

### Water Project Calculations

(All prices are in Tsh)

Total Cost \$95,243,812  
U.S. \$ 70,550.97

#### Universal Costs

	No. Needed	Price	Subtotals W/o VAT	VAT	Total w/ VAT	Total cost of VAT
<a href="#">Grundfos.pdf</a>						
Pump	1	\$11,371,000	\$11,371,000	18%	\$13,417,780	\$2,046,780
Air valves	3	\$100,000	\$300,000	18%	\$354,000	\$54,000
Tank Material	1	\$25,000,000	\$25,000,000	18%	\$29,500,000	\$4,500,000
Tank Labor	1	\$0	\$0	0%	\$0	\$0
Pump house	1	\$3,000,000	\$3,000,000	18%	\$3,540,000	\$540,000
House for watcher	1	\$15,000,000	\$15,000,000	18%	\$17,700,000	\$2,700,000
Well rings	2	\$600,000	\$1,200,000	18%	\$1,416,000	\$216,000
Digging well	1	\$0	\$0	0%	\$0	\$0
Saddle	3	\$7,500	\$22,500	18%	\$26,550	\$4,050
2in pipe return from tank	4	\$600,000	\$2,400,000	18%	\$2,832,000	\$432,000
2in st. connector	4	\$8,500	\$34,000	18%	\$40,120	\$6,120
Plumbing Connections	1	\$902,500	\$902,500	18%	\$1,064,950	\$162,450
		\$0	\$0	18%	\$0	\$0
<b>Subtotal</b>			<b>\$59,230,000</b>		<b>\$69,891,400</b>	<b>\$10,661,400</b>

#### Power from Dispensary using Close plot

	Distance	Total Cost	No. Needed	Cost	Subtotals W/o VAT	VAT	Total w/ VAT	Total cost of VAT
		<b>\$ 95,243,812.00</b>					\$ 108,910,132	
Pipe Pump to tank	1446	16 \$	900,000 \$	14,400,000 \$	18%	16,992,000 \$	2,592,000 \$	
Power	792	16 \$	18,355,812 \$	18,355,812 \$	0%	18,355,812 \$	- \$	
Worker labor	1446	96.4 \$	10,000 \$	964,000 \$	0%	964,000 \$	- \$	
Straight Connectors	1446	14 \$	25,000 \$	350,000 \$	18%	413,000 \$	63,000 \$	
Pipe Lake to Well	140	24 \$	81,000 \$	1,944,000 \$	18%	2,293,920 \$	349,920 \$	
<b>Variable Total</b>				<b>\$ 36,013,812</b>		<b>\$ 39,018,732</b>	<b>\$ 3,004,920</b>	

Well meters  
6 feet  
3.28 feet  
19.68  
feet per section  
4 sections needed  
5

#### Power from Dispensary using Close plot Tank on LIA

	Distance	Total Cost	No. Needed	Cost	Subtotals W/o VAT	VAT	Total w/ VAT	Total cost of VAT
		<b>\$ 94,790,478.67</b>					\$ 108,433,399	
Pipe Pump to tank	961	11 \$	900,000 \$	9,900,000 \$	18%	11,682,000 \$	1,782,000 \$	
Power	792	16 \$	18,355,812 \$	18,355,812 \$	0%	18,355,812 \$	- \$	
Worker labor	961	64.07 \$	10,000 \$	640,667 \$	0%	640,667 \$	- \$	
Straight Connectors	961	9 \$	25,000 \$	225,000 \$	18%	265,500 \$	40,500 \$	
Pipe Lake to Well	140	24 \$	81,000 \$	1,944,000 \$	18%	2,293,920 \$	349,920 \$	
Surface Pump	0	1 \$	7,000,000 \$	7,000,000 \$	18%	8,260,000 \$	1,260,000 \$	
Booster Pump	0	1 \$	11,300,000 \$	11,300,000 \$	18%	13,334,000 \$	2,034,000 \$	
<b>Variable Total</b>				<b>\$ 49,365,479</b>		<b>\$ 54,831,899</b>	<b>\$ 5,466,420</b>	

