PART 1 - Preliminary and General Items

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
1.1	**Contractual Requirements**				
1.1.1	Performance Security	LS	1		
1.1.2	Insurance for loss of or damage to the works, plant, and materials	LS	1		
1.1.3	Insurance for loss of or damage to Works and Contractor's equipment	LS	1		
1.1.4	Insurance for loss of or damage to property (except the works, plant, materials, and equipment) in connection with the Contract	LS	1		
1.1.5	Insurance for personal injury or death	LS	1		
1.1.6	Establishment and maintenance of Contractor's camp. Including Training Levy	LS	1		
1.2	**GENERAL REQUIREMENTS**				
1.2.1	**Facilities for the Engineer's Staff** (section 3 in the technical specification (Facilities and services for the engieer)				
1.2.1.1	Establishment of Engineer's office at Tiwi Water Office including office furniture and office equipments including water supply and electrical power for he whole project period **(18 months)**	PS	1	396,000	396,000
1.2.1.2.	Accommodation - 3* Hotel accommodation (incl. Water & Electricity) in single unit bedroom - 1No. Unit for the Resident Engineer and 2 Nr for ARE (1 months)	Day	30	18,000	540,000.00
1.2.1.3.	Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-3bedrooom)- 1No. Unit for the RE (18 months)	PS	1		1,800,000.00
1.2.1.4.	Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-2 bedrooom)- 2 No. Unit for the ARE (36 months)	PS	1		2,550,000.00
1.2.2	**Signboards**				
1.2.2.1	Signboards, provide	No	2		
1.2.2.2	Maintain signboards for the duration of the contract	Month	18		
1.2.3	**Equipment for Use by the Engineer's Staff**				
1.2.3.1	Surveying equipment to Specifications-Provide and Maintain. Revert to Contractor at end of Contract	LS	1		
1.2.3.2	Provision of National Standards and International Standards listed in the General Specifications	LS	1		
1.2.4	**Attendance Upon the Engineer's Staff**				
	(3.5 in the technical Specification)				
1.2.4.1	Drivers provide(2No)	Month	18		
1.2.4.2	Chainmen provide(3Nos)	Month	18		
1.2.4.3	Office messenger provide	Month	18		
1.2.4.4	Watchmen provide(2Nos)	Month	18		
1.2.5	**Testing of Materials**				
	By Third Party Inspection(natural materials)				
1.2.5.1	Cube Test - for an appropriate stength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled	No	10		
1.2.5.2	Slump Tests to determine the concrete consistency - in accordance with BS 1881	No	10		
	TOTAL PAGE 1				

PART 1 - Preliminary and General Items

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
	By Third Party Inspection(man-made other pipes)				
1.2.5.3	Inspection of pipe, fittings, plant manufacturing by the Employer and the Engineer as per Specifications	LS	1		
1.2.6	**Testing of Works**				
1.2.6.1	Water retaining structures constructed in the project including cleansing and sterilization for channels, chambers, at Kaya Bombo, Marere Headworks etc	LS	1		
1.2.7	**Temporary Works**				
1.2.7.1	Traffic regulation including charges by KENHA/KERRA	PS	1	350,000	350,000
1.2.7.2	De-watering	LS	1		
1.2.7.3	Diversion works at headworks during modification and construction of Flow Division Structure (Provisional)	LS	1		
1.2.7.4	By-pass pipework where disruption for more than 12 hours is anticipate (Provisional)	LS	1		
1.2.8	**PROVISIONAL SUMS**				
1.2.8.1	Labour (carried from Dayworks Schedule)	LS	1		
1.2.8.2	Materials (carried from Dayworks Schedule)	LS	1		
1.2.8.3	Plant (carried from Dayworks Schedule)	LS	1		
1.3	**PRIME COST SUMS**				
1.3.2	Upkeep and travel for Client's secondment staff	LS	1	450,000	450,000.00
1.3.3	Supply and delivery of 4WD double cabin are with dual air bags in the front and AC for the Resident and Assistant Resident Engineers- to revert to Employer - including provision of drivers for the duration of the contract	PS	2	7,500,000	15,000,000.00
1.3.4	Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)	Month	18	115,000	2,070,000.00
1.3.5	Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract	PS	1	900,000	900,000.00
1.3.6	Compensation and entry upon land	LS	1		
1.3.7	Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.	LS	1		
1.3.8	Investigations of internal repair works required for reseviors once emptied as director by the Engineer.	LS	1		
1.3.9	Supply of operation and maintenance tools and equipment for the Boreholes	LS	1		
	TOTAL PAGE 2				

PART 1 - Preliminary and General Items

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
1.3.10	HIV/AIDS and COVID-19 prevention sign boards and campaigns	LS	1		
1.3.11	KWS Wardens assistance in forest areas	LS	1		
1.3.12	Provisional sum of Ksh 70,000 for each borehole for acquisition of drilling and abstraction permits from Water Resources Authority, NEMA and County permits. The Contractor will be required to make applications on behalf of CWWDA and ensure timely acquisition of the permits. (2Nos Boreholes)	PC	2	70,000	140,000.00
1.3.13	Allow for service inspection by Engineer and Employer for works and installations upon completion	PS	1	100,000	100,000.00
1.4	**Environmental, Social, Health and Safety (ESHS)**				
1.4.1	Resources allocated to ESHS management	LS	1		
1.4.2	Drafting and updating the ESHS documentation, reporting, inspections	LS	1		
1.4.3	Implementation of the Health and Safety Plan	LS	1		
1.4.4	Accommodation, drinking water, meals and transportation of staff				
1.4.5	Training and local recruitment management costs	LS	1		
1.4.6	Protection of adjacent areas, biodiversity, prevention of erosion and wastewater management	LS	1		
1.4.7	Traffic, noise and atmospheric emissions management, land take	LS	1		
1.4.8	Waste and hazardous products management	LS	1		
1.4.9	Vegetation clearing and Site rehabilitation	LS	1		
	TOTAL PAGE 3				
	TOTAL CARRIED TO GRAND SUMMARY				

PART 2 - Combined hydraulic-chemical well rehabilitation

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
	Quantities 2.1-2.7 for 1 No of wells				
2.1	**Preparatory Measures**				
2.1.1	General site facilities to carry out the contractual services in terms of time and quantity, such as storage space, workplaces and parking spaces, machines and equipment of all kinds such as regeneration equipment, drain pipes, settling basins, other pumps and tools, to set up, load, assemble and dismantle water and power supply according to the specifications.	LS	1		
2.1.2	Construction site clearance after performance of the contract with restoration of the entire area including the access routes used, insofar as the restoration is rendered in individual items of this BoQ.	LS	1		
2.2	**Installation Work**				
2.2.1	Removal, cleaning and installation of well and shaft equipment including proper storage.(11.3 in the technical specification)	LS	1		
2.2.2	Disassembly, cleaning and installation of the rising pipe, U-pump and fittings including disassembly and professional installation of electrotechnical connections. Installation depth up to max. 120 m	LS	1		
2.2.3	Hose line up to 500 m length Laying to the nearest infiltration or discharge point and dismantle and remove after all work has been carried out.	LS	1		
2.2.4	Sedimentation tank with a capacity of 10 m³ for drainage of the pumped out regenerate transport, assemble/install and after all work has been carried out disassemble and remove.	LS	1		
2.3	**Preliminary and follow-up examinations**				
2.3.1	Mobilization and demobilization of the CCTV vehicle including personnel	LS	1		
2.3.2	Well inspection with color camera (axial and radial perspective) before respectively after regeneration up to 120 m depth	LS	1		
2.3.3	Protocol of the CCTV inspection before and after the regeneration, triple submission (3 x in writing, 1 x Word file) including photographic recording of anomalies before and after the regeneration (3 x in writing, 1 x jpg file)	No	2		
2.3.4	Documentation of the CCTV inspection carried out before and after the regeneration incl. submission of two copies of the video log on DVD)	No	2		
2.3.5	Turbidity-related clear pumping before or during well inspection	LS	1		
2.3.6	Performance of a pumping test before regeneration with a mobile flow meter to record the current capacity including documentation	LS	1		
2.4	**Mechanical and hydraulic pre-cleaning - Desanding**				
2.4.1	Mobilization and demobilization of the desanding facility and execution of desanding up to the technical absence of sand (0.1 g/m³)	LS	1		
2.4.2	Pre-cleaning of the well interior by brushes with variable diameter and the filter slots with adaptable bristle thicknesses including pumping off the dissolved parts according to specifications	LS	1		
2.4.3	Pre-cleaning of the well interior by means of high pressure including pumping out the dissolved parts. The rotating nozzle head is guided by pump centralizer, the nozzle diameter, the nozzle spacing and the pressure are adjusted to the well lining material and the well diameter.	LS	1		
2.4.4	Pre-cleaning of the filter gravel by straining with a packer in partial sections of 3.0 m	m	40		
2.4.5	Suction of the sump pipe up to the base plate	LS	1		
	TOTAL PAGE 1				0.00

PART 2 - Combined hydraulic-chemical well rehabilitation

2.5	**Hydraulic-chemical intensive cleaning**				
2.5.1	Provision, transport and installation of a double surge block (swabbing tool), as per specifictaions (incl. Maintenance and frequent installations as required)	LS	1		
2.5.2	Performance of a gravel-filling washing (pre-washing) in sections of 3.0 m each / overlapping 0.5 m with a circulating quantity of the regeneration solution adapted to the borehole diameter. The regeneration agent is added during the treatment of the respective section in order to prevent premature drifting in the substrate as described in the specifications. Reaction time 45 minutes.	m	40		
2.5.3	Straining of the regenerating solution with a packer until it can be proven that no regeneration agent is present.	No	2		
2.5.4	Performance of a gravel-filling wash (main wash) as described in item 2.5.2.	m	40		
2.5.5	Straining the regeneration solution with a packer until it can be proven that no regeneration agent is present.	No	1		
2.5.6	Performing the following measurements during pumping at 15-minute intervals: flow rate, water level, temperature, conductivity	LS	1		
2.5.7	Treatment and disposal of the pumped regeneration water: Discharge of the first surge of approx. 1 m³ from the respective section into a settling basin. Measurement and documentation of conductivity and sulphate and iron(II) concentration in 15 minute intervals. Subsequent discharge of the clear water phase, in compliance with the FAO limit (3000 µS/cm). Irrigation outside of protection zones I and II or discharge into the sewage system. Disposal of any flocculated oxide sludge together with other sludge from the waterworks in consultation with the client.	LS	1		
2.6	**Disinfection and well development**				
2.6.2	Performance of a well disinfection according to specifications (11.3.9 in the technical specification)	LS	1		
2.6.3	Performance of a pumping test as describe in the specifications.	No	1		
2.7	**Documentation**				
2.7.1	Preparation and delivery of documentation including daily construction reports, protocols and progress control measurements (3 x written, 1 x Word-/Excel). All measurement results as well as the regeneration process must be documented. - water level measurements - quantities of water - Consumption of regeneration agent per section - Measurements of all required chemical and physical parameters, test rod results and observations - discharge rates - Pump tests including water flow diagrams before/after - Desanding	No	1		
	Total for No 1 well: (Pos 2.2 - Pos. 2.7.1)				
	Provisional Sum **Rehabilitation of additional wells** as Multiple of "Total for No 1 Well" :				
	Rehabilitation of additional wells	PS	14		
	Total PAGE 2				**0**
	TOTAL CARRIED TO GRAND SUMMARY				**0**

PART 3 - PROVISIONAL BILL: Geophysical Investigations

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
3.1	**Mobilization**				
3.1.1	Mobilization/Demobilization of all necessary equipment and staff for proposed tasks to Momabasa/Tiwi	LS	1		
3.2	**Field Work**				
3.2.1	Execution of geoelectrical measurements Tiwi: Areas(s) to be covered as presented in the Annex: Tiwi: 1,9 km x 7,4 km (as per dwg 1210/K/015A) Calculations shall include all neccessary field work, cabeling, re-cabeling, Power supplies, as decribed in the specifications	LS	1		
3.2.2	Report: Presentation of a report with the following, but not limited to results and quality features: The report must also contain a generally understandable summary of the results. Minimum requirements of the report: 1.Title, author, client, customer, date, project number 2.Abstract 3.Geological information: Introduction, location, summary of available knowledge. 4.Up-to-date information: Digital photos of the area at the time of the investigations; description of locations including geology, topography, surface texture, vegetation, soil moisture, weather during data collection, possibly also a rough description of the weather situation before data collection (important for resistance mapping) 5.Method description, reason for the choice of prospecting method and the choice of devices, the measurement point density as well as a detailed device description 6.Deep position of the aquifer, salinities, additional information on layers and sublayer as well as on capacity. 7.Results, description and interpretation-see also points IV and V. vii) Summary 8.Data presentation as color pictures, topography and interpretation plan Three copies of the report as well as three copies of the electronically stored raw data and the processed data must be made available to the client	LS	1		
	TOTAL CARRIED TO GRAND SUMMARY - Provisional Sum				**0**

PART 4 - Drilling, Construction, Test Pumping of 2 No. New Wells (1 No. at Site A and 1 No. at Site 9)					
Item	**Description**	**Unit**	**Qty**	**Rate(KES)**	**Amount(KES)**
4.1	**Mobilisation, Setting up & Demobilisation**				
4.1.1	Mobilisation and demobilisation of drilling rig and test pumping unit	LS	1		
4.1.2	Transportation of drilling rig and test pump unit to site	LS	1		
4.1.3	Transportation of drilling rig and test pump unit to second site	LS	1		
4.2	**DRILLING OF BOREHOLES**				
4.2.1	Rotary drilling techniques should be used for drilling of boreholes, 17" final diameter, depth up to 120 m according to specifications inclduing sampling as per technical specifications	m	240		
4.3	**Well Construction**				
4.3.1	Supply and Installation of a sanitary seal (MS) to 5 m, the borehole shall be grouted using cement slurry of 1.85 - 2.15 kg cement/liter including the steel standpipe for stabilisation purposes, according to specifications	m	10		
4.3.2	Supply and Installation of plain casing (PVC with a minimum wall thickness of 6 mm and a diamter of 200 mm), according to specifications	m	140		
4.3.3	Supply and Installation of screen casing (uPVC with a minimum wall thickness of 6 mm and a diameter of 200 mm), according to specifications	m	100		
4.3.4	Installation of a 3/4" Observation Pipe in the borehole, for Water level Measures, max. length: 100 m; Material; PVC wiith a locked cap.	m	200		
4.3.5	Supply and installation of bottom plug (wooden or PVC)	No	2		
4.3.6	Supply and installation of gravel pack (consist of washed, well-rounded particles of a uniform grading of between 0.3 to 4.0 mm, shall comprise 90% siliceous material and must contain no clay, shale, silt, fines, excessive amounts of calcareous material or crushed rock - Kilindini- Sands), according to specifications	m^3	10		
4.3.7	Clay sealing, back fill and grouting	No	2		
4.3.8	Well development, according to specifications	hr	24		
4.3.9	Well disinfection, according to specifications	No	2		
	TOTAL PAGE 1				0.00

PART 4 - Drilling, Construction, Test Pumping of 2 No. New Wells (1 No. at Site A and 1 No. at Site 9)					
Item	**Description**	**Unit**	**Qty**	**Rate(KES)**	**Amount(KES)**
4.4	**Test Pumping**				
4.4.1	Step testing, 3 duty points, 144 hours, incl. all for the correct performance of the task necessary installations, pumps, pipes, erosion protection	hr	288		
4.4.2	Recovery test	hr	48		
4.5	**Well Completion**				
	Supply and install submersible pump, according to the results of the test pumping - refer to BoQ Part 5				
4.5.1	Prepare and submit testing pumping Report as per specifications.	LS	2		
4.5.2	Construct apron / concrete slab and concrete housing of well incl. well head with all necessary installations, openings in the suitable size and material for the required functionality of the well	No	2		
4.6	**Miscellaneous Works**				
4.6.1	Water quality sampling - testing the physic-chemical and bacteriological quality . (minimum of 4 suitable two-liter capacity water containers	LS	2		
4.7	**PROVISIONAL SUMS**				
4.7.1	Provisional sums for additional max 5 new boreholes, as per above positions	PS	5		
4.7.2	Stand by time (provisional sum) for 8 hours per day max	Days	28		
	TOTAL PAGE 2				0.00
	TOTAL CARRIED TO GRAND SUMMARY				0.00

PART 5.1 - Electro-Mechanical Works & Pipeworks Borehole A (Site-Replacement)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.1.1	**Electro-Mechanical Works:**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST:				
5.1.1.01	Submersible pump set of capacity 40 m^3/hr of water against a total head of 135 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 54 metres below ground level.	Nr	1		
5.1.1.02	Overheads and profits on item 5.1.1.01 as specified for Prime Cost sum items	%		-	
5.1.1.03	16 mm^2/4 core submersible pump flat cable	m	58		
5.1.1.04	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.1.1.05	OD25 class D uPVC dipper pipe	m	55		
5.1.1.06	DN100 GS class C threaded water pipe.	m	55		
5.1.1.07	DN100 GS steam sockets	Nr	12		
5.1.1.08	DN100x300 mm long GI starter pipe	Nr	1		
5.1.1.09	0.75mm^2 sc double insulated copper cable(brown and black) each 53 metres	m	106		
5.1.1.10	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable	m	35		
5.1.1.11	Lay in trench/duct, connect and test 16 mm^2/4c armoured copper cable	LM	35		
5.1.1.12	Copper cable gland c/w lock-nut and shroud for 16 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.1.1.13	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable	Nr	2		
5.1.1.14	18.5 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
5.1.1.15	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.1.1.16	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.1.1.17	25 mm^2 sc copper cable (green)	m	5		
	TOTAL PAGE 1				**-**

PART 5.1 - Electro-Mechanical Works & Pipeworks Borehole A (Site-Replacement)

5.1.1.18	Supply and install water-tight GS cable junction box of size 125x125x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side, 3 No. 10 amps and 5 No. 60 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cables.	Nr.	1		
5.1.1.19	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr.	1		
5.1.1.20	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 70 m (to be determined after test pumping).	SET	1		
5.1.1.21	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN 80, Qmax=80m^3/hr, Qnom=40m^3/hr, Q_T=8m^3/hr and Qmin=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr.	1		
5.1.1.22	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr.	1		
5.1.1.23	**INSTALLATION SUNDRIES**				
5.1.1.23a	ID220x4 mm Thick GS Borehole cap with welded DN100 GS pipe piece, welded DN44 GI slow bend for passage of 16mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr.	1		
5.1.1.23b	Boss white (200 gm tin)	pc	3		
5.1.1.23c	550 mm plastic cable tie	Nr.	40		
5.1.1.23d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.1.1.23e	12 mm Wx12 ML PTFE thread seal tape	ROLL	15		
5.1.1.23f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.1.1.23g	Stainless steel ferrules for 16 mm^2 cable	Nr.	4		
	New Mains Power Control Swichgear Panel and Switch gear/Office Building Wiring				
5.1.2	**Mains Power Control Switchgear Panel**				
5.1.2.01	Free standing, 250 amps, 3 phase, 415 vac, compact, compartmented, indoor, surface metal clad maiins power control panel (IP20), dust-proof, termite-proof, comprising of but not limited to the following, duly wired and labeled. It shall be constructed from gauge 16 spangled sheet steel of minimum thickness 1.75mm;	Nr.	1		
5.1.2.02	Kenya Power & Lighting Company CUT-OUTS chamber	Nr.	1		
5.1.2.03	1xKPLC incommer Current transformers chamber	Nr.	1		
5.1.2.04	1xKPLC metering equipment chamber incommer Current transformers chamber	Nr.	1		
5.1.2.05	1x250 amps adjustable triple pole mccb (adjustable range: 0.7I_N, 0.8I_N, 0.9I_N, 1.0I_N set at 0.8I_N where I_N= rated current of mccb = 250 amps).	Nr.	1		
5.1.2.06	1x20 Kvar, 3 phase, 415 vac, 5 step central automatic power capacitor correction bank c/w 100 amps TP supply mccb, contactors, fuses, programmable electronic PF controller.relay etc.	Nr.	1		
5.1.2.07	1xsingle phase, 240 vac kWh energy registering meter	Nr.	1		
5.1.2.08	4x260 amps high conductivity rectangular bare copper bus-bar conductors.	Nr.	1		
5.1.2.09	2x100 amps, TP, 415 vac, mccbs, I_{CU} =15 kA. Each in its own compartment (for Boreholes).	Nr.	1		
5.1.2.10	1x63 amps, TP, 415 vac, mccbs, I_{CU} =15 kA. Each in its own cmpartment. (Spares)	Nr.	1		
5.1.2.11	1x3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mccb terminals.	Nr.	1		
	TOTAL PAGE 2				-

