BILL OF QUANTITIES					
CONSTRUCTION OF WAUTU KYANGAATI SAND DAM WATER PROJECT					
BILL 1.0	**PRELIMINARIES**				
S/No	**Item description**	**Unit**	**QTY**	**RATE**	**Amount Ksh**
1.01	Construction of plant and personnel mobilization to site including setting up camp and demobilization	L/sum	1		
	Setting out				
1.02	Allow for setting out of the pipeline route, buildings and water tank extents in the presence of clients appointed site engineer	L/sum	1	50,000	50,000.00
	Sign Post				
1.03	Fabricate and installation of publicity steel sign post as directed by the client's appointed engineer	No.	1		-
	Butt fusion (Rate per Joint)				
1.04	Butt fusion of HDPE Pipelines	Joint	25		
	Total Carried to Grand Bill Total for BILL No. 1				**50,000.00**
BILL 2.0	**SAND DAM CONSTRUCTION**				
ITEM No	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**RATE**	**AMOUNT**
	Supply, deliver the following materials and construct Wautu Kyangaati Sand Dam				
2.0.1	Construct sand dam wall by use of concrete grade 20/20 (1:2:4). Use quarry ballast ½"x3/4" and clean river sand. Sand dam shall be cured for 21 days. Works shall be done as per the working drawing.	M^3	136		-
2.0.2	Reinforcement bars Y12	Kgs	400		-
2.0.3	Reinforcement bars Y10	Kgs	425		-
2.0.4	Cypress timber 6"x1"	Rft	900		-
2.0.5	Cypress timber 3"x2"	Rft	700		-

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Chief officer:
Environment & Climate Change

2.0.6	Binding wire	Kg	20		-
2.0.7	Wire Nails assorted	Kg	30		-
2.0.8	Hard core	Tons	70		-
2.0.9	Excavate Vegetable soils 300mm deep	M3	80		-
2.0.10	Hacking on a rock surface	M2	70		-
	Draw-Off System for the Wautu Gravity Mains				
	Supply, deliver, set, fix , place the following for the draw-off system				
2.0.11	Sluice Gate 3" Installation and Manhole Chamber	No	1		-
2.0.12	Clear pipe route of bushes, shrubs and cart away all arisings, Excavate for 450mm wide x 600mm deep channel and stockpile soil material for reuse. Prepare channel bed for pipe laying	M	50		-
2.0.13	90mm dia. HDPE pipe PN 12.5. (Supply, deliver, handle, set and fix Twin draw off HDPE from sump from the reservoir section across Sand Dam Wall)	M	50		-
2.0.14	RC anchorage of the pipeline on the bank	Cu.m	6		-
	Sub Total				-
BILL 3.0	**CONSTRUCTION OF RC 100CU.M INTAKE SUMP**				
S/NO	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**RATE (KShs.)**	**AMOUNT (KShs.)**
	Excavation volumes				
3.0.1	Cut to spoil limited to maximum 3000mm deep from g.l. at the reservoir area and remove all vegetable soil to temporary spoil heap.	CM	50		-
3.0.2	E. O for rock formation	CM	10		-
3.0.3	Clear site from loose rocks and soil to create base for concrete slab as shall be directed by the engineer	SM	20		-
3.0.4	Allow for planking and strutting of the pit	LS	1		-
3.0.5	Allow for backfilling to approve levels after Completion of the works.	m^3	30		-