#### Using NTC to place the pump

	Distance	Total Cost	No. Needed	Cost	Subtotals W/o VAT	VAT	Total w/ VAT	Total cost of VAT
		<b>\$ 83,740,013.00</b>					\$ 98,422,253	
Pipe Pump to tank	1890	20 \$	900,000 \$	18,000,000 \$	18%	21,240,000 \$	3,240,000 \$	
Power	30	0 \$	912,013 \$	912,013 \$	0%	912,013 \$	- \$	
Worker labor	1890	126.00 \$	10,000 \$	1,260,000 \$	0%	1,260,000 \$	- \$	
Straight Connectors	1890	18 \$	25,000 \$	450,000 \$	18%	531,000 \$	81,000 \$	
Pipe Lake to Well	284	48 \$	81,000 \$	3,888,000 \$	18%	4,587,840 \$	699,840 \$	
<b>Variable Total</b>				<b>\$ 24,510,013</b>		<b>\$ 28,530,853</b>	<b>\$ 4,020,840</b>	

#### Using Mzee to place the pump

	Distance	Total Cost	No. Needed	Cost	Subtotals W/o VAT	VAT	Total w/ VAT	Total cost of VAT
		<b>\$ 82,932,181.00</b>					\$ 27,206,601	
Pipe Pump to tank	1740	19 \$	900,000 \$	17,100,000 \$	18%	20,178,000 \$	3,078,000 \$	
Power	111	2 \$	3,073,181 \$	3,073,181 \$	0%	3,073,181 \$	- \$	
Worker labor	1740	116 \$	10,000 \$	1,160,000 \$	0%	1,160,000 \$	- \$	
Straight Connectors	1740	17 \$	25,000 \$	425,000 \$	18%	501,500 \$	76,500 \$	
Pipe Lake to Well	140	24 \$	81,000 \$	1,944,000 \$	18%	2,293,920 \$	349,920 \$	
<b>Variable Total</b>				<b>\$ 23,702,181</b>		<b>\$ 27,206,601</b>	<b>\$ 3,504,420</b>	

#### Power from LIA

	Distance	Total Cost	No. Needed	Cost	Subtotals W/o VAT	VAT	Total w/ VAT	Total cost of VAT
		<b>\$ 99,960,910.00</b>					\$ 113,627,230	
Pipe Pump to tank	1446	16 \$	900,000 \$	14,400,000 \$	18%	16,992,000 \$	2,592,000 \$	
Power	1060	22 \$	23,072,910 \$	23,072,910 \$	0%	23,072,910 \$	- \$	
Worker labor	1446	96.4 \$	10,000 \$	964,000 \$	0%	964,000 \$	- \$	
Straight Connectors	1446	14 \$	25,000 \$	350,000 \$	18%	413,000 \$	63,000 \$	
Pipe Lake to Well	140	24 \$	81,000 \$	1,944,000 \$	18%	2,293,920 \$	349,920 \$	
<b>Variable Total</b>				<b>\$ 40,730,910</b>		<b>\$ 43,735,830</b>	<b>\$ 3,004,920</b>	

#### Power from LIA

	Distance	Total Cost	No. Needed	Cost	Subtotals W/o VAT	VAT	Total w/ VAT	Total cost of VAT
		<b>\$ 93,045,162.00</b>					\$ 106,711,482	
Pipe Pump to tank	1446	16 \$	900,000 \$	14,400,000 \$	18%	16,992,000 \$	2,592,000 \$	
Power	694	14 \$	16,157,162 \$	16,157,162 \$	0%	16,157,162 \$	- \$	
Worker labor	1446	96.4 \$	10,000 \$	964,000 \$	0%	964,000 \$	- \$	
Straight Connectors	1446	14 \$	25,000 \$	350,000 \$	18%	413,000 \$	63,000 \$	
Pipe Lake to Well	140	24 \$	81,000 \$	1,944,000 \$	18%	2,293,920 \$	349,920 \$	
<b>Variable Total</b>				<b>\$ 33,815,162</b>		<b>\$ 36,820,082</b>	<b>\$ 3,004,920</b>	

