00	169.00	169.00	169.00	169.00	169.00	
Total		436.51	436.51	436.51	436.51	436.51	436.51	436.51	436.51	436.51	436.51	436.51	436.51	
Operating hrs	10hrs/day	10	10	10	10	10	10	10	10	10	10	10	10	
Operating hours/ month		300	310	300	310	310	300	310	300	310	310	280	310	3650
Maximum Demand	kVA	135	135	135	135	135	135	135	135	135	135	135	135	
Energy Use	kW-hr	**130953**	**135318.1**	**130953**	**135318.1**	**135318.1**	**130953**	**135318.1**	**130953**	**135318.1**	**135318.1**	**122222.8**	**135318.1**	**1593261.5**

LOMAHASHA WATER SUPPLY SYSTEM

OPTION 3: CONNECTION TO EXISTING SYSTEM IN SIMUNYE

SUMMARY - ADMINISTRATION COSTS

	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
Salary - Operators	3 500.00	3 500.00	3 500.00	3 500.00	3 500.00	3 500.00	3 500.00	3 500.00	3 500.00	3 500.00	3 500.00	3 500.00	42 000.00
Salary - Security	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	5 250.00	63 000.00
Salary - Supervisor	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	60 000.00
Transport	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	15 000.00	180 000.00
Tools	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	6 000.00
Stationery/Sundry	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	500.00	6 000.00
Chemicals	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	60 000.00
TOTAL	**34 750.00**	**34 750.00**	**34 750.00**	**34 750.00**	**34 750.00**	**34 750.00**	**34 750.00**	**34 750.00**	**34 750.00**	**34 750.00**	**34 750.00**	**34 750.00**	**417 000.00**

	Daily Rate	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Febr	March	TOTAL
		30	31	30	31	31	30	31	30	31	31	28	31	365
Pump operator		7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	7 000.00	84 000.00
Supervisor		3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	3 800.00	45 600.00
Security		5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	5 000.00	60 000.00
TOTAL		**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**15 800.00**	**189 600.00**

LOMAHASHA WATER SUPPLY SYSTEM
OPTION 3: CONNECTION TO EXISTING SYSTEM IN SIMUNYE

MAINTENAANCE COSTS

Equipment	Life Cyle Years	Annual O&M costs as a % of Capital Costs	Estimated Cost	Annual Maintenance Cost
WATER PIPELINES		1	R 19 320 900.00	R 193 209.00
BOOSTER PUMP STATION CIVIL WORKS		1	R 839 559.00	R 8 395.59
BOOSTER PUMPS	15	5	R 2 521 050.00	R 126 052.50
CONSTRUCTION OF SUMPS	15	1	R 1 365 931.75	R 13 659.32
RESERVOIRS	25	1	R 3 561 220.50	R 35 612.21
RESEROIRS	25	1	R 1 355 356.50	R 13 553.57
TOTAL				**R 197 273.18**