	De-watering				
3.0.6	Allow for de-watering during construction of the lower levels of the sump tank	LS			
	Hardcore filling				
3.0.7	300mm thick approved hardcore filling compacted in layers not exceeding 150mm thick to make up levels	m^3	15		-
	Concrete work				
3.0.8	Construct square, 6.00 m x 6.00 m (internal measurements) vibrated concrete ring, as the sump footing. Use concrete class 20/20 (1:2:4). The footing shall be on firm ground as shall be approved by site Engineer. Footing section shall be 400 mm x 250 mm.	m^3	4		-
3.0.9	**Reinforcement bars**				
	i) Use Y12 bars, as ring beam reinforcement.	Kgs	152		-
	ii) Use Y8 as stir ups @ 250mm c/c.	Kgs	100		-
3.0.10	Construct reinforced concrete pillar at the centre of the sump floor. The pillar shall have a reinforced concrete footing 450mm x 450mm x 250mm. The pillar dimensions shall be 300mm x 300mm in section. Use concrete grade 20/20 (1:2:4). Pillar shall be reinforced with Y12 bars @ 250 mmc/c. Use Y8 Bars as stir-ups @200 mm c/c.	m3	1		-
3.0.11	Construct water sump. Use the necessary form work. walling shall be of vibrated and reinforced concrete, class 20/20 (1:2:4) and 300 mm thick.	m3	35		-
3.0.12	Use reinforcement bars as;				
	i) Use Y12 bars, @ 300 mm c/c cut and bend and placed in two rows.	Kg	1211		-
3.0.13	Roof 100m3 sump by use of vibrated reinforced concrete 1:2:4. class 20/20. Roof slab shall be 225 mm thick.	m3	11		-
3.0.14	Roof slab reinforcement shall be Y 12 @ 200mm	kg	746		-
3.0.15	Ditto Reinforced Concrete Manhole cover, which shall be air tight	m3	0.4		-

3.0.16	Provisional sum of KShs seventy thousands as cost of formwork	PS		70,000.00	70,000.00
3.0.17	Installation of 3" Dia infiltration galleries as instructed by the Engineer	Item	LS		
	Sub Total				**70,000.00**
BILL 4.0	**CONSTRUCTION OF KYANGAATI SD - WAUTU GRAVITY LINE**				
S/No	**Item description**	**Unit**	**QTY**	**RATE**	**Amount Ksh**
4.0.1	Bush clear and excavate to pipe invert level 800 mm n.e 1m below existing ground level and backfill/ reinstate to original ground level after testing pipeline, all to the approval of the engineer	m	2,400		-
4.0.2	Excavate for 450mm wide x 800mm deep channel at road crossings and stockpile soil material for reuse. Prepare channel bed for pipe laying	M	36		-
4.0.3	e.o in hard/ rock	m^3	10		-
4.0.4	Supply, deliver, fit and test 75mm (2.5") diameter HDPE pipe PN 10 manufactured under ISO 4427 standards using virgin PE90 material (Smooth Wall), fully printed with technical details. Cost includes adapters and connectors	m	1000		-
4.0.5	Supply, deliver, fit and test 75mm (2.5") diameter HDPE pipe PN 12.5 manufactured under ISO 4427 standards using virgin PE90 material (Smooth Wall), fully printed with technical details. Cost includes adapters and connectors	m	1400		-
4.0.6	Supply, deliver, lay in trench and backfill 50 mm Ø pipe (2.5") GI Pipe class B including joining to HDPE pipes above in sections directed by the supervising engineer	M	36		-
	Supply and fit the following pipe fittings into the pipeline as directed				
4.0.7	Pegler gate valve 2.5"diameter	No	3		-
4.0.8	GI Reducing Tee 2.5"diameter by 2"	No	2		-

4.0.9	Supply, deliver and install pressure relief valves 2'' diameter fitted into 2.5" pipeline with all accessories	No	3		-
4.0.10	Supply, deliver and install Double orifice air valve 2'' diameter fitted into 2.5" pipeline with all accessories	No	6		-
4.0.11	2.5" bulk water master meter	No.	1		-
4.0.12	Construct and Commission a Community Water Point, inclusive of Plumbing, Fittings & Consumer Water Meter in a lockable 0.75m X 0.75m chamber, as directed by Site Engineer.	item	1		-
	SUB TOTAL				-
BILL 5.0	**SOLAR PUMPING SYSTEM**				
ITEM	**ITEM DESCRIPTION**	**UNIT**	**QTY**	**RATE**	**AMOUNT**
5.0.1	Supply, Deliver and Install a Submersible Multistage Centrifugal Pump Set of Duty Point: - 12 m3/hr at Duty Point Head of 220meters. The pump Efficiency at duty point should be above 50%. The pump Impellers should be of Stainless Steel. Provide Copies of Pump Characteristic/Performance Curves (Brochures). Install as directed by the Supervising Engineer	Set	1		-
5.0.2	Supply, Deliver and Install an AC Solar Pump Control Module, incorporating: - detachable control interface; settable min/max frequency & open circuit voltage; display of operating parameters, including frequency, voltage, amperage, input power & pump speed; display of historical data, including energy generation, maximum power & operating times; protection against over/under voltage, over curerent, system overload & module over temperature; fault detection with error code display. Install SV3 11T 3ph. or as directed	Unit	1		-
5.0.3	Borehole Cable, Double Insulated, 4.0mm2 X 4core	M	50		-
5.0.4	Sensor Cable, 2Core, Double Insulated, 0.75mm2	M	50		-