PART 5.1 - Electro-Mechanical Works & Pipeworks Borehole A (Site-Replacement)					
5.1.2.12	1x125 amps,1phase, 240 vac class "A" mcbs (Building Distribution Board)	Nr	1		
5.1.2.13	1x Cooling fan rated 25 watts, 240 vac, 2800 rpm continuously rated installed on the side, 100 mm height from the bottom clw filter and termite-proof, dust-proof stainless steel protection D1.5 mm wiregauze.	Nr	1		
5.1.2.14	2x ventillation hole of size 150x100 mm installed on the top opposite sides, 50 mm below top c/w termite-proof, dust-proof filter and grid.	Nr	1		
5.1.2.15	1x3 phase, 240 vac network analyzer/recorder (voltage/current/kWh/Pf/Hz) resettable, as MCAplus, Circutor Smart or similar quality approved make with LED phase indicators (RED, YELLOW, BLUE) on front panel.	Nr	1		
5.1.2.16	100 amps, 6 way, 1 phase, 240 vac DIN distribution board; c/w; 2 No. 10 amps, 1 pole, 240 vac class "A" mcbs, 3 No. 20 amps, 1 pole class "A" mcbs, 1 No. Blanking plate.	Nr	1		
5.1.2.17	3xAC ammeters range 0-300 amps c/w CTS.	Nr	1		
5.1.7.18	1xAC voltmeter (0-500 vac) c/w vss and protection mcbs.	Nr	1		
5.1.2.19	250 amps, 415 vac TPN manual changer-over switch c/w pilot indicator lights (KPLC ON, KPLC LOAD ON, GENERATOR ON, GENERATOR LOAD ON etc).	Nr	1		
5.1.2.20	32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid.				
5.1.2.21	25x3 mm thick copper strip bound along the switchgear panel length (earthing)	SET	1		
5.1.3	**Electrical Repairs of Mains Power Control Switchgear/Office Building**				
5.1.3.01	Remove the existing socket/lighting wiring.	LS	1		
5.1.3.02	20 mm diam. GS conduit fixed on the walls and roof members. The cost shall be inclusive of tees, bends, circular boxes with covers, other necessary accessories	m	40		
5.1.3.03	1.5 mm^2 single copper cables (Red=80 m, Black=50 m , Green =50 m) laid in GS conduit and terminated at boh ends.	m	180		
5.1.3.04	2.5 mm^2 single copper cables (Red=25 m, Black=25 m , Green =25 m) laid in GS conduit and terminated at boh ends.	m	90		
5.1.3.05	10 amps, 1 way 2 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	1		
5.1.3.06	10 amps, 1 way 1 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	1		
5.1.3.07	13 amps, 240 vac, single switched socket outlet (smc) as Mem, Crabtree or similar quality approved make c/w box stainless steel screws (ringmain circuit).	Nr	4		
5.1.3.08	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	2		
5.1.3.09	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	4		
	TOTAL PAGE 3				-

PART 5.1 - Electro-Mechanical Works & Pipeworks Borehole A (Site-Replacement)					
5.1.3.10	2.5 mm^2 single core copper cables (Red= 10 m, Black=10 m, Green= 10 m)wired in 20 mm diameter pvc conduit from consumer unit to fan speed control unit and fan terminals.	m	30		
5.1.3.11	3 blade, adjustable slow speed (0-300 rpm), 240 vac ceiling mounted cooling fan c/w speed adjustable control unit completely wired (in conduit).	SET	1		
5.1.4	**Fire Fighting Equipment**				
5.1.4.01	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	2		
5.1.5	**Other Electro-Mechanical Works**				
5.1.5.01	Improve lightning protection system	LS	1		
5.1.5.02	Disconnection and handing over to the Employer the entire existing electrical installations	LS	1		
5.1.5.03	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.1.5.04	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.1.5.05	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations.	LS	1		
5.1.5.06	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.1.5.09	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GI pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	35		
5.1.5.10	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 20 Kg/cm^2 (0-20 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket.. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.1.5.11	High quality pressure gauge - IP54, with dual scale (Kg/cm^2 and Bar).Range (0 - 20 Kg/cm^2)/(0 - 20 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.1.5.12	Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe	Nr	No.		
5.1.5.13	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse,187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20,	Nr	1		
5.1.5.14	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz	Nr	1		
5.1.5.15	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to $+55^0$C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.1.5.16	Supply and installation of 1.5mm² armoured underground cable for the well probe.	m	35		
	TOTAL PAGE 4				**-**

PART 5.1 - Electro-Mechanical Works & Pipeworks Borehole A (Site-Replacement)

5.1.6	**Pressure Pipes and Fittings:**				
	Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.				
5.1.6.01	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
5.1.6.02	DN 100 mm, PN 16 bar non-slam, non-return valve.	Nr	1		
5.1.6.03a	DN 100 mm, PN 16 bar gate valve c/w hand wheel.	Nr	1		
5.1.6.03b	DN 100xPN 16 bar gate valve (threaded c/w hand wheel.	Nr	1		
5.1.6.04	DN 100 mm, PN 16 bar Y-strainer	Nr	1		
5.1.6.05	DN100x200 mmL GS pipe piece (threaded) with bore for mounting an air valve.	Nr	1		
5.1.6.06	DN100x1500 mmL GS pipe piece (threaded).	Nr	1		
5.1.6.07	DN100x250 mmL GS pipe piece, flanged on one side and plain at the opposite end.	Nr	6		
5.1.6.08	DN100x90^{o} GS slow bend (threaded)	Nr	4		
5.1.6.09	DN100 GS socket (threaded)	Nr	4		
5.1.6.10	DN100 double flanged GS equal Tee	Nr	1		
5.1.6.11	DN100 steel Johnson coupling c/w rubber rings.	Nr	4		
5.1.6.12	100mmWx5 mm thick rubber gasket	m	2		
5.1.6.13	DN100x1200 mmL GS pipe piece threaded.	Nr	2		
5.1.6.14	DN100x2500 mmL GS pipe piece (threaded).	Nr	2		
5.1.6.15	DN100 steel union	Nr	3		
5.1.6.16	DN100 GS male bush	Nr	4		
5.1.6.17	Any other accessories required for the system	LS	1		
5.1.7	**Removal Of Old Items And Trenching**				
5.1.7.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	30		
5.1.7.02	Break existing RC pipe support block.	Nr	2		
5.1.7.03	Excavate to expose and remove a section of existing DN 100 GS Borehole-Rising main inter-connection pipe work. Trim the trenching to size 500 mmW900 mm depth. Back fill to ground level after laying of cable. Cart away , dispose excess as advised.	m	5		
	TOTAL PAGE 5				**-**
	TOTAL BH A:- CARRIED TO BILLL 5 SUMMARY SHEET				**-**

PART 5.2 - Electro-Mechanical Works & Pipeworks Borehole C (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount (KES)
ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.2.1	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST:				
5.2.1.01	Submersible pump set of capacity 44m^3/hr of water against a total head of 156 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 55 metres below ground level.	nr	1		
5.2.1.02	Overheads and profits on item 5.2.1.01 as specified for Prime Cost sum items	%			
5.2.1.03	16 mm^2/4 core submersible pump flat cable	m	58		
5.2.1.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.21.06	OD25 class D uPVC dipper pipe	m	54		
5.2.1.07	DN100 GS class C threaded water pipe.	m	55		
5.2.1.08	DN100 Steel steam sockets	Nr	12		
5.2.1.09	DN100x300 mm long GS starter pipe (threaded)	Nr	1		
5.2.1.10	0.75mm^2 sc double insulated copper cable(brown and black) each 76 metres	m	116		
5.2.1.11	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable (starter panel to borehole)	m	15		
5.2.1.12	Lay in trench/duct, connect and test 10 mm^2/4c armoured copper cable	m	15		
5.2.1.13	Copper cable gland c/w lock-nut and shroud for 16 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.2.1.14	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable.	Nr	2		
5.2.1.15	Supply and install water-tight GS cable junction box of size 150x150x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side. 3 No. 10 amps and 5 No. 80 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cable.	Nr	1		
5.2.1.16	30 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit. The cost shall be inclusive 10 mm^2/4c armoured copper cable, cable glands etc for connection from starter panel to main switchgear.	SET	1		
5.2.1.17	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr	1		
5.2.1.18	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 75 m (to be determined after test pumping).	SET	1		
5.2.1.19	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN80, Q_{max}=80m^3/hr, Q_{nom}=40m^3/hr, Q_T=8m^3/hr and Q_{min}=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
	TOTAL PAGE 1				-

PART 5.2 - Electro-Mechanical Works & Pipeworks Borehole C (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount (KES)
5.2.1.20	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	No	1		
5.2.1.21	**Installation Sundries**				
5.2.1.21a	ID220x4 mm Thick GS Borehole cap with welded DN100 GS pipe piece, welded DN38 GS slow bend for passage of 16mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.2.1.21b	Boss white (200 gm tin)	pc	2		
5.2.1.21c	450 mm plastic cable tie	Nr	45		
5.2.1.21d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.2.1.21e	12 mm Wx12 ML PTFE thread seal tape	ROLL	10		
5.2.1.21f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.2.1.21g	Stainless steel ferrules for 16mm^2 cable	Nr	4		
5.2.1.21h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	3		
5.2.1.22	**Other Electro-mechanical Works - BH C**				
5.2.1.22a	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.2.1.23b	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.2.1.22c	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations.	LS	1		
5.2.1.22d	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.2.1.22e	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	10		
5.2.1.22f	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 25 Kg/cm^2 (0 - 25 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.2.1.22g	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 30 Kg/cm^2)/(0 - 30 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It	Nr	1		
5.2.1.22h	Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.	Nr	1		
5.2.1.22i	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse, 187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20.	Nr	1		
5.2.1.22j	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz.	Nr	1		
	TOTAL PAGE 2				-

PART 5.2 - Electro-Mechanical Works & Pipeworks Borehole C (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount (KES)
5.2.1.22k	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.2.1.22l	Supply and installation of 1.5mm² armoured underground cable for the well probe.	m	15		
5.2.1.23	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.2.1.23a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
5.2.1.23b	DN100x90^o GI slow bend with a bore for pressure gauge	Nr	1		
5.2.1.23c	DN100 GI socket with bore for mounting air valve	Nr	1		
5.2.1.23d	DN100x1200 GI pipe piece (threaded at both ends)	Nr	2		
5.2.1.23e	DN100x300 GI pipe piece (threaded at both ends)	Nr	1		
5.2.1.23f	DN100x90^o GI slow bend	Nr	2		
5.2.1.23g	DN100 GI hex nipple	Nr	4		
5.2.1.23h	DN100 GS union	Nr	3		
5.2.1.23i	DN100xPN16 steel Non-slam Non-Return valve.	Nr	1		
5.2.1.23j	DN100xPN16 steel gate valve c/w handwheel	Nr	2		
5.2.1.23k	DN100x250 mmL GS pipe piece	Nr	2		
5.2.1.23l	DN100x2500 mmL GS pipe piece.	Nr	1		
5.2.1.23m	DN100 steel Johnson coupling c/w rubber rings.	Nr	3		
5.2.2	**Removal Of Old Items And Trenching**				
5.2.2.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	15		
5..2.2.02	Excavate, expose and remove a section of existing DN100 GI Borehole-rising main inter-connection pipe work. Trim the trenching to size 500 mmWx600 mm depth. Back fill to ground level after laying of pipe. Cart away, dispose excess as advised.	m	3		
	TOTAL PAGE 3				**-**

PART 5.2 - Electro-Mechanical Works & Pipeworks Borehole C (Site-Repairs)					
ITEM	**DESCRIPTION**	**UNIT**	**QTY**	**Rate(KES)**	**Amount (KES)**
5.2.3	**REHABILITATION OF MAINS POWER CONTROL SWITCHGEAR PANEL, ELECTRICAL WIRING OF SWITCHGEAR/OFFICE/SANITATION BUILDING AND FIRE FIGHTING EQUIPMENT**				
5.2.3.1	**MAINS POWER CONTROL SWITCHGEAR PANEL**				
5.2.3.1.01	Open the mains power switchgear panel, carefully clean, dust and air blows the compartments. Tighten any loose, cables, bolts and nuts	Item	1		
5.2.3.1.02	Install 3 phase, 415 vac surge divertor c/w protective mcbs.	Nr	1		
5.2.3.1.03	Install 15 Kvar, 3 phase, 415 vac, 4 step automatic power capacitor correction bank.	Set	1		
5.2.3.1.04	Remove the defective cooling fan. Install a new one rated 25 watts, 240 vac at 100 mm height from the bottom of the panel c/w dust-prooof filter and protective GS wire frame (2x2xD1.5 mm). Install where the defective fan has been removed from, protective GS grid (2x2xD1.5 mm) c/w filter .	Set	1		
5.2.3.2	**MAINS POWER CONTROL SWITCHGEAR/OFFICE/WC BUILDING WIRING**				
5.2.3.2.01	Remove the existing socket/lighting wiring, replace the defective sections of conduit	Item	1		
5.2.3.2.02	Re-wire the lighting circuits using 1.5 mm^2 single copper cables (Red=90 m, Black=70 m , Green =70 m).	m	230		
5.2.3.2.03	Re-wire the sockets circuits using 2.5 mm^2 single copper cables (Red= 60 m, Black=60 m , Green = 60 m)	m	180		
5.2.3.2.04	10 amps, I way 2 gang switch (IVY white, flush) as Mem, Crabtree or similar quality approved make.	Nr	1		
5.2.3.2.05	13 amps, 240 vac, twin switched socket outlet (IVY White, flush) as Mem, Crabtree or similar quality approved make c/w stainless steel screws (ringmain circuit).	Nr	3		
5.2.3.2.06	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	2		
5.2.3.2.07	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	4		
5.2.3.2.08	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.2.3.2.09	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber..	Nr	1		
5.2.3.2.10	25 mm^2 sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape.	m	m		
5.2.3.2.11	3 blade, adjustable slow speed (0-300 rpm), 240 vac ceiling mounted cooling fan c/w speed adjustable control unit completely wired (in conduit).	SET	1		
5.2.4	**Fire Fighting Equipment**				
5.2.4.01	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	2		
	TOTAL PAGE 4				
TOTAL BH C:- CARRIED TO BILLL 5 SUMMARY SHEET					

PART 5.3 - Electro-Mechanical Works & Pipeworks Borehole D2, D3 (Site Repairs)

5.3.1 BOREHOLE D2

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.3.1.1	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
5.3.1.1.01	Submersible pump set of capacity 40m^3/hr of water against a total head of 165 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 42 metres below ground level.	nr	1		
5.3.1.1.02	Overheads and profits on item 5.3.1.1.01 as specified for Prime Cost sum items	%		-	
5.3.1.1.03	10 mm^2/4 core submersible pump flat cable	m	44		
5.3.1.1.04	DN6x120 mmL stainless steel water level cotrol electrodes.	pairs	1		
5.3.1.1.05	OD25 class D uPVC dipper pipe	mm	42		
5.3.1.1.06	DN75 GS class C threaded water pipe.	m	42		
5.3.1.1.07	DN75 GS steam sockets	Nr	12		
5.3.1.1.08	DN75x300 mm long GS starter pipe	Nr	1		
5.3.1.1.09	0.75mm^2 sc double insulated copper cable(brown and black) each 44 metres	m	88		
5.3.1.1.10	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable (starter panel to borehole)	m	20		
5.3.1.1.11	Lay in trench/duct, connect and test 10 mm^2/4c armoured copper cable	m	20		
5.3.1.1.12	Copper cable gland c/w lock-nut and shroud for 10 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.3.1.1.13	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable.	Nr	2		
5.3.1.1.14	Supply and install water-tight GS cable junction box of size 150x150x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side. 3 No. 10 amps and 5 No. 60 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 10 mm^2/4c and 0.75 mm^2 sc submerssible cable.	Nr	1		
5.3.1.1.15	22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit. The cost shall be inclusive 10 mm^2/4c armoured copper cable, cable glands etc for connection from starter panel to main switchgear.	SET	1		
5.3.1.1.16	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr	1		
5.3.1.1.17	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 70 m (to be determined after test pumping).	SET	1		
	TOTAL PAGE 1				**-**

PART 5.3 - Electro-Mechanical Works & Pipeworks Borehole D2, D3 (Site Repairs)

5.3.1 BOREHOLE D2

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.3.1.1.18	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN80, Q_{max}=80m^3/hr, Q_{nom}=40m^3/hr, Q_T=8m^3/hr and Q_{min}=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
5.3.1.1.19	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nt	1		
5.3.1.1.20	**Installation Sundries**				
5.3.1.1.20a	ID220x4 mm Thick GS Borehole cap with welded DN100 GS pipe piece, welded DN38 GS slow bend for passage of 10mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.3.1.1.20b	Boss white (200 gm tin)	pc	2		
5.3.1.1.20c	500 mm plastic cable tie	Nr	35		
5.3.1.1.20d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.3.1.1.20e	12 mm Wx12 ML PTFE thread seal tape	ROLL	10		
5.3.1.1.20f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.3.1.1.20g	Stainless steel ferrules for 10mm^2 cable	Nr	4		
5.3.1.1.20h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	3		
5.3.1.1.21	**Other Electro-mechanical Works - BH D2**				
5.3.1.1.21a	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.3.1.1.21b	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.3.1.1.21c	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations.	LS	1		
5.3.1.1.21d	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 20 bar, over	Nr	1		
5.3.1.1.21e	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	15		
5.3.1.1.21f.	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 25 Kg/cm^2 (0 - 25 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.3.1.1.21g	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 30 Kg/cm^2)/(0 - 30 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.3.1.1.21h	Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.	Nr	1		
5.3.1.1.21i	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse, 187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20.	Nr	1		
5.3.1.1.21j	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz.	Nr	1		
	TOTAL PAGE 2				-

PART 5.3 - Electro-Mechanical Works & Pipeworks Borehole D2, D3 (Site Repairs)