Prices	W/ VAT	W/o VAT	Unique	W/o VAT	W/ VAT
Simba				\$ 900,000	\$ 1,062,000
100m pipe	\$ 1,200,000	\$ 984,000	100m Pipe	\$ 30,000	\$ 35,400
St. Connector	\$ 20,000	\$ 16,400	T connector	\$ 25,000	\$ 29,500
Male connector	\$ 30,000	\$ 24,600	St. Connector	\$ 20,000	\$ 23,600
T connector	\$ 42,000	\$ 34,440	Male connector	\$ 100,000	\$ 118,000
			Air Valve 1 1/2in	\$ 7,500	\$ 8,850
			R bush 3 x 1 1/2in	\$ 30,000	\$ 35,400
			Class B Straight Pipe 6m 6"	\$ 81,000	\$ 95,580
			Class B Straight Pipe 6m 8"	\$ 150,000	\$ 177,000
			Class C Straight Pipe 6m 3"	\$ 42,000	\$ 49,560
			Class C Straight Pipe 6m 4"	\$ 53,000	\$ 62,540
			Class C Straight Pipe 6m 6"	\$ 109,000	\$ 128,620
			Class C Straight Pipe 6m 8"	\$ 250,000	\$ 295,000

## Distances

(in meters)

### Plot by NTC Pump Mzee

Distance to Lake 42

#### Main pipe from Mzee

Distance pump to M 1 754  
Distance M 1 to Cr. Of Soccer field 298  
Distance soccer field to chapel 203  
Distance chapel to corner of NTC 195  
Distance cr of NTC to tank 290  
**Total 1740**

#### Main pipe from Close plot

Pump to Cr. Of Soccer Field 758  
Cr. Of Soccer field to Chapel 203  
Distance chapel to corner of NTC 195  
Distance cr of NTC to tank 290  
**Total 1446**

### Plot with electric poles

#### Main pipe using Electric spot for pump

Cr NTC to pump 150  
Distance Cr NTC to M 1 754  
Distance M 1 to Cr Of Soccer field 298  
Distance soccer field to chapel 203  
Distance chapel to corner of NTC 195  
Distance cr of NTC to tank 290  
**Total 1890**

#### Water supply line

Distance chapel to corner of NTC 130  
Distance cr of NTC to tank 290  
**Total 420**

#### Main pipe from Close plot to tank on LYA

Pump to Cr. Of Soccer Field 758  
Cr. Of Soccer field to Chapel 203  
**Total 961**