5.0.5	Supply, Deliver and Install Fabricated Steel Tower, use square tubes, 4" x 4" x 4mm for solar Array System, securely anchored in concrete plinth, 0.5m x 0.5m x 1.0m/stand and minimum height - 4 meters high	Lot	1		-
5.0.6	Supply, deliver and install on the steel tower, solar array system of total output 17760 watts including high efficiency mono crystalline tier 1 modules such as Jinko or approved equivalent string using 6 mm sq DC cable and MC4 terminated on both sides to be properly mounted on the structure as directed by the supervising engineer	W	17760		-
5.0.7	Armored Cable, 4.0mm2 X 4 core	M	80		-
5.0.8	Armored Copper Cable, 1.5mm2 X 2 core	M	80		-
5.0.9	Cable Glands, 25mmL	No.	4		-
5.0.10	Cable Glands, 20mmL	No.	2		-
5.0.11	Splicing Kit, Medium Packet	No.	1		-
5.0.12	Cable Ties, Large Packet, Manila	No.	1		-
5.0.13	Insulating Tapes, Large	No.	10		-
5.0.14	EARTHROD C/W CLAMP	Set	1		-
5.0.15	LIGHTENING ARRESTOR C/W COPPER WIRE	Pc	1		-
5.0.16	6.0 MM* 1 CORE EARTH CABLE	Mts	25		-
5.0.17	upvc conduit	Pc	6		-
5.0.18	Pumping Site using 2.5 high concrete posts, 2.5m spacing, c/w Mesh Wire (Chain Link) 12.5 G, 8ft High ; include concrete column anchored double opening 2.5m High fabricated steel gate	m	60		-
5.0.19	Supply and install Solar Powered WiFi PTZ 360 Camera - With 6 Batteries of 19000mAh strategically fitted on metalic fabrications on site (configure the applications to two approved android project phones as instructed by the Engineer)	No	2		-
				KSH.	-
	Sub Total				

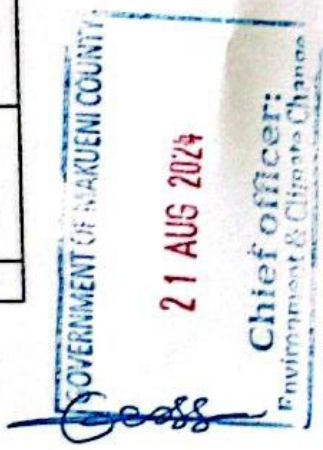
BILL 6.0	RISING MAIN				
S/No	Item description	Unit	QTY	RATE	Amount Ksh
A	Clearing/Excavation				
6.0.1	Clear pipe route of bushes, shrubs and cart away all arising, Excavate for 450mm wide x 800mm deep channel and stockpile soil material for reuse. Prepare channel bed for pipe laying	M	930		-
6.0.2	Excavate for 450mm wide x 800mm deep channel at road crossings and stockpile soil material for reuse. Prepare channel bed for pipe laying	M	36		-
6.0.3	e.o in hard/ rock	m^3	10		-
B	**Purchase, Supply and Lay joint the following including connecting to the Tank inlet**				
6.0.4	75mm dia. GS pipe class B (with sockets on one end). Provide for connection with the HDPE pipe	M	24		-
	Purchase, Supply and Lay joint through butt fusion the following including connecting to the Tanks and GI pipes				
6.0.5	90mm dia.HDPE pipe PN 20	M	200		-
6.0.6	90mm dia. HDPE pipe PN 16	M	400		-
6.0.7	90mm dia. HDPE pipe PN 12.5	M	300		-
6.0.8	3" Non return valve and its accessories	No	2		-
6.0.9	Double orifice Air relief valve 2" diameter fitted into 3" pipe with all accessories	No	3		-
6.0.10	Construct 1.0m x 1.0m x 0.75m (deep internal dimensions) brick walled chambers with steel frame, cover and locking devices in specified areas by the supervising engineer as per the provided drawing	No	5		-
	Sub Total				
Bill 7.0	CONSTRUCTION OF 100CU.M MASONRY WATER TANK	Unit	QTY	Rate	Amount
S/No	Item Description				
	EXCAVATIONS				