5.3.1 BOREHOLE D2

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.3.1.1.21k	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.3.1.1.21l	Supply and installation of 1.5mm² armoured underground cable for the well probe.	m	20		
5.3.1.1.22	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.3.1.1.22a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
5.3.1.1.22b	DN75x90^o GS slow bend with a bore for pressure gauge	Nr	1		
5.3.1.1.22c	DN75 GS socket with bore for mounting air valve	Nr	1		
5.3.1.1.22d	DN100x1200 GS pipe piece (threaded at both ends)	Nr	2		
5.3.1.1.22e	DN100x300 GS pipe piece (threaded at both ends)	Nr	1		
5.3.1.1.22f	DN75x90^o GS slow bend (threaded)	Nr	3		
5.3.1.1.22g	DN75 GS hex nipple	Nr	4		
5.3.1.1.22h	DN75 CS union	Nr	3		
5.3.1.1.22i	DN100xPN16 steel Non-slam Non-Return valve.	Nr	1		
5.3.1.1.22j	DN75xPN16 steel gate valve (threaded) c/w handwheel	Nr	1		
5.3.1.1.22k	DN100xPN16 steel gate valve c/w handwheel	Nr	1		
5.3.1.1.22l	DN100x250 mmL GS pipe piece	Nr	2		
5.3.1.1.22m	DN100x2000 mmL GS pipe piece.	Nr	1		
5.3.1.1.22n	DN100 steel Johnson coupling c/w rubber rings.	Nr	3		
5.3.1.1.22o	DN100x75 GS reducer.	Nr	1		
5.3.1.1.22p	DN75 steel Johnson coupling c/w rubber rings.	Nr	1		
5.3.1.1.22q	DN75x250 mmL adaptor GS pipe piece,flanged one end and plain the opposite end	Nr	1		
5.3.1.1.23r	DN100x250 mmL GS pipe piece one side flanged, the other side plain	Nr	1		
5.3.1.2	**INTER-CONNECTION OF BH D2 TO BH D1 RISING MAIN**				
5.3.1.2.01	DN100 GS pipe laid, from BH D2 and connected to BH D3 rising	m	50		
5.3.1.2.02	DN100 Equal Yye Tee	Nr	1		
5.3.1.2.03	DN100x300 mmL GS adaptor pipe piece.	Nr	2		
5.3.1.2.04	DN100x50 mmL GS adaptor pipe piece.	Nr	2		
5.3.1.2.05	Any other necessry item	LS	1		
5.3.1.3	**Removal Of Old Items and Trenching**				
5.3.1.3.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	15		
5.3.1.3.02	Excavate, expose and remove a section of existing DN100 GS Borehole-rising main inter-connection pipe work. Trim the trenching to size 500 mmWx600 mm depth. Back fill to ground level after laying of pipe. Cart away, dispose excess as advised.	m	60		
	TOTAL PAGE 3				**-**

PART 5.3 - Electro-Mechanical Works & Pipeworks Borehole D2, D3 (Site Repairs)

5.3.1 BOREHOLE D2

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)

BOREHOLE D3

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.3.2	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST:				
	NOTE:				
5.3.2.1.01	Submersible pump set of capacity 41m^3/hr of water against a total head of 180 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 62 metres below ground level.	Nr	1		
5.3.2.1.02	Overheads and profits on item 5.3.2.1.01 as specified for Prime Cost sum items	%			
5.3.2.1.03	16 mm^2/4 core submersible pump flat cable	m	65		
5.3.2.1.04	DN6x120 mmL stainless steel water level cotrol electrodes.	pair	1		
5.3.2.1.05	OD25 class D uPVC dipper pipe	m	62		
5.3.2.1.06	DN100 GS class C threaded water pipe.	m	62		
5.3.2.1.07	DN100 GS steam sockets	Nr	13		
5.3.2.1.08	DN100x300 mm long GS starter pipe	Nr	1		
5.3.2.1.09	0.75mm^2 sc double insulated copper cable(brown and black) each 65 metres	m	130		
5.3.2.1.10	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable (starter panel to borehole)	m	45		
5.3.2.1.11	Lay in trench/duct, connect and test 25 mm^2/4c armoured copper cable	m	45		
5.3.2.1.12	Copper cable gland c/w lock-nut and shroud for 25 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.3.2.1.13	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable.	Nr	2		
5.3.2.1.14	Supply and install water-tight GS cable junction box of size 150x150x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side. 3 No. 10 amps and 5 No. 80 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16 mm^2/4c and 0.75 mm^2 sc submerssible cable.	Nr	1		
5.3.2.1.15	26 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit. The cost shall be inclusive 25 mm^2/4c armoured copper cable, cable glands etc for connection from starter panel to main switchgear.	SET	1		
5.3.2.1.16	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr	1		
5.3.2.1.17	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm^2 of 70 m (to be determined after test pumping).	SET	1		
5.3.2.1.18	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN80, Q_{max}=80m^3/hr, Q_{nom}=40m^3/hr, Q_T=8m^3/hr and Q_{min}=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
	TOTAL PAGE 4				**-**

PART 5.3 - Electro-Mechanical Works & Pipeworks Borehole D2, D3 (Site Repairs)

5.3.1 BOREHOLE D2

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.3.2.1.19	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
5.3.2.1.20	**Installation Sundries**				
5.3.2.1.20a	ID220x4 mm Thick GS Borehole cap with welded DN100 GS pipe piece, welded DN38 GS slow bend for passage of 10mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.3.2.1.20b	Boss white (200 gm tin)	pc	2		
5.3.2.1.20c	550 mm plastic cable tie	Nr	45		
5.3.2.1.20d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.3.2.1.20e	12 mm Wx12 ML PTFE thread seal tape	ROLL	10		
5.3.2.1.20f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.3.2.1.20g	Stainless steel ferrules for 10mm^2 cable	Nr	4		
5.3.2.1.20h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	3		
5.3.2.1.21	**Other Electro-mechanical Works - BH D3**				
5.3.2.1.21a	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.3.2.1.21b	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.3.2.1.21c	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations.	LS	1		
5.3.2.1.21d	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.3.2.1.21e	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	15		
5.3.2.1.21f	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 30 Kg/cm^2 (0 - 30 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.3.2.1.21g	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 35 Kg/cm^2)/(0 - 35 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.3.2.1.21h	Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.	Nr	1		
	TOTAL PAGE 5				**-**

PART 5.3 - Electro-Mechanical Works & Pipeworks Borehole D2, D3 (Site Repairs)

5.3.1 BOREHOLE D2

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.3.2.1.21i	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse, 187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20.	Nr	1		
5.3.2.1.21j	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz.	Nr	1		
5.3.2.1.21k	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^0C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.3.2.1.21l	Supply and installation of 1.5mm² armoured underground cable for the well probe.	m	45		
5.3.2.1.22	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.3.2.1.22a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
5.3.2.1.22b	DN100x90° GS slow bend with a bore for pressure gauge	Nr	1		
5.3.2.1.22c	DN100 GS socket with bore for mounting air valve	Nr	1		
5.3.2.1.22d	DN100x1200 GS pipe piece (threaded at both ends)	Nr	2		
5.3.2.1.22e	DN100x300 GS pipe piece (threaded at both ends)	Nr	1		
5.3.2.1.22f	DN100x90° GS slow bend (threaded)	Nr	3		
5.3.2.1.22g	DN100 GS hex nipple	Nr	4		
5.3.2.1.22h	DN100xPN20 steel Non-slam Non-Return valve.	Nr	1		
5.3.2.1.22i	DN100xPN20 steel gate valve c/w handwheel	Nr	1		
5.3.2.1.22j	DN100x250 mmL GS pipe piece	Nr	2		
5.3.2.1.22k	DN100x2000 mmL GS pipe piece.	Nr	1		
5.3.2.1.22l	DN100 steel Johnson coupling c/w rubber rings.	Nr	5		
5.3.2.1.22m	DN100x250 mmL adaptor GS pipe piece,flanged one end and plain the opposite end	Nr	4		
5.3.2.3	**INTER-CONNECTION OF BH D2 TO BH D3 RISING MAIN**				
5.3.2.3.01	DN100 GS Class C pipe laid, from BH D2 and connected to BH D3 rising main.	m	50		
5.3.2.3.02	DN100 Equal Y-Tee	Nr	1		
5.3.2.3.03	DN100x300 mmL GS adaptor pipe piece.	Nr	3		
5.3.2.3.04	DN100x500 mmL GS adaptor pipe piece.	Nr	3		
5.3.2.3.05	Any other necessry item	LS	1		
	TOAL PAGE 6				**-**

PART 5.3 - Electro-Mechanical Works & Pipeworks Borehole D2, D3 (Site Repairs)

5.3.1 BOREHOLE D2

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.3.3	**Removal Of Old Items and Trenching**				
5.3.3.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	40		
5.3.3.02	Excavate, expose and remove a section of existing DN100 GS Borehole-rising main inter-connection pipe work. Trim the trenching to size 500 mmWx600 mm depth. Back fill to ground level after laying of pipe. Cart away, dispose excess as advised.	m	5		
5.3.3	**REHABILITATION OF MAINS POWER CONTROL SWITCHGEAR PANEL, ELECTRICAL WIRING OF SWITCHGEAR/OFFICE/SANITATION BUILDING AND FIRE FIGHTING EQUIPMENT**				
5.3.3.1	**MAINS POWER CONTROL SWITCHGEAR PANEL**				
5.3.3.1.01	Open the mains power switchgear panel, carefully clean, dust and air blows the compartments. Tighten any loose, cables, bolts and nuts	Item	1		
5.3.3.1.02	Install 3 phase, 415 vac surge divertor c/w protective mcbs and any other missing items.	LS	1		
5.3.3.2	**MAINS POWER CONTROL SWITCHGEAR/OFFICE BUILDING WIRING**				
5.3.3.2.01	Remove the existing socket/lighting wiring, replace the defective sections of conduit	LS	1		
5.3.3.2.02	Re-wire the lighting circuits using 1.5 mm^2 single copper cables (Red=90 m, Black=70 m , Green =70 m).	m	230		
5.3.3.2.03	Re-wire the sockets circuits using 2.5 mm^2 single copper cables (Red= 60 m, Black=60 m , Green = 60 m)	m	180		
5.3.3.2.04	10 amps, I way 2 gang switch (IVY white, flush) as Mem, Crabtree or similar quality approved make.	Nr	1		
5.3.3.2.05	13 amps, 240 vac, single switched socket outlet (IVY White, flush) as Mem, Crabtree or similar quality approved make c/w stainless steel screws (ringmain circuit).	Nr	4		
5.3.3.2.06	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	2		
5.3.3.2.07	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	4		
5.3.3.2.08	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.3.3.2.09	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.3.3.2.10	25 mm^2 sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape.	m	3		
5.3.3.2.11	32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid, wired using 6 mm2 sc copper cables in 32 mm diameter GS conduit.	Nr	1		
5.3.3.2.12	3 blade, adjustable slow speed (0-300 rpm), 240 vac ceiling mounted cooling fan c/w speed adjustable control unit completely wired (in GS conduit).	SET	1		
5.3.4	**Fire Fighting Equipment**				
5.3.4.01	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	2		
	TOTAL PAGE 7				-

TOTAL BHs D2, D3:- CARRIED TO BILLL 5 SUMMARY SHEET				

PART 5.4 - Electro-Mechanical Works & Pipeworks Borehole E2 (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.4.1	**Electro-Mechanical Works:**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
5.4.1.1	Remove Grundfos SP46-13 pump set c/w 42 metres of DN100 GI drop pipes.	LS	1		
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST:				
5.4.1.2	Submersible pump set of capacity 48 m^3/hr of water against a total head of 115 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 42 metres below ground level, c/w cable guard.	nr	1		
5.4.1.3	Overheads and profits on item 5.4.1.2 as specified for Prime Cost sum items	%			
5.4.1.4	10 mm^2/4 core submersible pump flat cable	m	45		
5.4.1.5	DN6x120 mmL stainless steel water level control electrodes.	pair	1		
5.4.1.6	OD25 class D uPVC dipper pipe	m	42		
5.4.1.7	DN100 GS class C threaded water pipe.	m	42		
5.4.1.8	DN100 steel steam sockets	Nr	11		
5.4.1.9	DN100x300 mm long GS starter pipe	Nr	1		
5.4.1.10	0.75mm^2 sc double insulated copper cable(brown and black) each 45 metres	m	90		
5.4.1.11	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable	m	20		
5.4.1.12	Lay in trench/duct, connect and test 10 mm^2/4c armoured copper cable	m	20		
5.4.1.13	Copper cable gland c/w lock-nut and shroud for 10m^2/4 core pvc swa pvc copper cable.	Nr	2		
5.4.1.14	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable	Nr	2		
5.4.1.15	22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
5.4.1.16	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.4.1.17	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.4.1.18	35 mm^2 sc copper cable (green)	m	5		
	TOTAL PAGE 1				-

PART 5.4 - Electro-Mechanical Works & Pipeworks Borehole E2 (Site-Repairs)					
ITEM	**DESCRIPTION**	**UNIT**	**QTY**	**Rate(KES)**	**Amount(KES)**
5.4.1.19	Supply and install water-tight GS cable junction box of size 125x125x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side,. 3 No. 10 amps and 5 No. 60 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 10mm^2/4c and 0.75 mm^2 sc submerssible cables.	Nr	1		
5.4.1.20	DN38x150 mmL GI threaded pipe piece (cable entry)	Nr	1		
5.4.1.21	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 70 m (to be determined after test pumping).	SET	1		
5.4.1.22	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN 80, Qmax=80m^3/hr, Qnom=40m^3/hr, Q_T=8m^3/hr and Qmin=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
5.4.1.23	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
5.4.1.24	**INSTALLATION SUNDRIES**				
	ID320x7 mm Thick GS Borehole cap with welded DN100 GS pipe piece, welded DN38 GS slow bend for passage of 10 mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.4.1.24b	Boss white (200 gm tin)	Pc	3		
5.4.1.24c	550 mm plastic cable tie	Nr	35		
5.4.1.24d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.4.1.24e	12 mm Wx12 ML PTFE thread seal tape	ROLL	15		
5.4.1.24f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.4.1.24g	Stainless steel ferrules for 10 mm^2 cable	Nr	4		
5.4.1.24h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	2		
	New Mains Power Control Swichgear Panel and Switch gear/Office Building Wiring				
5.4.2	**Mains Power Control Switchgear Panel**				
5.4.2.1	Free standing, 250 amps, 3 phase, 415 vac, compact, compartmented, indoor, surface metal clad maiins power control panel (IP20), dust-proof, termite-proof, comprising of but not limited to the following, duly wired and labeled. It shall be constructed from gauge 16 spangled sheet steel of minimum thickness 1.75mm;	Nr	1		
5.4.2.2	Kenya Power & Lighting Company CUT-OUTS chamber	Nr	1		
5.4.2.3	1xKPLC incommer Current transformers chamber	Nr	1		
5.4.2.4	1xKPLC metering equipment chamber incommer Current transformers chamber	Nr	1		
5.4.2.5	1x250 amps adjustable triple pole mccb (adjustable range: 0.7I_N, 0.8I_N, 0.9I_N, 1.0I_N set at 0.8I_N where I_N= rated current of mccb = 250 amps).	Nr	1		
	TOTAL PAGE 2				**-**

PART 5.4 - Electro-Mechanical Works & Pipeworks Borehole E2 (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.4.2.6	1x20 Kvar, 3 phase, 415 vac, 5 step central automatic power capacitor correction bank c/w 100 amps TP supply mccb, contactors, fuses, programmable electronic PF controller.relay etc.	Nr	1		
5.4.2.7	1xsingle phase, 240 vac kWh energy registering meter (Client)	Nr	1		
5.4.2.8	4x260 amps high conductivity rectangular bare copper bus-bar conductors.	Nr	1		
5.4.2.9	2x100 amps, TP, 415 vac, mccbs, I_{CU} =15 kA. Each in its own compartment (for Borehole E2 and 1 No. spare).	Nr	1		
5.4.2.10	2x63 amps, TP, 415 vac, mccbs, I_{CU} =15 kA. Each in its own compartment. (Spares)	Nr	1		
5.4.2.11	1x3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mccb terminals.	Nr	1		
5.4.2.12	2x100 amps,1phase, 240 vac class "A" mcbs (spare)	Nr	1		
5.4.2.13	1x Cooling fan rated 25 watts, 240 vac, 2800 rpm continuously rated installed on the side, 100 mm height from the bottom clw filter and termite-proof, dust-proof stainless steel protection D1.5 mm wiregauze.	Nr	1		
5.4.2.14	2x ventillation hole of size 150x100 mm installed on the top opposite sides, 50 mm below top c/w termite-proof, dust-proof filter and grid.	Nr	1		
5.4.2.15	1x3 phase, 240 vac network analyzer/recorder (voltage/current/kWh/Pf/Hz) resettable, as MCAplus, Circutor Smart or similar quality approved make with LED phase indicators (RED, YELLOW, BLUE) on front panel.	Nr	1		
5.4.2.16	3xAC ammeters range 0-300 amps c/w CTS.	Nr	1		
5.4.2.17	1xAC voltmeter c/w vss and protection mcbs.	Nr	1		
5.4.2.18	250 amps, 415 vac TPN manual changer-over switch c/w pilot indicator lights (KPLC ON, KPLC LOAD ON, GENERATOR ON, GENERATOR LOAD ON etc).	Nr	1		
5.4.5.19	32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid.	Nr	1		
5.4.2.20	25x3 mm thick copper strip bound along the switchgear panel length (earthing)	SET	1		
5.4.3	**Electrical Repairs of Mains Power Control Switchgear/Office Building**				
5.4.3.1	Remove the existing socket/lighting wiring.	LS	1		
5.4.3.2	20 mm diam. GS conduit fixed on the walls and roof members. The cost shall be inclusive of tees, bends, circular boxes with covers, other necessary accessories	LM	44		
5.4.3.3	1.5 mm^2 single copper cables (Red=70 m, Black=50 m , Green =50 m) laid in GS conduit and terminated at both ends.	LM	170		
5.4.3.4	2.5 mm^2 single copper cables (Red=50 m, Black=50 m , Green =50 m) laid in GS conduit and terminated at both ends.	LM	150		
5.4.3.5	10 amps, I way 1 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	No	3		
	TOTAL PAGE 3				-

PART 5.4 - Electro-Mechanical Works & Pipeworks Borehole E2 (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.4.3.6	13 amps, 240 vac, twin switched socket outlet (smc) as Mem, Crabtree or similar quality approved make c/w box stainless steel screws (ringmain circuit).	Nr	2		
5.4.3.7	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	2		
5.4.3.8	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	4		
5.4.3.9	100 watts, 240 vac, Opal white lighting fitting c/w 60 watts bulb	Nr	1		
5.4.3.10	1.5 mm^2 single core copper cables wired in 20 mm diameter pvc conduit from consumer unit to fan speed control unit and fan terminals (red 12 m, black =12m, green=12 m).	m	36		
5.4.3.11	3 blade, adjustable slow speed (0-300 rpm), 240 vac ceiling mounted cooling fan c/w speed adjustable control unit completely wired (in conduit).	set	1		
5.4.3.12	35 mm^2 sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape	m	3		
5.4.4	**Fire Fighting Equipment**				
5.4.4.1	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	2		
5.4.5	**Other Electro-Mechanical Works**				
5.4.5.1	Improve lightning protection system	LS	1		
5.4.5.2	Supply, installation, testing and commissioning of pole mounted 3 phase, 75 Kva,0.433 Kv/11 Kv ONAN transformer for the site.	Nr	1		
5.4.5.3	Disconnection and handing over to the Employer the entire existing electrical installations	LS	1		
5.4.5.4	Testing and commissioning of the incoming electricity supply and Main Low Voltage Switchboard	LS	1		
5.4.5.5	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.4.5.6	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.4.5.7	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations	LS	1		
	TOTAL PAGE 4				**-**