## Pipe form lake to pump

### NTC options

#### NTC Lake to Well through Mzay

Into Lake 100  
Lake to Mzay 40  
Mzay to Plot with power 173  
**Total 313**

#### NTC Lake to Well right side NTC pump

Into Lake 100  
Lake to Plot with Power 184  
**Total 284**

### Close Plot

**Close Plot**  
Into Lake 100  
Lake to Well 40  
**Total 140**

## Electric Distance options

	Type of power	Distance	# of poles	Price	Total	Power		
<b>NTC to Pump to high school</b>								
NTC to Pump	3 phase	694		\$16,157,162	\$16,157,162	Tenesco power	120	\$ 3,073,181
Pump to High School	1 phase	592		\$9,749,981	\$9,749,981			
					<b>\$25,907,143</b>			
<b>Disp to pump to high school</b>								
Dispencery to Pump	3 phase	792		\$18,355,812	\$18,355,812			
Pump to High school	1 Phase	592		\$9,749,981	\$9,749,981	Armored cable	190 16,000	\$ 3,040,000 \$ 912,013
					<b>\$28,105,793</b>			<b>\$ 3,952,013</b>
<b>Disp to pump tangent to high school</b>								
Dispencery to Pump	3 phase	792		\$18,355,812	\$18,355,812			
Tangent line to 3 Phase	1 Phase	385		\$6,128,590	\$6,128,590			
					<b>\$24,484,402</b>			
<b>LJA to pump perpendicular to high school</b>								
Mtebe power to Pump	3 Phase	1060	1	\$23,072,910	\$23,072,910			
Perpendicular line to 3 phase	1 Phase	120		\$3,073,181	\$3,073,181			
					<b>\$26,146,091</b>			
<b>Use NTC for pump, LJA to high school</b>								
NTC to spot by NTC	3 Phase	111	3	\$3,073,181	\$3,073,181			
1 phase from school	1 Phase	430	9	\$1,300,000	\$1,700,000			
					<b>\$14,773,181</b>			
<b>LJA close side to 2nd school</b>								
Mtebe Power to close side of 2nd school	3 Phase	1118	23		\$0			
high school to 3 phase line	1 Phase	70	2	\$1,300,000	\$1,300,000			
					<b>\$1,300,000</b>			
<b>LJA far side of 2nd school</b>								
Mtbe power to far side of 2nd School	3 Phase	1188	24		\$0			
Power to high school	1 Phase	30	1	\$1,300,000	\$1,300,000			
					<b>\$1,300,000</b>			
		500		\$ 8,276,638				
		483		\$ 8,165,753				

## Differences in Pipe

### Pipe NTC to Tank Mzee

	distance	# needed	Cost	Total
Class C poly pipe	1740	19	\$900,000	\$17,100,000
Connectors	1740	17	\$25,000	\$425,000
				<b>\$17,525,000</b>
Class C Straight pipe	1740	290	\$42,000	<b>\$12,180,000</b>
		Difference		<b>\$5,345,000</b>

### Pipe NTC to Tank Electric spot

Class C poly pipe	1890	20	\$900,000	\$18,000,000
Connectors	1890	18	\$25,000	\$450,000
				<b>\$18,450,000</b>
Class C Straight pipe	1890	315.00	\$42,000	<b>\$13,230,000</b>
		Difference		<b>\$5,220,000</b>

### Close Spot to Tank

	distance	# needed	Cost	Total
Class C poly pipe	1446	14.46	\$900,000	\$13,014,000
Connectors	1446	13	\$25,000	\$325,000
				<b>\$13,339,000</b>
Class C Straight pipe	1446	241	\$42,000	<b>\$10,122,000</b>
		Difference		<b>\$3,217,000</b>

Difference NTC and close **\$4,186,000**

### NTC Lake to the Well Mzay

	Distance	# needed	Cost	Total	
Class B Straight Pipe	4"	313	53	\$30,000	<b>\$1,590,000</b>
Class B Straight Pipe	6"	313	53	\$81,000	<b>\$4,293,000</b>
Class B Straight Pipe	8"	313	53	\$150,000	<b>\$7,950,000</b>
Class C Straight Pipe	4"	313	53	\$53,000	<b>\$2,809,000</b>
Class C Straight Pipe	6"	313	53	\$109,000	<b>\$5,777,000</b>
Class C Straight Pipe	8"	313	53	\$250,000	<b>\$13,250,000</b>

### NTC Lake to Well Right of NTC

	Distance	# needed	Cost	Total	
Class B Straight Pipe	4"	284	48	\$30,000	<b>\$1,440,000</b>
Class B Straight Pipe	6"	284	48	\$81,000	<b>\$3,888,000</b>
Class B Straight Pipe	8"	284	48	\$150,000	<b>\$7,200,000</b>
Class C Straight Pipe	4"	284	48	\$53,000	<b>\$2,544,000</b>
Class C Straight Pipe	6"	284	48	\$109,000	<b>\$5,232,000</b>
Class C Straight Pipe	8"	284	48	\$250,000	<b>\$12,000,000</b>

### Close Plot Lake to Well

	Distance	# needed	Cost	Total	
Class B Straight Pipe	4"	140	24	\$30,000	<b>\$720,000</b>
Class B Straight Pipe	6"	140	24	\$81,000	<b>\$1,944,000</b>
Class B Straight Pipe	8"	140	24	\$150,000	<b>\$3,600,000</b>
Class C Straight Pipe	4"	140	24	\$53,000	<b>\$1,272,000</b>
Class C Straight Pipe	6"	140	24	\$109,000	<b>\$2,616,000</b>
Class C Straight Pipe	8"	140	24	\$250,000	<b>\$6,000,000</b>