7.0.1	Strip top soil 200mm from g.l. over area of tank and remove all vegetable soil to temporary spoil heap.	m^3	24.5		-
	HARDCORE				
7.0.2	Provide, place and compact hardcore of approved quality 250mm thick to make up levels	Tons	25		-
	CONCRETE WORK				
	Provide place, handle, mix and vibrate as directed by the Engineer				
7.0.3	Mass concrete mix 1:4:8: in 50mm thick blinding to hardcore	m^3	4		-
7.0.4	Vibrated reinforced concrete mix 1:2:4 in 125mm thick for slab	m^3	11.5		-
7.0.5	Vibrated reinforced concrete mix 1:2:4 mix in 150mm thick at edges rising to 200mm thick at the centre roof slab	m^3	11.5		-
7.0.6	Ditto in lintel	m^3	0.11		-
7.0.7	Ditto in ring beam	m^3	11		-
7.0.8	Ditto centre Column	m^3	0.45		-
7.0.9	Vibrated mass concrete 250mm thick surrounded to off take and scour pipes	m^3	0.5		-
	REINFORCEMENT BARS				
	Provide, handle, cut, bend and fix the following reinforcement bars as stated in the bending schedule or as directed by the Engineer				
7.0.10	12mm twisted mild steel bars	Kg	1,386		-
7.0.11	8mm round mild steel stirrup	Kg	164		-
	FORMWORK				
	Sawn timber formwork as per engineer's Specification. Include propping strutting and striking off to:				
7.0.12	Edges of 125mm floor slab	M	40		-
7.0.13	Edges of 100mm roof slab	M	40		-
7.0.14	Soffits of 100mm roof slab	m^2	52		-
7.0.15	Edge of the manhole opening	M	24		-

7.0.16	Soffits of roof slab on the external side	m^2	30		-
	WALLING				
	Below includes the base height of the tank				
7.0.17	300mm thick dressed quarry stone walling curved on plan radius 6500mm	m^2	27		-
7.0.18	225mm thick dressed quarry stone walling curved on plan radius 6500mm	m^2	110		-
7.0.19	225mm thick dressed quarry stone walling	m^2	15		-
7.0.20	Provide, handle and fix bondex as per Drawing	Kg	25		-
	BITUMEN PAINT				
7.0.21	Floor slab 300mm wide long circumference with mean radius of 4151mm in three coats	m	28		-
7.0.22	Top of 225mm thick wall along circumference with mean radius of 6500mm in three coats	m	28		-
7.0.23	25mm thick 1:2 cement sand screed to floor slab with waterproof cement at 1kg for 1 No.50kg ordinary Portland cement with steel float finish	m^2	50		-
7.0.24	20mm thick 1:2 cement sand to interior face of the wall with water proof cement at 1kg for 1No. 50kg of ordinary Portland cement with steel float finish	m^2	80		-
7.0.25	20mm thick 1:2 cement sand to exterior face of tank wall	m^2	84		-
7.0.26	20mm thick 1:2 cement sand to masonry column with steel float finish	m^2	84		-
7.0.27	20mm thick 1:2 cement sand to lintel with steel float finish	m^2	2.6		-
7.0.28	20mm thick 1:2 cement sand to soffit of roof slab	m^2	25		-
7.0.29	20mm ditto to exterior face of roof slab	m^2	25		-
7.0.30	20mm thick 1:2 cement sand to edge of 100mm thick slab	m^2	2.5		-
7.0.31	20mm thick 1:2 cement sand to soffit of roof slab with groove	No	2		-
	MISCELLANEOUS WORKS				
7.0.32	Construct and fix a vertical ladder of length of 3.4M fixed to wall and floor on the external and internal side of tank	No.	2		-