PART 5.4 - Electro-Mechanical Works & Pipeworks Borehole E2 (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.4.5.8	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 16 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.4.5.9	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GI pipe for connection on GI rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	18		
5.4.5.10	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 20 Kg/cm^2 (0-20 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket.. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.4.5.11	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 20 Kg/cm^2)/(0 - 20 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.4.5.12	Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe	Nr	1		
5.4.5.213	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse,187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20,	Nr	1		
5.4.5.14	Supply, installation and testing of Input / Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz	Nr	1		
5.4.5.15	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.4.5.16	Supply and installation of 1.5mm² armoured underground cable for the well probe	m	20		
5.4.6	**Pressure Pipes and Fittings:**				
	Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.				
5.4.6.1	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	TOTAL PAGE 5				**-**

PART 5.4 - Electro-Mechanical Works & Pipeworks Borehole E2 (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
	Supply, delivery to Site, Install and Test:				
5.4.6.2	DN 100 mm, PN 16 bar non-slam, non-return valve.	Nr	1		
5.4.6.3	DN 100 mm, PN 16 bar gate valve.	Nr	1		
5.4.6.4	DN 100 mm, PN 16 bar Y-strainer	Nr	1		
5.4.6.5	DN100x200 mmL GS pipe piece with bore for mounting an air valve.	Nr	1		
5.4.6.6	DN100x1500 mmL GS pipe piece.	Nr	1		
5.4.6.7	DN100x250 mmL GS pipe piece, flanged on one side and plain at the opposite end.	Nr	4		
5.4.6.8	DN100x90° GS slow bend	Nr	2		
5.4.6.9	DN100 GS socket	Nr	4		
5.4.6.10	DN100 GS equal Tee	Nr	1		
5.4.6.11	DN100 GI hex nipple	Nr	4		
5.4.6.12	DN100 steel Johnson coupling c/w rubber rings.	Nr	4		
5.4.6.13	100mmWx5 mm thick rubber gasket	m	2		
5.4.6.14	DN100x1200 mmL GS pipe piece threaded at both ends	Nr	1		
5.4.6.15	DN100x2500 mmL double flanged GS pipe piece.	Nr	1		
5.4.6.16	DN100x90° GS female threaded elbow.	Nr	2		
5.4.6.17	DN100x6000 mmL GS pipe piece	Nr	1		
5.4.6.18	DN100x2000 mmL GS pipe piece	Nr	1		
5.4.6.19	Steel chequered cover plates of size 300 mmWx1000 mmLx10 mm Thick	Nr	3		
5.4.6.20	Any other accessories required for the system	LS	1		
5.4.7	**Removal Of Old Items and Trenching**				
5.4.7.1	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	15		
5.4.7.2	Break existing RC pipe support block.	Nr	1		
5.4.7.3	Excavate to expose and remove a section of existing DN 100 GS Borehole-Rising main inter-connection pipe work. Trim the trenching to size 500 mmW 900 mm depth. Back fill to ground level after laying of cable. Cart away , dispose excess as advised.	m	12		
5.4.7.4	Excavate cable trench of size 300 mmWx175 mm Depth floor slab (1:3:6) in the power control room (control power panel to starters and exit holes to boreholes. Straighten the sides and floor. Plaster the sides,place 25 mm thick screed (1:3). Apply nilo an all the surfaces and evel after laying of the pipe. Cart away , dispose debris as advised.	m	3		
	TOTAL PAGE 6				**-**
	TOTAL BH E:- CARRIED TO BILLL 5 SUMMARY SHEET				**-**

PART 5.5 - Electro-Mechanical Works & Pipeworks Borehole G1, G2 (Site-Repairs)

BOREHOLE G1

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.5.1	**Electro-Mechanical Works:**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
5.5.1.01	Remove Grundfos SP46-15 pump set c/w 48 metres of DN100 GI drop pipes.	LS	1		
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST: **NOTE:**				
5.5.1.02	Submersible pump set of capacity 48 m^3/hr of water against a total head of 125 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 50 metres below ground level, c/w cable guard.	Nr	1		
5.5.1.03	Overheads and profits on item 5.5.1.02 as specified for Prime Cost sum items	%	5		
5.5.1.04	16 mm^2/4 core submersible pump flat cable	m	52		
5.5.1.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.5.1.06	OD25 class D uPVC dipper pipe	m	50		
5.5.1.07	DN100 GS class C threaded water pipe.	m	50		
5.5.1.08	DN100 steel steam sockets	Nr	12		
5.5.1.09	DN100x300 mm long GS starter pipe	Nr	1		
5.5.1.10	0.75mm^2 sc double insulated copper cable(brown and black) each 45 metres	m	104		
5.5.1.11	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable	m	25		
5.5.1.12	Lay in trench/duct, connect and test 16 mm^2/4c armoured copper cable	m	25		
5.5.1.13	Copper cable gland c/w lock-nut and shroud for 16m^2/4 core pvc swa pvc copper cable.	Nr	2		
5.5.1.14	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable	Nr	2		
5.5.1.15	22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
5.5.1.16	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.5.1.17	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.5.1.18	35 mm^2 sc copper cable (green)	m	5		
	TOTAL PAGE 1				**-**

PART 5.5 - Electro-Mechanical Works & Pipeworks Borehole G1, G2 (Site-Repairs)

BOREHOLE G1

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.5.1.19	Supply and install water-tight GS cable junction box of size 125x125x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side,. 3 No. 10 amps and 5 No. 80 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cables.	Nr	1		
5.5.1.20	DN38x150 mmL GI threaded pipe piece (cable entry)	Nr	1		
5.5.1.21	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 70 m (to be determined after test pumping).	SET	1		
5.5.1.22	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN 80, Qmax=80m^3/hr, Qnom=40m^3/hr, Q_T=8m^3/hr and Qmin=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
5.5.1.23	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
5.5.1.24	**INSTALLATION SUNDRIES**				
	ID320x7 mm Thick GS Borehole cap with welded DN100 GS pipe piece, welded DN38 GS slow bend for passage of 10 mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.5.1.24b	Boss white (200 gm tin)	pc	3		
5.5.1.24c	550 mm plastic cable tie	Nr	35		
5.5.1.24d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.5.1.24e	12 mm Wx12 ML PTFE thread seal tape	ROLL	15		
5.5.1.24f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.5.1.24g	Stainless steel ferrules for 16 mm^2 cable	Nr	4		
5.5.1.24h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	2		
5.5.1.25	**Pressure Pipes and Fittings:**				
	Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.				
5.5.1.25a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	TOTAL PAGE 2				-

PART 5.5 - Electro-Mechanical Works & Pipeworks Borehole G1, G2 (Site-Repairs)

	BOREHOLE G1				
ITEM	**DESCRIPTION**	**UNIT**	**QTY**	**Rate(KES)**	**Amount(KES)**
	Supply, delivery to Site, Install and Test:				
5.5.1.25b	DN 100 mm, PN 16 bar non-slam, non-return valve.	Nr	1		
5.5.1.25c	DN 100 mm, PN 16 bar gate valve c/w handwheel.	Nr	1		
5.5.1.25d	DN 100 mm, PN 16 bar Y-strainer	Nr	1		
5.5.1.25e	DN100x200 mmL GS pipe piece theaded both ends with bore for mounting an air valve.	Nr	1		
5.5.1.25f	DN100x200 mmL GS adaptable pipe piece threaded both ends.	Nr	1		
5.5.1.25g	DN100x250 mmL GS pipe piece, flanged on one side and plain at the opposite end.	Nr	3		
5.5.1.25h	DN100x90° GS slow bend	Nr	2		
5.5.1.25i	DN100 GS socket theaded	Nr	4		
5.5.1.25j	DN100 GS equal Tee threaded	Nr	6		
5.5.1.25k	DN100 GS hex nipple	Nr	4		
5.5.1.25l	DN100 steel Johnson coupling c/w rubber rings.	Nr	3		
5.5.1.25m	100mmWx5 mm thick rubber gasket	m	2		
5.5.1.25n	DN100x1000 mmL GS pipe piece threaded both ends.	Nr	1		
5.5.1.25o	DN100x90° GS female threaded elbow.	Nr	2		
5.5.1.25p	DN100x6000 mmL GS pipe piece threaaded both ends	Nr	1		
5.5.1.25q	DN100x3500 mmL GS pipe piece threaded both ends	Nr	1		
5.5.1.25r	DN100x250 mmL GS adaptable pipe piece.	Nr	3		
5.5.1.25s	Any other accessories required for the system	LS	1		
5.5.2	**Removal Of Old Items And Trenching**				
5.5.2.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	20		
5.5.2.02	Break existing RC pipe support block.	Nr	2		
5.5.2.03	Excavate to expose and remove a section of existing DN 100 GS Borehole-Rising main inter-connection pipe work. Trim the trenching to size 500 mmW900 mm depth. Back fill to ground level after laying of cable. Cart away , dispose excess as advised.	m	12		
	TOTAL PAGE 3				**-**

PART 5.5 - Electro-Mechanical Works & Pipeworks Borehole G1, G2 (Site-Repairs)

	BOREHOLE G1				
ITEM	**DESCRIPTION**	**UNIT**	**QTY**	**Rate(KES)**	**Amount(KES)**

BOREHOLE G2

ITEM	**DESCRIPTION**	**UNIT**	**QTY**	**Rate(KES)**	**Amount(KES)**
5.5.3	**Electro-Mechanical Works:**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST: **NOTE:**				
5.5.3.02	Submersible pump set of capacity 48 m^3/hr of water against a total head of 125 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 50 metres below ground level, c/w cable guard.	Nr	1		
5.5.3.03	Overheads and profits on item 5.5.3.02 as specified for Prime Cost sum items	%			
5.5.3.04	16 mm^2/4 core submersible pump flat cable	m	52		
5.5.3.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.5.3.06	OD25 class D uPVC dipper pipe	m	50		
5.5.3.07	DN100 GS class C threaded water pipe.	m	50		
5.5.3.08	DN100 steel steam sockets	Nr	12		
5.5.3.09	DN100x300 mm long GS starter pipe	Nr	1		
5.5.3.10	0.75mm^2 sc double insulated copper cable(brown and black) each 45 metres	m	104		
5.5.3.11	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable	m	45		
5.5.3.12	Lay in trench/duct, connect and test 16 mm^2/4c armoured copper cable	m	45		
5.5.3.13	Copper cable gland c/w lock-nut and shroud for 16 m^2/4 core pvc swa pvc copper cable.	Nr	2		
5.5.3.14	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable	Nr	2		
5.5.3.15	22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
5.5.3.16	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.5.3.17	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.5.3.18	35 mm^2 sc copper cable (green)	m	5		
	TOTAL PAGE 4				**-**

PART 5.5 - Electro-Mechanical Works & Pipeworks Borehole G1, G2 (Site-Repairs)

BOREHOLE G1

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.5.3.19	Supply and install water-tight GS cable junction box of size 125x125x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side,. 3 No. 10 amps and 5 No. 80 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cables.	Nr	1		
5.5.3.20	DN38x150 mmL GI threaded pipe piece (cable entry)	Nr	1		
5.5.3.21	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 70 m (to be determined after test pumping).	SET	1		
5.5.3.22	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN 80, Qmax=80m^3/hr, Qnom=40m^3/hr, Q_T=8m^3/hr and Qmin=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	No	1		
5.5.1.23	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
5.5.3.24	**INSTALLATION SUNDRIES**				
	ID220x4 mm Thick GS Borehole cap with welded DN100 GS pipe piece, welded DN38 GS slow bend for passage of 16 mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.5.3.24b	Boss white (200 gm tin)	pc	3		
5.5.3.24c	550 mm plastic cable tie	Nr	35		
5.5.3.24d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.5.3.24e	12 mm Wx12 ML PTFE thread seal tape	ROLL	15		
5.5.3.24f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.5.3.24g	Stainless steel ferrules for 16 mm^2 cable	Nr	4		
5.5.3.24h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	2		
5.5.3.25	**Pressure Pipes and Fittings:**				
	Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.				
5.5.3.25a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
5.5.3.25b	DN 100 mm, PN 16 bar non-slam, non-return valve.	Nr	1		
5.5.3.25c	DN 100 mm, PN 16 bar gate valve c/w handwheel.	Nr	1		
5.5.3.25d	DN 100 mm, PN 16 bar Y-strainer	Nr	1		
5.5.3.25e	DN100x200 mmL GS pipe piece theaded both ends with bore for mounting an air valve.	Nr	1		
5.5.3.25f	DN100x200 mmL GS adaptable pipe piece threaded both ends.	Nr	1		
5.5.3.25g	DN100x250 mmL GS pipe piece, flanged on one side and plain at the opposite end.	Nr	3		
5.5.3.25h	DN100x90^o GS slow bend	Nr	2		
5.5.3.25i	DN100 GS socket theaded	Nr	4		
5.5.3.25j	DN100 GS equal Tee threaded	Nr	6		
5.5.3.25k	DN100 GS hex nipple	Nr	4		
5.5.3.25l	DN100 steel Johnson coupling c/w rubber rings.	Nr	3		
5.5.3.25m	100mmWx5 mm thick rubber gasket	m	2		
5.5.3.25n	DN100x1000 mmL GS pipe piece threaded both ends.	Nr	1		
5.5.3.25o	DN100x90^o GS female threaded elbow.	Nr	2		
5.5.3.25p	DN100x6000 mmL GS pipe piece threaaded both ends	Nr	1		
5.5.3.25q	DN100x3500 mmL GS pipe piece threaded both ends	Nr	1		
5.5.3.25r	DN100x250 mmL GS adaptable pipe piece.	Nr	3		
5.5.3.25s	Any other accessories required for the system	LS	1		
	TOTAL PAGE 5				-

PART 5.5 - Electro-Mechanical Works & Pipeworks Borehole G1, G2 (Site-Repairs)

	BOREHOLE G1				
ITEM	**DESCRIPTION**	**UNIT**	**QTY**	**Rate(KES)**	**Amount(KES)**
5.5.4	**Removal Of Old Items and Trenching**				
5.5.4.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	40		
5.5.4.02	Break existing RC pipe support block.	No	1		
5.5.4.03	Excavate to expose and remove a section of existing DN 100 GS Borehole-Rising main inter-connection pipe work. Trim the trenching to size 500 mmW900 mm depth. Back fill to ground level after laying of cable. Cart away , dispose excess as advised.	m	12		
5.5.5	**New Mains Power Control Swichgear Panel and Switch gear/Office Building Wiring**				
5.5.5.1	**Mains Power Control Switchgear Panel**				
5.5.5.1.01	Open the mains power switchgear panel, carefully clean, dust and air blows the compartments. Tighten any loose, cables, bolts and nuts.	LS	1		
5.5.5.1.02	Supply, install, test 3 phase, 415 vac surge divertor c/w protective mcbs.	Nr	1		
5.5.5.1.03	Supply, install panel cooling fan rated 18 watts, 240 vac, 0.1 amps, 2860 rpm	Nr	1		
5.5.5.1.04	Supply and install any other missing items	LS	1		
5.5.5.2	**Electrical Repairs of Mains Power Control Switchgear/Office Building**				
5.5.5.1.01	Remove the existing socket/lighting wiring.	LS	1		
5.5.5.1.02	20 mm diam. GS conduit fixed on the walls and roof members. The cost shall be inclusive of tees, bends, circular boxes with covers, other necessary accessories	m	44		
5.5.5.1.03	1.5 mm^2 single copper cables (Red=70 m, Black=50 m , Green =50 m) laid in GS conduit and terminated at both ends.	m	170		
5.5.5.1.04	2.5 mm^2 single copper cables (Red=50 m, Black=50 m , Green =50 m) laid in GS conduit and terminated at both ends.	m	150		
5.5.5.1.05	10 amps, I way 1 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	3		
	TOTAL PAGE 3				
5.5.5.1.06	13 amps, 240 vac, twin switched socket outlet (smc) as Mem, Crabtree or similar quality approved make c/w box stainless steel screws (ringmain circuit).	Nr	2		
5.5.5.1.07	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	2		
5.5.5.1.08	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	4		
5.5.5.1.09	100 watts, 240 vac, Opal white lighting fitting c/w 60 watts bulb	Nr	1		
5.5.5.1.01	1.5 mm^2 single core copper cables wired in 20 mm diameter pvc conduit from consumer unit to fan speed control unit and fan terminals (red 12 m, black =12m, green=12 m).	m	36		
5.5.5.1.10	3 blade, adjustable slow speed (0-300 rpm), 240 vac ceiling mounted cooling fan c/w speed adjustable control unit completely wired (in conduit).	set	1		
5.5.5.1.11	35 mm^2 sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape	m	3		
5.5.6	**Fire Fighting Equipment**				
5.5.6.01	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	2		
5.5.7	**Other Electro-Mechanical Works**				
5.5.7.01	Improve lightning protection system	LS	1		
5.5.7.02	Supply, installation, testing and commissioning of pole mounted 3 phase, 75 Kva,0.433 Kv/11 Kv ONAN transformer for the site.	Nr	1		
	TOTAL PAGE 6				**-**

PART 5.5 - Electro-Mechanical Works & Pipeworks Borehole G1, G2 (Site-Repairs)

BOREHOLE G1

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.5.7.03	Testing and commissioning of the incoming electricity supply and Main Low Voltage Switchboard	LS	1		
5.5.7.04	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.5.7.05	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.5.7.06	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations	LS	1		
5.5.7.07	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 16 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.5.7.08	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GI pipe for connection on GI rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	45		
5.5.7.09	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 20 Kg/cm^2 (0-20 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket.. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.5.7.10	High quality pressure gauge with dual scale (Kg/cm^2 and Bar).Range (0 - 20 Kg/cm^2)/(0 - 20 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.5.7.11	Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe	Nr	1		
5.5.7.12	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse,187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20,	Nr	1		
5.5.7.13	Supply, installation and testing of Input / Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz	Nr	1		
5.5.7.14	Supply and installation of 1.5mm² armoured underground cable for the well probe	m	45		
Total Page 7					
TOTAL BHs G1 & G2:- CARRIED TO BILLL 5 SUMMARY SHEET					

PART 5.6 - Electro-Mechanical Works & Pipeworks (Site-Repairs)