## Pump Placement Options

### Single pump

	Distance	# needed	Price	
Surface pump			1 \$ 13,688,000	\$ 13,688,000
3" pipe	420		5 \$ 900,000	\$ 4,500,000
Labor	420		28 \$ 10,000	\$ 280,000
3" connectors	420		5 \$ 25,000	\$ 125,000
2" pipe	420		4 \$ 600,000	\$ 2,400,000
2" connectors	420		4 \$ 15,000	\$ 60,000
				\$ 21,053,000

### Booster pumps

Surface pump	\$	7,500,000
booster pump	\$	12,000,000
	\$	19,500,000

Plumbing

description	#		
1 GS Pipe 2"	2	\$ 80,000	\$ 160,000
2 Foot Valve 2.5"	1	\$ 150,000	\$ 150,000
3 Gate Valve 2.5"	1	\$ 125,000	\$ 125,000
4 T- Connector 2.5"	2	\$ 25,000	\$ 50,000
5 Nipple 2.5"	10	\$ 4,500	\$ 45,000
6 Reducer Socket 2.5" x2"	2	\$ 4,500	\$ 9,000
7 Nipple 3/4"	10	\$ 500	\$ 5,000
8 Stop Cork 3/4"	1	\$ 10,000	\$ 10,000
9 Seal Tape	10	\$ -	\$ -
10 Ball Valve 2"	2	\$ 120,000	\$ 240,000
11 Flange 2.5"	2	\$ 10,000	\$ 20,000
12 Flange 2"	2	\$ 6,000	\$ 12,000
13 Bend 2.5"	1	\$ 12,000	\$ 12,000
14 Plug 2.5"	1	\$ 4,000	\$ 4,000
15 GS pipe 3/4"	1	\$ 30,000	\$ 30,000
16 T- Joint 3/4"	1	\$ 500	\$ 500
17 Elbow 3/4"	4	\$ 500	\$ 2,000
18 Bolts & Nuts	20	\$ -	\$ -
19 Union 3/4"	2	\$ 1,000	\$ 2,000
20 Male connector 3"	1	\$ 20,000	\$ 20,000
21 Reducer Socket 3" x 2"	1	\$ 6,000	\$ 6,000
<b>Total</b>		<b>\$ 902,500</b>	

Electrical

1 Flexible Wire 4mm x 4core	10	\$ 5,500	\$ 55,000
2 Frabrication of Control Panel Mounting	1	\$ -	\$ -
3 Trunking	2	\$ 48,000	\$ 96,000
4 Insulation Tape	10	\$ 600	\$ 6,000
5 Cable Ties PKT	1	\$ 8,000	\$ 8,000
6 Float Switch	1	\$ 18,000	\$ 18,000
7 Flexible Wire 2.5mm X 3core	20	\$ 3,500	\$ 70,000
<b>Total</b>		<b>\$ 253,000</b>	

27731770  
529230  
32320200  
60,581,200

<b>Totals</b>					
	<b>NTC</b>	<b>Mzee</b>	<b>Disp</b>	<b>LJA</b>	<b>NTC power to Close lake</b>
<b>Electrical</b>	912,013	3,073,181	18,355,812	23,072,910	16,157,162
<b>E high school</b>	8,165,753	8,165,753	6,128,590	3,073,181	8,165,753
<b>Pipe</b>	17,525,000	18,450,000	13,339,000	13,339,000	13,339,000
<b>6" pipe into lake</b>	3,888,000	1,944,000	1,944,000	1,944,000	1,944,000
<b>Labor</b>	1,260,000	1,160,000	964,000	964,000	964,000
<b>Shillings</b>	<b>31,750,766</b>	<b>32,792,934</b>	<b>40,731,402</b>	<b>42,393,091</b>	<b>40,569,915</b>
<b>Dollars</b>	\$23,519	\$24,291	\$30,171	\$31,402	\$30,052