7.0.33	60mmx600mm cast iron manhole cover complete with frame, locking device and keys	No.	2		-
7.0.34	16mm reinforcement bar to be cut bent to terminate at manhole cover as per drawings or as directed by the engineer	m^2	12		-
	OUTLET PIPE:				
7.0.35	Supply and install 150mm x 110mm Bell Mouth GS with 90^0 Bend connected to 110mm diameter flanged pipe 3.6m long	No	1		-
7.0.36	Supply and install 110mm diameter flanged AVK Sluice valve PN16 Bars	No	1		-
7.0.37	Supply and install 110mm diameter GI flanged pipe 2m long	No	1		-
7.0.38	Construct standard valve chamber (1200 x1200)	No	1		-
	INLET PIPE:				
7.0.39	Supply and install 90 mm 4m long GI Pipe flanged with GS flanged 90mm 90^0 double Bend flanged as instructed by engineer	M	6		-
7.0.40	Supply and install 90mm 500mm long GI pipe flanged with puddle flange	No	1		-
7.0.41	Supply and install 90mm diameter flanged AVK sluice valve	No	1		-
7.0.42	Construct standard valve chamber (1200 x1200)	No	1		-
	WASHOUT :				
7.0.43	Supply and install 150mm x 100mm Bell Mouth GS with 90^0 bend connected to 100mm diameter flanged pipe 2m long	No	1		-
7.0.44	Supply and install 100mm diameter flanged Sluice valve connected to 100mm diameter GI flanged (one end & threaded one end) pipe 1m long	No	1		-
7.0.45	Construct standard valve chamber (600 x600).	No	1		-

7.0.46	Supply and install 75mm diameter pipe 3.6m long (threaded) and connect to washout chamber	Item	1		-
7.0.47	75mm 90° bend	No	1		-
7.0.48	75mm socket	No	2		-
7.0.49	75mm threaded 300mm with puddle flange	No	1		-
7.0.50	75mm nipple	No	2		-
	AIRVENT :				
7.0.51	75mm GI pipe piece 200mm long threaded	No	4		-
7.0.52	75mm GI elbow with mosquito gauze	No	8		-
7.0.53	75mm GI nipple	No	4		-
	Communal Water Point Infrastructure				
7.0.54	Allow for Distribution Line - Tank Outlet Connection and Reducing Sundries	L/Sum	1		-
7.0.55	Excavate to pipe invert level 800 mm n.e 1m below existing ground level and backfill/ reinstate to original ground level after testing pipeline, all to the approval of the engineer	m	30		-
7.0.56	Supply, deliver, fit and test 75mm (2.5") diameter HDPE pipe PN 10 manufactured under ISO 4427 standards using virgin PE90 material (Smooth Wall), fully printed with technical details. Cost includes adapters and connectors	m	30		-
7.0.57	2" bulk water master meter	No.	1		-
7.0.58	Construct 1.0m x 1.0m x 0.75m (deep internal dimensions) brick walled chambers with steel frame, cover and locking devices in specified areas by the supervising engineer as per the provided drawing	No	2		-
7.0.59	Construct and Commission a Community Water Point, inclusive of Plumbing, Fittings & Consumer Water Meter in a lockable 0.75m X 0.75m chamber, as directed by Site Engineer.	item	1		-
	SUB TOTAL				-



	Sub Total				
	GRAND SUMMARY				
BILL 1.0	Preliminaries				
BILL 2.0	Sand dam construction				-
BILL 3.0	Construction of RC 100CU.M intake sump				
BILL 4.0	Construction of Kyangaati SD - Wautu gravity line				-
BILL 5.0	Solar pumping system				-
BILL 6.0	Rising main				-
BILL 7.0	Construction OF 100CU.M masonry water tank				-
	SUB TOTAL A				
	Contingencies				
BILL 8.0	Allow 2.5% (Of Sub Total A) for contingencies to be expended at the discretion of the project manager				353,405.43
	SUB TOTAL (BUILDER WORKS)				