5.6.1 Tiwi Borehole No. 1

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.6.1	**Electro-Mechanical Works:**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
5.6.1.1	Remove pump set and 70 metres of DN100 GI drop pipes.	LS	1		
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST:				
5.6.1.2	Submersible pump set of capacity 50 m^3/hr of water against a total head of 125 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 70 metres below ground level.	Nr	1		
5.6.1.3	Overheads and profits on item 5.6.1.2 as specified for Prime Cost sum items	%			
5.6.1.4	16 mm^2/4 core submersible pump flat cable	m	75		
5.6.1.5	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.6.1.6	OD25 class D uPVC dipper pipe	m	75		
5.6.1.7	DN100 GI class C threaded water pipe.	m	72		
5.6.1.8	DN100 GI steam sockets	Nr	17		
5.6.1.9	DN75x300 mm long GI starter pipe	Nr	1		
5.6.1.10	DN100x75 GI reducer (female threaded)	Nr	1		
5.6.1.11	0.75mm^2 sc double insulated copper cable(brown and black) each 75 metres	m	150		
5.6.1.12	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable	m	30		
5.6.1.13	Lay in trench/duct, connect and test 16 mm^2/4c armoured copper cable	m	30		
5.6.1.14	Copper cable gland c/w lock-nut and shroud for 16 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.6.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable	Nr	2		
5.5.1.16	22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
5.6.1.17	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.6.1.18	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.6.1.19	35 mm^2 sc copper cable (green)	m	5		
5.6.1.20	Supply and install water-tight GS cable junction box of size 125x125x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side,. 3 No. 10 amps and 5 No. 60 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cables.	Nr	1		
5.6.1.21	DN38x150 mmL GI threaded pipe piece (cable entry)	Nr	1		
5.6.1.22	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm^2 of 70 m (to be determined after test pumping).	SET	1		
	TOTAL PAGE 1				-

5.6.1.23	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN 80, Qmax=80m^3/hr, Qnom=40m^3/hr, Q_T=8m^3/hr and Qmin=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
5.6.1.24	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
5.6.1.25	**INSTALLATION SUNDRIES**				
5.6.1.25a	ID320x7 mm Thick GS Borehole cap with welded DN100 GI pipe piece, welded DN44 GI slow bend for passage of 25mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.6.1.25b	Boss white (200 gm tin)	Pc	1		
5.6.1.25c	550 mm plastic cable tie	Nr	45		
5.6.1.25d	20 mm Wx9ML self bonding electrical tape (scotch 23)	Roll	2		
5.6.1.25e	12 mm Wx12 ML PTFE thread seal tape	Roll	15		
5.6.1.25f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	Roll	4		
5.6.1.25g	Stainless steel ferrules for 16 mm^2 cable	Nr	4		
5.6.1.25i	10 amps cable terminal block	Nr	3		
5.6.1.25j	60 amps cable terminal block	Nr	4		
	New Mains Power Control Swichgear Panel and Switch gear/Office Building Wiring				
5.6.2	**Mains Power Control Switchgear Panel**				
5.6.2.1	Free standing, 250 amps, 3 phase, 415 vac, compact, compartmented, indoor, surface metal clad mailins power control panel (IP20), dust-proof, termite-proof, comprising of but not limited to the following, duly wired and labeled. It shall be constructed from gauge 16 spangled sheet steel of minimum thickness 1.75mm;	Nr	1		
5.6.2.2	Kenya Power & Lighting Company CUT-OUTS chamber	Nr	1		
5.6.2.3	1xKPLC incommer Current transformers chamber	Nr	1		
5.6.2.4	1xKPLC metering equipment chamber incommer Current transformers chamber	Nr	1		
5.6.2.5	1x250 amps adjustable triple pole mccb (adjustable range: 0.7I_N, 0.8I_N, 0.9I_N, 1.0I_N set at 0.8I_N where I_N= rated current of mccb = 250 amps).	Nr	1		
5.6.2.6	1x25 Kvar, 3 phase, 415 vac, 5 step central automatic power capacitor correction bank c/w 100 amps TP supply mccb, contactors, fuses, programmable electronic PF controller.relay. 154 µF/phase etc.	Nr	1		
5.6.2.7	1xsingle phase, 240 vac kWh energy registering meter (Client)	Nr	1		
5.6.2.8	4x260 amps high conductivity rectangular bare copper bus-bar conductors.	Nr	1		
5.6.2.9	2x125 amps, TP, 415 vac, mccbs, I_{CU} =15 kA. Each in its own compartment (for Borehole No. 1 and 1 No. spare).	Nr	1		
5.6.2.10	1x63 amps, TP, 415 vac, mccbs, I_{CU} =15 kA. Each in its own cmpartment. (Spares)	Nr	1		
5.6.2.11	1x3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mccb terminals.	Nr	1		
5.6.2.12	2x100 amps,1phase, 240 vac class "A" mcbs (staff houses)	Nr	1		
5.6.2.13	1x Cooling fan rated 25 watts, 240 vac, 2800 rpm continuously rated installed on the side, 100 mm height from the bottom clw filter and termite-proof, dust-proof stainless steel protection D1.5 mm wiregauze.	Nr	1		
	TOTAL PAGE 2				-

5.6.2.14	2x ventillation hole of size 150x100 mm installed on the top opposite sides, 50 mm below top c/w termite-proof, dust-proof filter and grid.	Nr	1		
5.6.2.15	1x3 phase, 240 vac network analyzer/recorder (voltage/current/kWh/Pf/Hz) resettable, as MCAplus, Circutor Smart or similar quality approved make with LED phase indicators (RED, YELLOW, BLUE) on front panel.	Nr	1		
5.6.2.16	100 amps, 6 way, 1 phase, 240 vac DIN distribution board; c/w; 2 No. 10 amps, 1 pole, 240 vac class "A" mcbs, 3 No. 20 amps, 1 pole class "A" mcbs, 1 No. Blanking plate.	Nr	1		
5.6.2.17	250 amps, 415 vac TPN manual changer-over switch c/w pilot indicator lights (KPLC ON, KPLC LOAD ON, GENERATOR ON, GENERATOR LOAD ON etc).	Nr	1		
5.6.2.18	3xAC ammeters range 0-300 amps c/w CTS.	Nr	1		
5.6.2.19	1xAC voltmeter (0-500 vac) c/w vss and protection mcbs.	Nr	1		
5.6.5.20	32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid.	Nr	1		
5.6.2.21	25x3 mm thick copper strip bound along the switchgear panel length (earthing)	SET	1		
5.6.3	**Electrical Repairs of Mains Power Control Switchgear/Office Building**				
5.6.3.1	Remove the existing socket/lighting wiring, replace the defective sections of conduit	LS	1		
5.6.3.2	Re-wire the lighting circuits using 1.5 mm^2 single copper cables (Red=80 m, Black=50 m , Green =50 m).	m	180		
5.6.3.3	Re-wire the sockets circuits using 2.5 mm^2 single copper cables (Red=25m, Black=25 m , Green =25 m)	m	180		
5.6.3.4	6 amps, I way 1 gang switch (IVY white, flush) as Mem, Crabtree or similar quality approved make, c/w stsinless steel screws.	Nr	2		
5.6.3.5	10 amps, I way 2 gang switch (IVY white, flush) as Mem, Crabtree or similar quality approved make.	Nr	1		
5.6.3.6	13 amps, 240 vac, twin switched socket outlet (IVY White, flush) as Mem, Crabtree or similar quality approved make c/w stainless steel screws (ringmain circuit).	Nr	3		
5.6.3.7	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	2		
5.6.3.8	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	4		
5.6.3.9	100 watts, 240 vac, Opal white lighting fitting c/w 60 watts bulb	Nr	1		
5.6.3.10	1.5 mm^2 single core copper cables wired in 20 mm diameter pvc conduit from consumer unit to fan speed control unit and fan terminals (red 12 m, black =12m, green=12 m).	m	36		
5.6.3.11	3 blade, adjustable slow speed (0-300 rpm), 240 vac ceiling mounted cooling fan c/w speed adjustable control unit completely wired (in conduit).	set	1		
5.6.3.12	35 mm^2 sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape	Nr	3		
5.6.3.13	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	2		
	TOTAL PAGE 3				**-**

5.6.4	**MODIFICATION OF EXISTING BOREOLE No. 1 STARTER PANNEL**				
5.6.4.1	Fix 3 phase, 415 vac surge divertor c/w protective mcbs on incomer mccb terminals	Nr	1		
5.6.4.2	Rewire neatly and label the starter panel.	LS	1		
5.6.5	**Other Electro-Mechanical Works**				
5.6.5.1	Improve lightning protection system	LS	1		
5.6.5.2	Supply, installation, testing and commissioning of pole mounted 3 phase, 75 Kva,0.433 Kv/11 Kv ONAN transformer for the site.	Nr	1		
5.6.5.3	Disconnection and handing over to the Employer the entire existing electrical installations	LS	1		
5.6.5.4	Testing and commissioning of the incoming electricity supply and Main Low Voltage Switchboard	LS	1		
5.6.5.5	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.6.5.6	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.6.5.7	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations	LS	1		
5.6.5.8	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 16 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.6.5.9	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GI pipe for connection on GI rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	25	LM		
5.6.5.10	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 20 Kg/cm^2 (0-20 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket.. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	1	No.		
5.6.5.11	High quality pressure gauge - IP54 (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 20 Kg/cm^2)/(0 - 20 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.6.5.12	Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe	Nr	1		
5.6.5.213	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse,187 – 264 VAC, 47 to 63 Hz,0°C…+45°C,≥ IP20.	Nr	1		
5.6.5.14	Supply, installation and testing of Input / Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz	Nr	1		
5.6.5.15	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.6.5.16	Supply and installation of 1.5mm² armoured underground cable for the well probe	m	30		
5.6.5.17	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation on works as per the Specifications	LS	1		
5.6.5.18	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
	TOTAL PAGE 4				**-**

5.6.6	**Pressure Pipes and Fittings:**				
	Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.				
5.6.6.1	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
	NOTE: **i).** All Valves, pipes, pipe fittings, water meter shall be new. **ii).** Unless otherwise stated, valves, pipes, pipe fittings, water meter shall be double flanged, drilled and supplied c/w high tensile strength stainless steel bolts, nuts and washers. **iii).** Cutting and adjustment of pipework on site to fit.				
5.6.6.2	DN 100 mm, PN 16 bar non-slam, non-return valve.	Nr	1		
5.6.6.3	DN 100 mm, PN 16 bar gate valve.	Nr	1		
5.6.6.4	DN 100 mm, PN 16 bar Y-strainer	Nr	1		
5.6.6.5	DN100x200 mmL GS pipe piece with bore for mounting an air valve.	Nr	1		
5.6.6.6	DN100x1500 mmL GS pipe piece.	Nr	1		
5.6.6.7	DN100x250 mmL GS pipe piece, flanged on one side and plain at the opposite end.	Nr	6		
5.6.6.8	DN100x90^{o} GS slow bend	Nr	2		
5.6.6.9	DN100 GS socket	Nr	3		
5.6.6.10	DN100 double flanged GS equal Tee	Nr	1		
5.6.6.11	DN100 steel Johnson coupling c/w rubber rings.	Nr	4		
5.6.6.12	100mmWx5 mm thick rubber gasket	m	2		
5.6.6.13	DN100x1200 mmL GS pipe piece threaded at both ends	Nr	1		
5.6.6.14	DN100x2500 mmL double flanged GS pipe piece.	Nr	1		
5.6.6.15	Any other accessories required for the system	LS	1		
5.6.7	**Removal Of Old Items and Trenching**				
5.6.7.1	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	25		
5.6.6.2	Break existing RC pipe support block.	Nr	1		
5.6.6.3	Excavate to expose and remove a section of existing DN 100 GS Borehole-Rising main inter-connection pipe work. Trim the trenching to size 500 mmW900 mm depth. Back fill to ground level after laying of cable. Cart away , dispose excess as advised.	m	3		
	TOTAL PAGE 5				-
	TOTAL BH 1::- CARRIED TO BILLL 5 SUMMARY SHEET				-

PART 5.7 - Electro-Mechanical Works & Pipeworks Borehole 2 (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.7.1	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
5.7.1.1	Remove pump set and 60 metres of DN100 GI drop pipes.	LS	1		
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST: **NOTE:**				
5.7.1.2	Submersible pump set of capacity 48 m^3/hr of water against a total head of 134 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 60 metres below ground level.	Nr	1		
5.7.1.3	Overheads and profits on item 5.7.1.2 as specified for Prime Cost sum items	%			
5.7.1.4	16 mm^2/4 core submersible pump flat cable	m	65		
5.7.1.5	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.7.1.6	OD25 class D uPVC dipper pipe	m	59		
5.7.1.7	DN100 GI class C threaded water pipe.	m	60		
5.7.1.8	DN100 GI steam sockets	Nr	14		
5.7.1.9	DN75x300 mm long GI starter pipe	Nr	1		
5.7.1.10	DN100x75 GI reducer (female threaded)	Nr	1		
5.7.1.11	0.75mm^2 sc double insulated copper cable(brown and black) each 65 metres	m	130		
5.7.1.12	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable	m	20		
5.7.1.13	Lay in trench/duct, connect and test 25 mm^2/4c armoured copper cable	m	20		
5.7.1.14	Copper cable gland c/w lock-nut and shroud for 25 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.7.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable.	Nr	2		
5.7.1.16	30 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
5.7.1.17	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.7.1.18	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.7.1.19	35 mm^2 sc copper cable (green)	m	5		
5.7.1.20	Supply and install water-tight GS cable junction box of size 125x125x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side,. 3 No. 10 amps and 5 No. 60 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cables.	Nr	1		
5.7.1.21	DN38x150 mmL GI threaded pipe piece (cable entry)	Nr	1		
	TOTAL PAGE 1				**-**

PART 5.7 - Electro-Mechanical Works & Pipeworks Borehole 2 (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.7.1.22	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 70 m (to be determined after test pumping).	SET	1		
5.7.1.23	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN 80, Qmax=80m^3/hr, Qnom=40m^3/hr, Q_T=8m^3/hr and Qmin=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
5.7.1.24	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
5.7.1.25	**INSTALLATION SUNDRIES**				
5.7.1.25a	ID320x7 mm Thick GS Borehole cap with welded DN100 GI pipe piece, welded DN44 GI slow bend for passage of 25mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.7.1.25b	Boss white (200 gm tin)	Pc	3		
5.7.1.25c	550 mm plastic cable tie	Nr	50		
5.7.1.25d	20 mm Wx9ML self bonding electrical tape (scotch 23)	Roll	2		
5.7.1.25e	12 mm Wx12 ML PTFE thread seal tape	Roll	15		
5.7.1.25f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	Roll	4		
5.7.1.25g	Stainless steel ferrules for 16 mm^2 cable	Nr	4		
5.7.1.25i	10 amps cable terminal block	Nr	3		
5.7.1.25j	60 amps cable terminal block	Nr	4		
	Mains Power Control Swichgear Panel and Switch gear/Office Building Wiring				
5.7.2	**Mains Power Control Switchgear Panel**				
5.7.2.1	Gently clean, air blow, the interior and exterior of the switchgear.				
	Supply, delivery. Install, wire and Test the following items:				
5.7.2.2	125 amps, 415 vac TP mcbs (Legrand, DPX)	Nr	2		
5.7.2.2	63 amps, 415 vac TP mcbs (Legrand, DPX)	Nr	2		
5.7.2.3	12 Kvar, 3 phase, 415 vac, 4 step central automatic power capacitor correction bank c/w 100 amps TP supply mccb, contactors, fuses, programmable electronic PF controller relay, 74 µFcapacitors etc.	SET	1		
5.7.2.4	3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mccb	SET	1		
5.7.2.5	1xCooling fan rated 25 watts, 240 vac, 2800 rpm continuously rated installed on the side, 100 mm height from the bottom clw filter and termite-proof, dust-proof stainless steel protection D1.5 mm wire gauze.	Nr	1		
5.7.2.6	Ventillation hole of size 150x100 mm installed on the top opposite sides, 50 mm below top c/w termite-proof, dust-proof filter and grid.	Nr	2		
5.7.2.7	25x3 mm thick copper strip bound along the switchgear panel length (earthing)	m	3		
5.7.3	**Electrical Repairs of Mains Power Control Switchgear Room**				
5.7.3.1	Remove the existing socket/lighting wiring, replace the defective sections of conduit	Item	1		
5.7.3.2	Re-wire the lighting circuits using 1.5 mm^2 single copper cables (Red=15 m, Black=10 m , Green =10 m).	m	35		
	TOTAL PAGE 2				-

PART 5.7 - Electro-Mechanical Works & Pipeworks Borehole 2 (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.7.3.3	Re-wire the sockets circuits using 2.5 mm^2 single copper cables (Red= 4 m, Black=4 m , Green = 4 m)	m	12		
5.7.3.4	10 amps, I way 2 gang switch (IVY white, flush) as Mem, Crabtree or similar quality approved make.	Nr	1		
5.7.3.5	13 amps, 240 vac, twin switched socket outlet (IVY White, flush) as Mem, Crabtree or similar quality approved make c/w stainless steel screws (ringmain circuit).	Nr	1		
5.7.3.6	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	1		
5.7.3.7	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	4		
5.7.3.8	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.7.3.9	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber..	Nr	1		
5.7.3.10	25 mm^2 sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape.	m	3		
5.7.3.13	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	1		
5.7.4	**MODIFICATION OF EXISTING BOREOLE No. 2 STARTER PANNEL**				
5.7.4.1	3 phase, 415 vac surge divertor c/w protective mcbs on incomer mccb terminals	Nr	1		
5.7.4.2	Rewire neatly and label the starter panel.	LS	1		
5.7.4.3	Replace the existing incomer 125 amps, TP mccb make Terasaki with one rated 100 amps, 415vac)	Nr	1		
5.7.5	**Other Electro-Mechanical Works**				
5.7.5.1	Improve lightning protection system	LS	1		
5.7.5.2	Supply, installation, testing and commissioning of pole mounted 3 phase, 75 Kva, 0.433 Kv/11 Kv ONAN transformer for the site.	Nr	1		
5.7.5.3	Testing and commissioning of the incoming electricity supply and Main Low Voltage Switchboard	LS	1		
5.7.5.4	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.7.5.5	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.7.5.6	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations	LS	1		
5.7.5.7	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 16 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.7.5.8	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	25		
	TOTAL PAGE 3				-

PART 5.7 - Electro-Mechanical Works & Pipeworks Borehole 2 (Site-Repairs)

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.7.5.9	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 20 Kg/cm^2 (0-20 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket.. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.7.5.10	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 20 Kg/cm^2)/(0 - 20 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	No.		
5.7.5.11	Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe	Nr	No.		
5.7.5.12	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse,187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20,	Nr	1		
5.7.5.13	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz	Nr	1		
5.7.5.14	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.7.5.15	Supply and installation of 1.5mm² armoured underground cable for the well probe	m	25		
5.7.6	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.7.6.1	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
	NOTE: **i).** All Valves, pipes, pipe fittings, water meter shall be new. **ii).** Unless otherwise stated, valves, pipes, pipe fittings, water meter shall be double flanged, drilled and supplied c/w high tensile strength stainless steel bolts, nuts and washers. **iii).** Cutting and adjustment of pipework on site to fit.				
5.7.6.2	DN 100 mm, PN 16 bar non-slam, non-return valve.	Nr	1		
5.7.6.3	DN 100 mm, PN 16 bar gate valve.	Nr	1		
5.7.6.4	DN 100 mm, PN 16 bar Y-strainer	Nr	1		
5.7.6.5	DN100x200 mmL GS pipe piece with bore for mounting an air valve.	Nr	1		
5.7.6.6	DN100x500 mmL GS pipe piece.	Nr	2		
5.7.6.7	DN100x250 mmL GS pipe piece, flanged on one side and plain at the opposite end.	Nr	1		
5.7.6.8	DN100x90^o GS slow bend	Nr	3		
5.7.6.9	DN100 GS socket	Nr	3		
5.7.6.10	DN100 double flanged GS equal Tee	Nr	1		
5.7.6.11	DN100 steel Johnson coupling c/w rubber rings.	Nr	4		
5.7.6.12	100mmWx5 mm thick rubber gasket	m	2		
5.7.6.13	DN100x1200 mmL GS pipe piece threaded at both ends	Nr	1		
5.7.6.14	DN100x600 mmL GS pipe piece.	Nr	2		
5.7.6.15	Any other accessories required for the system	LS	1		
5.7.7	**Removal Of Old Items and Trenching**				
5.7.7.1	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	20		
5.7.7.2	Break existing RC pipe support block.	Nr	1		
5.7.7.3	Excavate to expose and remove a section of existing DN 100 GS Borehole-Rising main inter-connection pipe work. Trim the trenching to size 500 mmW900 mm depth. Back fill to ground level after laying of cable. Cart away , dispose excess as advised.	m	3		
	TOTAL PAGE 4				-
	TOTAL CARRIED TO BILLL 5 SUMMARY SHEET				-

PART 5.8 - Electro-Mechanical Works & Pipeworks Boreholes 4 & 7 (Site-Repairs)

5.8.1 BOREHOLE NO. 4

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.8.1.1	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
5.8.1.1.01	Remove pump set and drop pipes (Grundfos SP46-12, DN100 GS, Pump depth = 54 metres below ground level	LS	1		
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST:				
	NOTE:				
5.8.1.1.02	Submersible pump set of capacity 50 m^3/hr of water against a total head of 150 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 54 metres below ground level.	Nr	1		
5.8.1.1.03	Overheads and profits on item 5.8.1.1.02 as specified for Prime Cost sum items	%			
5.8.1.1.04	16 mm^2/4 core submersible pump flat cable	m	58		
5.8.1.1.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.8.1.1.06	OD25 class D uPVC dipper pipe	m	52		
5.8.1.1.07	DN100 GI class C threaded water pipe.	m	52		
5.8.1.1.08	DN100 Steel steam sockets	Nr	14		
5.8.1.1.09	DN75x300 mm long GI starter pipe	Nr	1		
5.8.1.1.10	DN100x75 GI reducer (female threaded)	Nr	1		
5.8.1.1.11	0.75mm^2 sc double insulated copper cable(brown and black) each 58 metres	m	116		
5.8.1.1.12	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable (starter panel to borehole)	m	20		
5.8.1.1.13	Lay in trench/duct, connect and test 16 mm^2/4c armoured copper cable	m	20		
5.8.1.1.14	Copper cable gland c/w lock-nut and shroud for 16 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.8.1.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable.	Nr	2		
5.8.1.1.16	30 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
5.8.1.1.17	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.8.1.1.18	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.8.1.1.19	35 mm^2 sc copper cable (green)	m	5		
5.8.1.1.20	Supply and install water-tight GS cable junction box of size 150x150x90mm depth, fabricated from 3 mm thick plate. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side,. 3 No. 10 amps and 5 No. 80 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cables.	Nr	1		
5.8.1.1.21	DN38x150 mmL GI threaded pipe piece (cable entry)	Nr	1		
	TOTAL PAGE 1				-

5.8.1.1.22	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 70 m (to be determined after test pumping).	SET	1		
5.8.1.1.23	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN 80, Qmax=80m^3/hr, Qnom=40m^3/hr, Q_T=8m^3/hr and Qmin=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
5.8.1.1.24	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
5.8.1.1.25	**Installation Sundries**				
5.8.1.1.25a	ID320x7 mm Thick GS Borehole cap with welded DN100 GI pipe piece, welded DN38 GS slow bend for passage of 16mm^2/4c pvc swa pvc cu. cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.8.1.1.25b	Boss white (200 gm tin)	pc	2		
5.8.1.1.25c	550 mm plastic cable tie	Nr	35		
5.8.1.1.25d	20 mm Wx9ML self bonding electrical tape (scotch 23)	Roll	1		
5.8.1.1.25e	12 mm Wx12 ML PTFE thread seal tape	Roll	15		
5.8.1.1.25f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	Roll	4		
5.8.1.1.25g	Stainless steel ferrules for 16 mm^2 cable	Nr	4		
5.8.1.1.25i	10 amps cable terminal block	Nr	3		
5.8.1.1.25j	80 amps cable terminal block	Nr	4		
5.8.1.1.26	**Other Electro-Mechanical Works - BH 4**				
5.8.1.1.26a	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.8.1.1.26b	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.8.1.1.26c	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations	LS	1		
5.8.1.1.26d	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 16 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.8.1.1.26e	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	20		
5.8.1.126f	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 25 Kg/cm^2 (0-25 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket.. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.8.1.1.26g	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 25 Kg/cm^2)/(0 - 25 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.8.1.1.26h	Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.	Nr	1		
5.8.1.1.26i	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse,187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20.	Nr	1		
5.8.1.1.256j	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz	Nr	1		
5.8.1.1.26k	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.8.1.1.26l	Supply and installation of 1.5mm² armoured underground cable for the well probe	m	20		
	TOTAL PAGE 2				-

5.8.1.1.27	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.8.1.1.27a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
5.8.1.1.27b	DN100x90° GS slow bend with a bore for pressure gauge and pressure switch (treaded at one end and flanged at the opposite end.	Nr	1		
5.8.1.1.27c	DN100x200 mmL GS pipe piece with bore for mounting an air valve	Nr	1		
5.8.1.1.27d	DN100x1500 mmL GS pipe piece.	Nr	1		
5.8.1.1.27e	DN100x300 mmL GS pipe piece.	Nr	1		
5.8.1.1.27f	DN100x90° GS slow bend	Nr	2		
5.8.1.1.27g	DN100 steel Johnson coupling c/w rubber rings.	Nr	4		
5.8.1.1.27h	1000mmWx5 mm thick rubber gasket	m	2		
5.8.1.1.27i	DN100x1200 mmL GS pipe piece.	Nr	1		
5.8.1.1.27j	DN100 GS equal Tee	Nr	1		
5.8.1.1.27k	DN100x600 mmL GS pipe piece.	Nr	2		
5.8.1.1.27l	DN150x100 mm GS reducer.	Nr	1		
5.8.1.1.27m	DN100 CS anti-slam, Non-Return valve .	Nr	1		
5.8.1.1.27n	DN100 GI hex nipple	Nr	5		
5.8.1.1.27o	DN100 steel union	Nr	1		
5.8.1.1.27p	DN100 mm, PN 16 bar Y-strainer	Nr	1		
5.8.1.1.27q	DN100x250 mmL GI pipe piece, threaded at one end and plain at the opposite end.	Nr	1		
5.8.1.1.27r	DN150xPN16 gate valve c/w handwheel.	Nr	1		
5.8.1.1.27s	Steel chequered cover plate of size 300 mmWx100 mmLx10mm thick	Nr	3		
5.8.1.1.27t	Any other accessories required for the system	LS	1		
5.8.1.2	**Removal Of Old Items And Trenching**				
5.8.1.2.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away , dispose excess as advised.	m	15		
5.8.1.2.02	Break existing RC pipe support block.	Nr	1		
5.8.1.2.03	Excavate, expose and remove a section of existing DN 100 GI Borehole-rising main inter-connection pipe work .	m	3		
5.8.1.2.04	Excavate pipe trench of size 500 mmWx900 mm Depth incompacted soil. Back fill to ground level after laying of the pipe. Cart away , dispose excess as advised.	m	5		
5.8.1.2.05	Excavate cable trench of size 300 mmWx175 mm Depth floor slab (1:3:6) in the power control room (control power panel to starters and exit holes to boreholes. Straighten the sides and floor. Plaster the sides,place 25 mm thick screed (1:3). Apply nilo on all the surfaces after laying of the pipe. Cart away , dispose debris as advised.	m	3		
	TOTAL PAGE 3				**-**

5.8.2 BOREHOLE NO. 7

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.8.2.1	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
5.8.2.1.01	Remove pump set and drop pipes (Grundfos SP46-12, DN100 GS, Pump depth = 54 metres below ground level	LS	1		
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST: **NOTE:**				
5.8.2.1.02	Submersible pump set of capacity 50 m^3/hr of water against a total head of 150 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 54 metres below ground level.	Nr	1		
5.8.2.1.03	Overheads and profits on item 5.8.2.1.02 as specified for Prime Cost sum items	%			
5.8.2.1.04	16 mm^2/4 core submersible pump flat cable	m	58		
5.8.2.1.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.8.2.1.06	OD25 class D uPVC dipper pipe	m	52		
5.8.2.1.07	DN100 GI class C threaded water pipe.	m	52		
5.8.2.1.08	DN100 Steel steam sockets	Nr	14		
5.8.2.1.09	DN75x300 mm long GI starter pipe	Nr	1		
5.8.2.1.10	DN100x75 GI reducer (female threaded)	Nr	1		
5.8.2.1.11	0.75mm^2 sc double insulated copper cable(brown and black) each 58 metres	m	116		
5.8.2.1.12	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable (starter panel to borehole)	m	70		
5.8.2.1.13	Lay in trench/duct, connect and test 25 mm^2/4c armoured copper cable	m	70		
5.8.2.1.14	Copper cable gland c/w lock-nut and shroud for 25 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.8.2.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable.	Nr	2		
5.8.2.1.16	30 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
5.8.2.1.17	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.8.2.1.18	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.8.2.1.19	35 mm^2 sc copper cable (green)	m	2		
5.8.2.1.20	Supply and install water-tight GS cable junction box of size 175x175x90mm depth, fabricated from 3 mm thick plate. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side,. 3 No. 10 amps and 5 No. 80 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 25 mm^2/4c, 16mm^2/4c and 0.75 mm^2 sc submerssible cables.	Nr	1		
5.8.2.1.21	DN38x150 mmL GI threaded pipe piece (cable entry)	Nr	1		
	TOTAL PAGE 4				-

5.8.2.1.22	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 70 m (to be determined after test pumping).	SET	1		
5.8.2.1.23	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN 80, Qmax=80m^3/hr, Qnom=40m^3/hr, Q_T=8m^3/hr and Qmin=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	No	1		
5.8.2.1.24	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	No	1		
5.8.2.1.25	**Installation Sundries**				
5.8.2.1.25a	ID320x7 mm Thick GS Borehole cap with welded DN100 GI pipe	Nr	1		
5.8.2.1.25b	Boss white (200 gm tin)	pc	2		
5.8.2.1.25c	550 mm plastic cable tie	Nr	35		
5.8.2.1.25d	20 mm Wx9ML self bonding electrical tape (scotch 23)	Roll	2		
5.8.2.1.25e	12 mm Wx12 ML PTFE thread seal tape	Roll	15		
5.8.2.1.25f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	Roll	4		
5.8.2.1.25g	Stainless steel ferrules for 16 mm^2 cable	Nr	4		
5.8.2.1.25i	10 amps cable terminal block	Nr	3		
5.8.2.1.25j	80 amps cable terminal block	Nr	4		
5.8.2.1.26	**Other Electro-Mechanical Works - BH 7**				
5.8.2.1.26a	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.8.2.1.26b	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.8.2.1.26c	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations	LS	1		
5.8.2.1.26d	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 16 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.8.2.1.26e	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	70		
5.8.2.1.26f	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 25 Kg/cm^2 (0-25 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket.. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.8.2.1.26g	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 25 Kg/cm^2)/(0 - 25 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.8.2.1.26h	Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.	Nr	1		
5.8.2.1.26i	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse,187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20.	Nr	1		
5.8.2.1.26j	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz	Nr	1		
5.8.2.1.26k	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
	TOTAL PAGE 5				**-**

5.8.2.1.27	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.8.2.1.27a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
	NOTE: **i).** All Valves, pipes, pipe fittings, water meter shall be new. **ii).** Unless otherwise stated, valves, pipes, pipe fittings, water meter shall be double flanged, drilled and supplied c/w high tensile strength stainless steel bolts, nuts and washers. **iii).** Cutting and adjustment of pipework on site to fit.				
5.8.2.1.27b	DN100x90° GS slow bend with a bore for pressure gauge and pressure switch (treaded at one end and flanged at the opposite end.	Nr	1		
5.8.2.1.27c	DN100x200 mmL GS pipe piece with bore for mounting an air valve	Nr	1		
5.8.2.1.27d	DN100x1500 mmL GS pipe piece.	Nr	1		
5.8.2.1.27e	DN100x300 mmL GS pipe piece.	Nr	3		
5.8.2.1.27f	DN100x90° GS slow bend	Nr	2		
5.8.2.1.27g	DN100 steel Johnson coupling c/w rubber rings.	Nr	4		
5.8.2.1.27h	1000mmWx5 mm thick rubber gasket	m	2		
5.8.2.1.27i	DN100x1500 mmL GS pipe piece.	Nr	1		
5.8.2.1.27j	DN100 GS equal Tee	Nr	1		
5.8.2.1.27k	DN100x600 mmL GS pipe piece.	Nr	2		
5.8.2.1.27l	DN100 CS anti-slam, Non-Return valve .	Nr	1		
5.8.2.1.27m	DN100 GI hex nipple	Nr	8		
5.8.2.1.27n	DN100 steel union	Nr	1		
5.8.2.1.27o	DN100 mm, PN 16 bar Y-strainer	Nr	1		
5.8.2.1.27p	DN100x250 mmL GI pipe piece, threaded at one end and plain at the opposite end.	Nr	1		
5.8.2.1.27q	DN100xPN16 gate valve c/w handwheel.	Nr	1		
5.8.2.1.27r	DN150x100 GI reducer.	Nr	1		
5.8.2.1.27s	DN150 CS Non-Return valve.	Nr	1		
5.8.2.1.27t	Any other accessories required for the system	LS	1		
5.8.2.2	**Removal Of Old Items and Trenching**				
5.8.2.2.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away , dispose excess as advised.	m	65		
5.8.2.2.02	Excavate, expose and remove a section of existing DN 100 GI Borehole-rising main inter-connection pipe work .	m	4		
5.8.2.2.03	Excavate pipe trench of size 500 mmWx900 mm Depth in compacted soil. Back fill to ground level after laying of the pipe. Cart away, dispose excess as advised.	m	5		
	TOTAL PAGE 6				**-**
	TOTAL BH NO. 7				

5.8.3. NEW MAINS POWER CONTROL SWITCHGEAR PANEL, ELECTRICAL AND FIRE FIGHTING EQUIPMENT

5.8.3.1	**NEW MAINS POWER CONTROL SWITCHGEAR PANEL**				
5.8.3.1.01	Free standing, 250 amps, 3 phase, 415 vac, compact, compartmented, indoor, surface metal clad maiins power control panel (IP20), dust-proof, termite-proof, comprising of but not limited to the following, duly wired and labeled. It shall be constructed from gauge 16 spangled sheet steel of minimum thickness 1.75mm;	Nr	1		
5.8.3.1.02	Kenya Power & Lighting Company CUT-OUTS chamber	Nr	1		
5.8.3.1.03	1xKPLC incommer Current transformers chamber	Nr	1		
5.8.3.1.04	1xKPLC metering equipment chamber incommer Current transformers chamber	Nr	1		
5.8.3.1.05	1x250 amps adjustable triple pole mccb (adjustable range: $0.7I_N$, $0.8I_N$, $0.9I_N$, $1.0I_N$ set at $0.8I_N$ where I_N= rated current of mccb = 250 amps).	Nr	1		
5.8.3.1.06	1x25 Kvar, 3 phase, 415 vac, 5 step central automatic power capacitor correction bank c/w 100 amps TP supply mccb, contactors, fuses, programmable electronic PF controllerrelay etc.	Nr	1		
5.8.3.1.07	1xsingle phase, 240 vac kWh energy registering meter)	Nr	1		
5.8.3.1.08	4x260 amps high conductivity rectangular bare copper bus-bar conductors	Nr	1		
5.8.3.1.09	2x125 amps, TP, 415 vac, mccbs, I_{CU} =25 kA. Each in its own cmpartment (1 No. for Borehole No.4, 1 No. for BH No.7, and 2 No. spares.	Nr	1		
5.8.3.1.10	2x63 amps, TP, 415 vac, mccbs, I_{CU} =15 kA. Each in its own cmpartment. (Spares)	Nr	1		
5.8.3.1.11	1x3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mccb	Nr	1		
5.8.3.1.12	2x100 amps,1phase, 240 vac class "A" mcbs (staff houses)	Nr	1		
5.8.3.1.13	1xCooling fan rated 25 watts, 240 vac, 2800 rpm continuously rated installed on the side, 100 mm height from the bottom clw filter and termite-proof, dust-proof stainless steel protection D1.5 mm wiregauze.	Nr	1		
5.8.3.1.14	2x ventillation hole of size 150x100 mm installed on the top opposite sides, 50 mm below top c/w termite-proof, dust-proof filter and grid.	Nr	1		
5.8.3.1.15	1x3 phase, 240 vac resettable digital network analyzer/recorder (voltage, current, kWh, Kva, Pf,Hz, Kw) with LED phase indicators (RED, YELLOW, BLUE) on front panel.	Nr	1		
5.8.3.1.16	100 amps, 6 way, 1 phase, 240 vac DIN distribution board; c/w; 2 No. 10 amps,1 pole, 240 vac class "A" mcbs, 3 No. 20 amps, 1 pole class "A" mcbs, 1 No. Blanking plate.	Nr	1		
5.8.3.1.17	3xAC ammeters range 0-300 amps c/w CTS.	Nr	1		
5.8.3.1.18	1xAC voltmeter (0-500 vac) c/w vss and protection mcbs.	Nr	1		
5.8.3.1.19	32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid.	Nr	1		
5.8.3.1.20	250 amps, 415 vac TPN manual changer-over switch c/w pilot indicator lights (KPLC ON, KPLC LOAD ON, GENERATOR ON, GENERATOR LOAD ON)	Nr	1		
5.8.3.1.21	25x3 mm thick copper strip bound along the switchgear panel length (earthing)	SET	1		
5.8.3.2	**Electrical Repairs of Mains Power Control Switchgear/Office/Chemical Dosing Room**				
5.8.2.1	Remove the existing socket/lighting wiring.	LS	1		
5.8.2.2	20 mm diam. GS conduit fixed on the walls and roof members. The cost shall be inclusive of tees, bends, circular boxes with covers, other necessary accessories	m	108		
5.8.2.3	1.5 mm^2 single copper cables (Red=150 m, Black=120 m , Green =120 m) laid in GS conduit and terminated at boh ends.	m	390		
	TOTAL PAGE 7				-

5.8.2.4	2.5 mm^2 single copper cables (Red=80 m, Black=80 m , Green =80 m) laid in GS conduit and terminated at both ends.	m	240		
5.8.2.5	10 amps, I way 2 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	1		
	10 amps, I way 1 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	2		
5.8.2.6	13 amps, 240 vac, twin switched socket outlet (smc) as Mem, Crabtree or similar quality approved make c/w box stainless steel screws (ringmain circuit).	Nr	6		
5.8.2.7	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	4		
5.8.2.8	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	6		
5.8.2.9	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.8.2.10	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber..	Nr	1		
5.8.2.11	35 mm^2 sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape.	m	5		
5.8.2.1	Improve lightning protection system	LS	1		
5.8.4	**Fire Fighting Equipment**				
5.8.4.1	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	No	2		
	TOTAL PAGE 8				-
TOTAL BHs 4 & 7:- CARRIED TO BILLL 5 SUMMARY SHEET					-

PART 5.9 - Electro-Mechanical Works & Pipeworks Boreholes 6.1 & 6.2 (Site-Repairs)

5.9.1 BOREHOLE NO. 6.1

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.9.1.1	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST: **NOTE:**				
5.9.1.1.01	Submersible pump set of capacity 22.5 m^3/hr of water against a total head of 175 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 55 metres below ground level c/w cable guard.	Nr	1		
5.9.1.1.02	Overheads and profits on item 5.9.1.1.02 as specified for Prime Cost sum items	%			
5.9.1.1.03	10 mm^2/4 core submersible pump flat cable	m	58		
5.9.1.1.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.9.1.1.06	OD25 class D uPVC dipper pipe	m	55		
5.9.1.1.07	DN100 GS class C threaded water pipe.	m	54		
5.9.1.1.08	DN100 Steel steam sockets	Nr	12		
5.9.1.1.09	DN75x300 mm long GS starter pipe	Nr	1		
5.9.1.1.10	DN100x75 GS reducer (female threaded)	Nr	1		
5.9.1.1.11	0.75mm^2 sc double insulated copper cable(brown and black) each 58 metres	m	116		
5.9.1.1.12	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable (starter panel to borehole)	m	30		
5.9.1.1.13	Lay in trench/duct, connect and test 16 mm^2/4c armoured copper cable	m	30		
5.9.1.1.14	Copper cable gland c/w lock-nut and shroud for 16 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.9.1.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable.	Nr	2		
5.9.1.1.16	18.5 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
5.9.1.1.17	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.9.1.1.18	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.9.1.1.19	Supply and install water-tight GS cable junction box of size 150x150x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side. 3 No. 10 amps and 5 No. 30 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cable.	Nr	1		
5.9.1.1.19a	Supply and install water-tight GS cable junction box of size 150x150x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side. 3 No. 10 amps and 5 No. 60 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cable.	Nr	1		
5.9.1.1.19b	35 mm^2 sc copper cable (green)	m	5		
5.9.1.1.20	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr	1		
5.9.1.1.21	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 70 m (to be determined after test pumping).	SET	1		
5.9.1.1.22	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN80, Q_{max}=80m^3/hr, Q_{nom}=40m^3/hr, Q_T=8m^3/hr and Q_{min}=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
	TOTAL PAGE 1				-

5.9.1.1.23	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
5.9.1.1.24	**Installation Sundries**				
5.9.1.1.24a	ID220x4 mm Thick GS Borehole cap with welded DN75 GS pipe piece, welded DN38 GS slow bend for passage of 16mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.9.1.1.24b	Boss white (200 gm tin)	pc	2		
5.9.1.1.24c	550 mm plastic cable tie	Nr	40		
5.9.1.1.24d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.9.1.1.24e	12 mm Wx12 ML PTFE thread seal tape	ROLL	10		
5.9.1.1.24f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.9.1.1.24g	Stainless steel ferrules for 10mm^2 cable	Nr	4		
5.9.1.1.24h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	2		
5.9.1.1.24i	10 amps cable terminal block	Nr	3		
5.9.1.1.24j	60 amps cable terminal block	Nr	4		
5.9.1.1.25	**Other Electro-mechanical Works - BH 6.1**				
5.9.1.1.25a	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.9.1.1.25b	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.9.1.1.25c	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations.	LS	1		
5.9.1.1.25d	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.9.1.1.25e	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	30		
5.9.1.1.25f	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 25 Kg/cm^2 (0 - 25 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	1	No.		
5.9.1.1.25g	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 30 Kg/cm^2)/(0 - 30 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.9.1.1.25h	Single orifice cast steel air valve c/w accessories for mounting on DN75 GS pipe.	Nr	1		
5..1.1.25i	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse, 187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20.	Nr	1		
	TOTAL PAGE 2				**-**

5.9.1.1.25j	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz.	Nr	1		
5.9.1.1.25k	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.9.1.1.25l	Supply and installation of 1.5mm² armoured underground cable for the well probe	m	30		
5.9.1.1.26	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.9.1.1.26a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
	NOTE: **i).** All Valves, pipes, pipe fittings, water meter shall be new. **ii).** Unless otherwise stated, valves, pipes, pipe fittings, water meter shall be double flanged, drilled and supplied c/w high tensile strength stainless steel bolts, nuts and washers. **iii).** Cutting and adjustment of pipework on site to fit.				
5.9.1.1.26b	DN100x90^o GS slow bend with a bore for pressure gauge	Nr	3		
5.9.1.1.26c	DN100 GS socket with bore for mounting air valve	Nr	1		
5.9.1.1.26d	DN100x75 GS reducer.	Nr	1		
5.9.1.1.26e	DN100x1500 mmL GS pipe piece	Nr	1		
5.9.1.1.26f	DN100x300 mmL GS pipe piece.	Nr	2		
5.9.1.1.26g	DN100x90^o GS slow bend	Nr	2		
5.9.1.1.26h	DN100 CS non-slam, Non-Return valve.	Nr	1		
5.9.1.1.26i	DN100 steel Johnson coupling c/w rubber rings.	Nr	3		
5.9.1.1.26k	DN100xPN20 gate valve c/w handwheel.	Nr	2		
5.9.1.1.26l	DN100, PN 20 bar Y-strainer	Nr	1		
5.9.1.2	**Removal Of Old Items And Trenching**				
5.9.1.2.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	20		
5.9.1.2.02	Excavate, expose and remove a section of existing DN100 GS Borehole-rising main inter-connection pipe work. Trim the trenching to size 500 mmWx600 mm depth. Back fill to ground level after laying of pipe. Cart away, dispose excess as advised.	m	5		
	TOTAL PAGE 3				**-**

5.9.2 BOREHOLE NO. 6.2

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.9.2.1	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
5.9.2.1.01	Remove pump set and drop pipes (Grundfos SP17-17, DN75 GS, Pump inlet depth = 73 metres below ground level	LS	1		
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST: **NOTE:**				
5.9.2.1.02	Submersible pump set of capacity 11 m^3/hr of water against a total head of 175 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 73 metres below ground level.	Nr	1		
5.9.2.1.03	Overheads and profits on item 5.9.2.1.02 as specified for Prime Cost sum items	%			
5.9.2.1.04	16 mm^2/4 core submersible pump flat cable	m	75		
5.9.2.1.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.9.2.1.06	OD25 class D uPVC dipper pipe	m	73		
5.9.2.1.07	DN75 GS class C threaded water pipe.	m	73		
5.9.2.1.08	DN75 Steel steam sockets	Nr	15		
5.9.2.1.09	DN65x300 mm long GS starter pipe	Nr	1		
5.9.2.1.10	DN75x65 GS reducer (female threaded)	Nr	1		
5.9.2.1.11	0.75mm^2 sc double insulated copper cable(brown and black) each 75 metres	m	150		
5.9.2.1.12	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable (starter panel to borehole)	m	170		
5.9.2.1.13	Lay in trench/duct, connect and test 16 mm^2/4c armoured copper cable	m	170		
5.9.2.1.14	Copper cable gland c/w lock-nut and shroud for 16 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.9.2.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable.	Nr	2		
5.9.2.1.16	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.9.2.1.17	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.9.2.1.18	16 mm^2 sc copper cable (green)	m	5		
5.9.2.1.19	Supply and install water-tight GS cable junction box of size 150x150x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side. 3 No. 10 amps and 5 No. 30 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cable.	Nr	1		
5.9.2.1.20	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr	1		
5.9.2.1.21	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 70 m (to be determined after test pumping).	SET	1		
	TOTAL PAGE 4				-

5.9.2.1.22	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN80, Qmax=80m^3/hr, Q_{nom}=40m^3/hr, Q_T=8m^3/hr and Q_{min}=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
5.9.2.1.23	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL	Nr	1		
5.9.2.1.24	**Installation Sundries**				
5.9.2.1.24a	ID220x4 mm Thick GS Borehole cap with welded DN75 GS pipe piece, welded DN38 GI slow bend for passage of 16mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.9.2.1.24b	Boss white (200 gm tin)	pc	2		
5.9.2.1.24c	450 mm plastic cable tie	Nr	50		
5.9.2.1.24d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.9.2.1.24e	12 mm Wx12 ML PTFE thread seal tape	ROLL	10		
5.9.2.1.24f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.9.2.1.24g	Stainless steel ferrules for 16mm^2 cable	Nr	4		
5.9.2.1.24h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	2		
5.9.2.1.24i	10 amps cable terminal block	Nr	3		
5.9.2.1.24j	30 amps cable terminal block	Nr	4		
5.9.2.1.25	**Other Electro-mechanical Works - BH 6.2**				
5.9.2.1.25a	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.9.2.1.25b	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works.	LS	1		
5.9.2.1.25c	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations.	LS	1		
5.9.2.1.25d	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.9.2.1.25e	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	165		
5.9.2.1.25f	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 25 Kg/cm^2 (0 - 25 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac,	1	No.		
	Total page 5				**-**

5.9.2.1.25g	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 30 Kg/cm^2)/(0 - 30 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.9.2.1.25h	Single orifice cast steel air valve c/w accessories for mounting on DN75 GS pipe.	Nr	1		
5..9.2.1.25i	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse, 187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20.	Nr	1		
5.9.2.1.25j	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz	Nr	1		
5.9.2.1.25k	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.9.2.1.25l	Supply and installation of 1.5mm² armoured underground cable for the well probe	m	170		
5.9.2.1.26	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.9.2.1.26a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
5.9.2.1.26b	DN75x90^o GS slow bend with a bore for pressure gauge	Nr	3		
5.9.2.1.26c	DN75 GS socket with bore for mounting air valve	Nr	1		
5.9.2.1.26d	DN75x50 GS reducer (threaded)	Nr	1		
5.9.2.1.26e	DN75x1500 GS pipe piece (threaded at both ends)	Nr	1		
5.9.2.1.26f	DN75x300 GS pipe piece)(threaded at both ends	Nr	1		
5.9.21.26g	DN75x90^o GS slow bend	Nr	2		
	TOTAL PAGE 6				**-**

5.9.2.1.26h	DN75 GS hex nipple	Nr	4		
5.9.2.1.26i	DN75 GS union (threaded)	Nr	3		
5.9.2.1.26j	DN75 stainless steel non-slam, Non-Return valve (threaded)	Nr	1		
5.9.2.1.26k	DN75 steel Johnson coupling c/w rubber rings.	Nr	2		
5.9.2.1.26l	DN75xPN20 gate valve c/w handwheel.	Nr	2		
5.9.2.1.26m	DN75, PN 20 bar Y-strainer	Nr	1		
5.9.2.2	**Removal Of Old Items and Trenching**				
5.9.2.2.01	Excavate, expose and remove existing cables (power control room to	m	150		
5.9.2.2.02	Excavate, expose and remove a section of existing DN75 GS Borehole-rising main inter-connection pipe work .Trim the trenching to size 500 mmWx600 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	5		
5.9.3	**REHABILITATION OF MAINS POWER CONTROL SWITCHGEAR PANEL, ELECTRICAL WIRING OF SWITCHGEAR//OFFICE/STORE BUILDING AND FIRE FIGHTING EQUIPMENT**				
5.9.3.1	**MAINS POWER CONTROL SWITCHGEAR PANEL**				
5.9.3.1	Open the mains power switchgear panel, carefully clean, dust and air blows the compartment..	Item	1		
5.9.3.1	Replace the existing 125 mps, 3 phase mccb (Legrand DPX 125) on power control switchgear panel feeding starter for Bh. No. 6.2 with one rated 63 amps	Nr	1		
5.9.3.1	Install 3 phase, 415 vac surge arrestor equipment in the panel.	Nr	1		
5.9.3.1	Install 15 Kvar, 3 phase, 415 vac, 4 step automatic power capacitor correction bank	Set	1		
5.9.3.2	**ELECTRICAL WIRING OF MAINS POWER CONTROL**				
5.9.3.2.01	Remove the existing socket/lighting wiring.	LS	1		
5.9.3.2.02	20 mm diam. GS conduit fixed on the walls and roof members. The cost shall be inclusive of tees, bends, circular boxes with covers, other necessary accessories	m	100		
5.9.3.2.03	1.5 mm^2 single copper cables (Red=130 m, Black=100 m , Green	m	330		
5.9.3.2.04	2.5 mm^2 single copper cables (Red=75 m, Black=75 m , Green =75 m) laid in GS conduit and terminated at both ends.	m	225		
5.9.3.2.05	10 amps, I way 2 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	1		
5.9.3.2.06	10 amps, I way 1 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	2		
5.9.3.2.07	13 amps, 240 vac, twin switched socket outlet (smc) as Mem, Crabtree or similar quality approved make c/w box stainless steel screws (ringmain circuit).	Nr	4		
5.9.3.2.08	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	4		
5.9.3.2.09	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	4		
5.9.3.2.10	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.9.3.2.11	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber..	Nr	1		
5.9.3.2.12	25 mm^2 sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape.	m	5		
5.9.3.2.13	Improve lightning protection system	LS	1		
5.9.3.3	**Fire Fighting Equipment**				
5.9.3.3.01	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	2		
	Total Page 7				**-**
TOTAL BHs 6.1 & 6.2:- CARRIED TO BILLL 5 SUMMARY SHEET					**-**

PART 5.10 - Electro-Mechanical Works & Pipeworks Borehole 8.1 & 8.2 (Site-Repairs)

5.10.1 BOREHOLE NO. 8.3

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.10.1.1	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST: **NOTE:**				
5.10.1.1.01	Submersible pump set of capacity 12 m^3/hr of water against a total head of 165 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 74 metres below ground level.	Nr	1		
5.10.1.1.02	Overheads and profits on item 5.10.1.1.01 as specified for Prime Cost sum items	%			
5.10.1.1.03	10 mm^2/4 core submersible pump flat cable	m	76		
5.10.1.1.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.10.1.1.06	OD25 class D uPVC dipper pipe	m	74		
5.10.1.1.07	DN50 GS class C threaded water pipe.	m	74		
5.10.1.1.08	DN50 Steel steam sockets	Nr	14		
5.10.1.1.09	DN65x300 mm long GS starter pipe	Nr	1		
5.10.1.1.10	DN65x50 GS reducer (female threaded)	Nr	1		
5.10.1.1.11	0.75mm^2 sc double insulated copper cable(brown and black) each 76 metres	m	152		
5.10.1.1.12	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable (starter panel to borehole)	m	35		
5.10.1.1.13	Lay in trench/duct, connect and test 10 mm^2/4c armoured copper cable	m	35		
5.10.1.1.14	Copper cable gland c/w lock-nut and shroud for 10 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.10.1.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable.	Nr	2		
5.10.1.1.16	Supply and install water-tight GS cable junction box of size 150x150x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side. 3 No. 10 amps and 5 No. 30 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 10mm^2/4c and 0.75 mm^2 sc submerssible cable.	Nr	1		
5.10.1.1.17	10 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit. The cost shall be inclusive 10 mm^2/4c armoured copper cable, cable glands etc for connection from starter panel to main switchgear.	SET	1		
5.10.1.1.18	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr	1		
5.10.1.1.19	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 75 m (to be determined after test pumping).	SET	1		
5.10.1.1.20	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN80, Q_{max}=80m^3/hr, Q_{nom}=40m^3/hr, Q_T=8m^3/hr and Q_{min}=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
5.10.1.1.21	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
	TOTAL PAGE 1				-

PART 5.10 - Electro-Mechanical Works & Pipeworks Borehole 8.1 & 8.2 (Site-Repairs)

5.10.1.1.22	**Installation Sundries**				
5.10.1.1.22a	ID320x4 mm Thick GS Borehole cap with welded DN50 GS pipe piece, welded DN38 GS slow bend for passage of 10mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.10.1.1.22b	Boss white (200 gm tin)	pc	2		
5.10.1.1.22c	450 mm plastic cable tie	Nr	50		
5.10.1.1.22d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.10.1.1.22e	12 mm Wx12 ML PTFE thread seal tape	ROLL	10		
5.10.1.1.22f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.10.1.1.22g	Stainless steel ferrules for 10mm^2 cable	Nr	4		
5.10.1.1.22h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	3		
5.10.1.1.22i	10 amps cable terminal block	Nr	4		
5.10.1.1.22j	30 amps cable terminal block	Nr	4		
5.10.1.1.23	**Other Electro-mechanical Works - BH 8.3**				
5.10.1.1.23a	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.10.1.1.23b	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.10.1.1.23c	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations.	LS	1		
5.10.1.1.23d	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.10.1.1.23e	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	30		
5.10.1.1.22f	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 25 Kg/cm^2 (0 - 25 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.10.1.1.23g	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 30 Kg/cm^2)/(0 - 30 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.10.1.1.22h	Single orifice cast steel air valve c/w accessories for mounting on DN75 GS pipe.	Nr	1		
5.10.1.1.22i	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse, 187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20.	Nr	1		
5.10.1.1.22j	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz.	Nr	1		
5.10.1.1.23k	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.10.1.1.23l	Supply and installation of 1.5mm² armoured underground cable for the well probe	m	30		
5.10.1.1.24	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.10.1.1.24a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	TOTAL PAGE 2				

PART 5.10 - Electro-Mechanical Works & Pipeworks Borehole 8.1 & 8.2 (Site-Repairs)

	Supply, delivery to Site, Install and Test:				
5.10.1.1.24b	DN50x90° GI slow bend with a bore for pressure gauge	Nr	1		
5.10.1.1.24c	DN50 GI socket with bore for mounting air valve	Nr	1		
5.10.1.1.24d	DN75x50 GI reducer (female threaded)	Nr	1		
5.10.1.1.24e	DN50x1500 GI pipe piece (threaded at both ends)	Nr	1		
5.10.1.1.24f	DN50x300 GI pipe piece)(threaded at both ends	Nr	1		
5.10.1.1.24g	DN50x90° GI slow bend	Nr	2		
5.10.1.1.24h	DN50 GI hex nipple	Nr	4		
5.10.1.1.24i	DN50 GS union	Nr	3		
5.10.1.1.24k	DN50 stainless steel Non-Return.	Nr	1		
5.10.1.1.24l	DN75 steel Johnson coupling c/w rubber rings, bolts, washers and nuts	Nr	2		
5.10.1.2	**Removal Of Old Items and Trenching**				
5.10.1.2.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	35		
5.10.1.2.02	Excavate, expose and remove a section of existing DN50 GI Borehole-rising main inter-connection pipe work. Trim the trenching to size 500 mmWx600 mm depth. Back fill to ground level after laying of pipe. Cart away, dispose excess as advised.	m	5		
5.10.2	**BOREHOLE NO. 8.1**				
5.10.2.1	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping				
5.10.2.1.01	Remove pump set and drop pipes (Grundfos SP30-21, DN75 GI, Pump inlet depth = 75 metres below ground level	LS	1		
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST: **NOTE:**				
5.10.2.1.02	Submersible pump set of capacity 23 m^3/hr of water against a total head of 175 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 73 metres below ground level.	Nr	1		
5.10.2.1.03	Overheads and profits on item 5.10.2.1.02 as specified for Prime Cost sum items	%			
5.10.2.1.04	16 mm^2/4 core submersible pump flat cable	m	76		
5.10.2.1.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.10.2.1.06	OD25 class D uPVC dipper pipe	m	74		
5.10.2.1.07	DN75 GS class C threaded water pipe.	m	74		
5.10.2.1.08	DN75 Steel steam sockets	Nr	15		
5.10.2.1.09	DN75x300 mm long GS starter pipe	Nr	1		
5.10.2.1.10	DN100x75 GS reducer (female threaded)	Nr	1		
5.10.2.1.11	0.75mm^2 sc double insulated copper cable(brown and black) each 75 metres	m	152		
5.10.2.1.12	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable (starter panel to borehole)	m	25		
5.10.2.1.13	Lay in trench/duct, connect and test 16 mm^2/4c armoured copper cable	m	25		
5.10.2.1.14	Copper cable gland c/w lock-nut and shroud for 16 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.10.2.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc copper cable.	Nr	2		
5.10.2.1.16	Masory earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).	Nr	1		
5.10.2.1.17	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.10.2.1.18	16 mm^2 sc copper cable (green)	m	5		
5.10.2.1.19a	Supply and install water-tight GS cable junction box of size 150x150x90mm depth, fabricated from 3 mm thick plate. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side. 3 No. 10 amps and 5 No.60 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 16mm^2/4c and 0.75 mm^2 sc submerssible cable	Nr	1		
5.10.2.1.1b	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr	1		
5.10.2.1.20	18.5 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
	TOTAL PAGE 3				-

PART 5.10 - Electro-Mechanical Works & Pipeworks Borehole 8.1 & 8.2 (Site-Repairs)

5.10.2.1.21	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 76 m (to be determined after test pumping).	SET	1		
5.10.2.1.22	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN80, Qmax=80m^3/hr, Q_{nom}=40m^3/hr, Q_T=8m^3/hr and Q_{min}=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
5.10.2.1.23	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
5.10.2.1.24	**Installation Sundries**				
5.10.2.1.24a	ID220x4 mm Thick GS Borehole cap with welded DN75 GS pipe piece, welded DN38 GI slow bend for passage of 16mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.10.2.1.24b	Boss white (200 gm tin)	Pc	2		
5.10.2.1.24c	450 mm plastic cable tie	Nr	50		
5.10.2.1.24d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.10.2.1.24e	12 mm Wx12 ML PTFE thread seal tape	ROLL	10		
5.10.2.1.24f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.10.2.1.24g	Stainless steel ferrules for 16mm^2 cable	Nr	4		
5.10.2.1.24h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	2		
5.10.2.1.24i	10 amps cable terminal block	Nr	3		
5.10.2.1.24j	30 amps cable terminal block	Nr	4		
5.10.2.1.25	**Other Electro-mechanical Works - BH 8.1**				
5.10.2.1.25a	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.10.2.1.25b	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works.	LS	1		
5.10.2.1.25c	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations.	LS	1		
5.10.2.1.25d	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.10.2.1.25e	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	20		
5.10.2.1.25f	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 25 Kg/cm^2 (0 - 25 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.10.2.1.25g	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 30 Kg/cm^2)/(0 - 30 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.	Nr	1		
5.10.2.1.25h	Single orifice cast steel air valve c/w accessories for mounting on DN75 GS pipe.	Nr	1		
5.10.2.1.25i	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse, 187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20.	Nr	1		
	TOTAL PAGE 4				

PART 5.10 - Electro-Mechanical Works & Pipeworks Borehole 8.1 & 8.2 (Site-Repairs)

5.10.2.1.25j	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz	Nr	1		
5.10.2.1.25k	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.10.2.1.25l	Supply and installation of 1.5mm² armoured underground cable for the well probe	m	170		
5.10.2.1.26	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.10.2.1.26a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
5.10.2.1.26b	DN75x90^o GS slow bend with a bore for pressure gauge	Nr	1		
5.10.2.1.26c	DN75 GS socket with bore for mounting air valve	Nr	1		
5.10.2.1.26d	DN75x50 GS reducer (threaded)	Nr	1		
5.10.2.1.26e	DN75x1500 GS pipe piece (threaded at both ends)	Nr	1		
5.10.2.1.26f	DN75x300 GS pipe piece)(threaded at both ends	Nr	1		
5.10.21.26g	DN75x90^o GS slow bend	Nr	2		
5.10.2.1.26h	DN75 CS hex nipple	Nr	4		
5.10.2.1.26i	DN75 GS union (threaded)	Nr	3		
5.`0.2.1.26j	DN75 stainless steel non-slam, Non-Return valve (threaded)	Nr	1		
5.10.2.1.26k	DN75 steel Johnson coupling c/w rubber rings.	Nr	3		
5.10.2.1.26l	DN75xPN20 gate valve c/w handwheel.	Nr	2		
5.10.2.1.26m	DN75, PN 20 bar Y-strainer	Nr	1		
5.10.2.1.26n	DN100x75 GS reducer	Nr	2		
5.10.2.1.26o	DN100x200 mmL GS pipe piece	Nr	2		
5.10.2.1.26p	DN100x250 mmL GS pie piece	Nr	2		
5.10.2.1.26q	DN100 steel Johnson coupling c/w rubber rings.	Nr	2		
5.10.2.1.26r	DN100xPN20 gate valve c/w handwheel.	Nr	1		
5.10.2.2	**Removal Of Old Items and Trenching**				
5.10.2.2.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	20		
5.10.2.2.02	Excavate, expose and remove a section of existing DN75 GIS Borehole-rising main inter-connection pipe work .Trim the trenching to size 500 mmWx600 mm depth. Back fill to ground level after laying of pipe. Cart away, dispose excess as advised.	m	3		
	TOTAL PAGE 5				**-**
	TOTAL BH NO. 8.1				

PART 5.10 - Electro-Mechanical Works & Pipeworks Borehole 8.1 & 8.2 (Site-Repairs)

5.10.3	**REHABILITATION OF MAINS POWER CONTROL SWITCHGEAR PANEL, ELECTRICAL WIRING OF SWITCHGEAR/OFFICE BUILDING AND FIRE FIGHTING EQUIPMENT**				
5.10.3.1	**MAINS POWER CONTROL SWITCHGEAR PANEL**				
5.10.3.1.01	Open the mains power switchgear panel, carefully clean, dust and air blows the compartment..	ITEM	1		
5.10.3.1.02	Replace the existing 125 mps, 3 phase mccb on power control switchgear panel feeding starter for BH. No. 8.2 with one rated 63 amps	Nr	1		
5.10.3.1.03	Install 3 phase, 415 vac surge arrestor equipment in the panel.	Nr	1		
5.10.3.1.04	Install 18 Kvar, 3 phase, 415 vac, 4 step automatic power capacitor correction bank	SET	1		
5.10.3.1.05	3x2.5 mm^2 single core copper cables wired in 20 mm diameter pvc conduit from consumer unit to fan speed control unit and fan terminals.	m	6		
5.10.3.1.06	Remove the defective cooling fan. Install a new one rated 25 watts, 240 vac at 100 mm height from the bottom of the panel c/w dust-prooof filter and protective GS wire frame (2x2xD1.5 mm). Install where the defective fan has been removed from, protective GS grid (2x2xD1.5 mm) c/w filter .	SET	1		
5.10.3.2	**ELECTRICAL WIRING OF MAINS POWER CONTROL SWITCHGEAR/ OFFICE BUILDING**				
5.10.3.2.01	Remove the existing socket/lighting wiring.	LS	1		
5.10.3.2.02	20 mm diam. GS conduit fixed on the walls and roof members. The cost shall be inclusive of tees, bends, circular boxes with covers, other necessary accessories	m	28		
5.10.3.2.03	1.5 mm^2 single copper cables (Red=50 m, Black=25 m , Green =25 m) laid in GS conduit and terminated at boh ends.	m	90		
5.10.3.2.04	2.5 mm^2 single copper cables (Red=25 m, Black=25 m , Green =25 m) laid in GS conduit and terminated at boh ends.	m	75		
5.10.3.2.05	10 amps, 1l way 2 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	1		
5.10.3.2.06	10 amps, 1 way 1 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	1		
5.10.3.2.07	13 amps, 240 vac, twin switched socket outlet (smc) as Mem, Crabtree or similar quality approved make c/w box stainless steel screws (ringmain circuit).	Nr	2		
5.10.3.2.08	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	2		
5.10.3.2.09	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	4		
5.10.3.2.10	3x2.5 mm^2 single core copper cables wired in 20 mm diameter pvc conduit from consumer unit to fan speed control unit and fan terminals.	m	6		
5.10.3.2.11	3 blade, adjustable slow speed (0-300 rpm), 240 vac ceiling mounted cooling fan c/w speed adjustable control unit completely wired (in conduit).	SET	1		
5.10.3.2.12	Improve lightning protection system	LS	1		
5.10.3.3	**FIRE FIGHTING EQUIPMENT**				
5.10.3.3.1	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	2		
	TOTAL BH 8.2				
TOTAL BHs 8.1 & 8.2 :- CARRIED TO BILLL 5 SUMMARY SHEET					

PART 5.11 - Electro-Mechanical Works & Pipeworks Borehole 9 (Site-Replacement)

5.11.1 BOREHOLE NO. 9

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.11.1.1	**Electro-Mechanical Works**				
	Items below are given for assumed pump capacity, final specifications (e.g. cable thickness) and quantity are dependent on type of pump and pumping depths and have to be identified by the contractor after test pumping.				
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST: **NOTE:**				
5.11.1.1.01	Submersible pump set of capacity 9 m^3/hr of water against a total head of 150 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 66 metres below ground level c/w cable guard.	Nr	1		
5.11.1.1.02	Overheads and profits on item 5.11.1.1.01 as specified for Prime Cost sum items	%			
5.11.1.1.03	6 mm^2/4 core submersible pump flat cable	m	70		
5.11.1.1.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1		
5.11.1.1.06	OD25 class D uPVC dipper pipe	m	66		
5.11.1.1.07	DN50 GS class C threaded water pipe.	m	65		
5.11.1.1.08	DN50 Steel steam sockets	Nr	14		
5.11.1.1.09	DN50x300 mm long GS starter pipe	Nr	1		
5.11.1.1.10	DN75x50 GS reducer (female threaded)	Nr	1		
5.11.1.1.11	0.75mm^2 sc double insulated copper cable(brown and black) each 76 metres	m	140		
5.11.1.1.12	Lay in trench/duct, connect and test 1.5 mm^2/2c pvc swa pvc copper cable (starter panel to borehole)	m	15		
5.11.1.1.13	Lay in trench/duct, connect and test 6 mm^2/4c armoured copper cable	LM	15		
5.11.1.1.14	Copper cable gland c/w lock-nut and shroud for 6 mm^2/4 core pvc swa pvc copper cable.	Nr	2		
5.11.1.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm^2/2 core pvc swa pvc	Nr	2		
5.11.1.1.16	Supply and install water-tight GS cable junction box of size 150x150x90mm depth, fabricated from 3 mm thick plate.. It shall have GS DIN plate fixed at the inside centre but raised by 10 mm from back side. 3 No. 10 amps and 5 No. 30 amps cable terminal blocks mounted on the plate, tough rubber cable grommets for 10mm^2/4c and 0.75 mm^2 sc submerssible cable.	Nr	1		
5.11.1.1.17	7.5 Kw, 3 phase, 415 vac,Direct-On Line starter panel (smc,DIN, wall mounted). It shall comprise of the following componennts amoung others, fully wired and labeled (powerand control wiring drawings must be submitted): including integral 3 phase surge arrestor unit, 32 amps Tpn Isolator with door rotary handle, amps 32 amps tpn class B mcb, LED pilot indicatotor lights (Green = Run, Red = Overload Tripped, Amber= BH Level Low, Yellow= Discharge Pressure High), Start, Stop/Rest push buttons, Hours Counter, Over/Under Voltage and Phase Failure Relay, Thermal Overload relay range 16-19-22 amps Set at 19 amps, Water level control relay, 10No. 10 amps, 8 No. 30 ambs cable terminal blocks firmly fixed on GS bracket mounted near the bottom etc	SET	1		
	TOTAL PAGE 1				**-**

PART 5.11 - Electro-Mechanical Works & Pipeworks Borehole 9 (Site-Replacement)					
5.11.1	**BOREHOLE NO. 9**				
5.11.1.1.18	**Installation Sundries**				
5.11.1.1.18a	ID320x4 mm Thick GS Borehole cap with welded DN50 GS pipe piece, welded DN38 GS slow bend for passage of 10mm^2/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
5.11.1.1.18b	Boss white (200 gm tin)	pc	2		
5.11.1.1.18c	400 mm plastic cable tie	Nr	40		
5.11.1.1.18d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.11.1.1.18e	12 mm Wx12 ML PTFE thread seal tape	ROLL	10		
5.11.1.1.18f	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.11.1.1.18g	Stainless steel ferrules for 6 mm^2 cable	Nr	4		
5.11.1.1.18h	Stainless steel ferrules for 0.75 mm^2 cable	Nr	3		
5.11.1.1.18j	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr	1		
5.11.1.1.19	**Other Electro-mechanical Works - BH 9**				
5.11.1.1.19a	Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.	LS	1		
5.11.1.1.19b	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	LS	1		
5.11.1.1.19c	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations.	LS	1		
5.11.1.1.19d	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10<UCB<30 VDC and signal output 4-20 mA 2-wire system.	Nr	1		
5.11.1.1.`19e	Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm² of 75 m (to be determined after test pumping).	SET	1		
5.11.1.1.19f	Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN80, Q_{max}=80m^3/hr, Q_{nom}=40m^3/hr, Q_T=8m^3/hr and Q_{min}=1.2m^3/hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
5.11.1.1.19g	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70^{0}C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +o.25%<4mH2O.	Nr	1		
5.11.1.1.19h	ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends etc enclosed in DN15 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.	m	30		
5.11.1.1.19i	Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm^2 and Bar), range 0 - 25 Kg/cm^2 (0 - 25 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket. It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.	Nr	1		
5.11.1.1.19j	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm^2 and Bar).Range (0 - 30 Kg/cm^2)/(0 - 30 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve	Nr	1		
5.11.1.1.19k	Single orifice cast steel air valve c/w accessories for mounting on DN75 GS pipe.	Nr	1		
5.11.1.1.19l	Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse, 187 – 264 VAC, 47 to 63 Hz,0°C….+45°C,≥ IP20.	Nr	1		
5.11.1.1.19m	Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2 digital inputs with frequency range 0-16 Hz.	Nr	1		
	TOTAL PAGE 2				-

PART 5.11 - Electro-Mechanical Works & Pipeworks Borehole 9 (Site-Replacement)

5.11.1	**BOREHOLE NO. 9**				
5.11.1.1.19n	Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W@900 MHz,1W@ 1800 MHz,Control via AT commands, -20^0 C to +55^{0}C,RS 232 interface,TCP/IP protocol stack for M2M	No	1		
5.11.1.1.19o	Supply and installation of 1.5mm² armoured underground cable for the well probe	LM	15		
5.11.1.1.20	**Pressure Pipes and Fittings:** **Modification of the connection between the new pump, the suction and the discharge pipes and fittings, and for corresponding concrete works.**				
5.11.1.1.20a	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		
	Supply, delivery to Site, Install and Test:				
5.11.1.1.20b	DN50x90^o GS slow bend with a bore for pressure gauge/switch	Nr	1		
5.11.1.1.20c	DN75 GS socket with bore for mounting air valve	Nr	1		
5.11.1.1.20d	DN75x50 GS reducer (female threaded)	Nr	1		
5.11.1.1.20e	DN50x1500 GS pipe piece (threaded at both ends)	Nr	1		
5.11.1.1.20f	DN50x300 GS pipe piece (threaded at both ends)	Nr	2		
5.11.1.1.20g	DN50x90^o GS slow bend	Nr	2		
5.11.1.1.20h	DN50 GS hex nipple	Nr	4		
5.11.1.1.20i	DN50 GS union	Nr	3		
5.11.1.1.20k	DN50 steel non-slam, Non-Return.(threaded)	Nr	1		
5.11.1.1.20l	DN75 steel Johnson coupling c/w rubber rings, bolts, washers and nuts	Nr	2		
5.11.1.1.20m	DN75x2500 mmL GS pipe piece (threaded at both ends)	Nr	2		
5.11.1.1.20n	DN75 GS equal Tee (threaded)	Nr	1		
5.11.1.1.20o	DN75x1500 mmL GS pipe piece (threaded at both ends)	Nr	2		
5.11.1.1.20p	DN75 GS union	Nr	2		
5.11.1.1.20q	DN75 GS hex nipple	Nr	3		
5.11.1.1.20r	DN75 GS GS elbow	Nr	2		
5.11.1.1.20r	DN75xPN20 gate valve c/w handwheel	Nr	2		
5.11.1.1.2	**Removal Of Old Items and Trenching**				
5.11.1.1.2.01	Excavate, expose and remove existing cables (power control room to borehole). Trim the trenching to size 450 mmWx500 mm depth. Back fill to ground level after laying of cable. Cart away, dispose excess as advised.	m	10		
5.11.1.1.2.02	Excavate, expose and remove a section of existing DN75 GI Borehole-rising main inter-connection pipe work. Trim the trenching to size 500 mmWx600 mm depth. Back fill to ground level after laying of pipe. Cart away, dispose excess as advised.	m	6		
	TOTAL PAGE 3				**-**

PART 5.11 - Electro-Mechanical Works & Pipeworks Borehole 9 (Site-Replacement)

5.11.1 BOREHOLE NO. 9

5.11.1.3. MAINS POWER CONTROL SWITCHGEAR PANEL, ELECTRICAL WIRING OF SWITCHGEAR/OFFICE/CHEMICAL DOSING BUILDING AND FIRE FIGHTING EQUIPMENT

5.11.1.3.1	**NEW MAINS POWER CONTROL SWITCHGEAR PANEL**				
5.11.1.3.01	Pick the existing free standing switchgear panel existing on site, remove the existing components,repair, clean, air blow the panel, apply two coats of paint on both the interior and exterior surfaces.	Nr	1		
5.11.1.3.02	Supply,install, wire and test the following items in the panel (see other new switchgear panels at other borehole sites);	Nr	1		
5.11.3.1.03	Kenya Power & Lighting Company CUT-OUTS chamber	Nr	1		
5.11.3.1.04	1xKPLC incommer Current transformers chamber	Nr	1		
5.11.3.1.05	1xKPLC metering equipment chamber incommer Current transformers chamber	Nr	1		
5.11.3.1.06	1x250 amps adjustable triple pole mccb (adjustable range: $0.7I_N$, $0.8I_N$, $0.9I_N$, $1.0I_N$ set at $0.8I_N$ where I_N= rated current of mccb = 250 amps).	Nr	1		
5.11.3.1.07	1x7.5 Kvar, 3 phase, 415 vac, 5 step central automatic power capacitor correction bank c/w 40 amps TP supply mccb, contactors, fuses, programmable electronic PF controller.relay. 154 µF/phase etc.	Nr	1		
5.11.3.1.08	1xsingle phase, 240 vac kWh energy registering meter)	Nr	1		
5.11.3.1.09	4x260 amps high conductivity rectangular bare copper bus-bar conductors	Nr	1		
5.11.3.1.10	1x125 amps, TP, 415 vac, mccbs, I_{CU} =25 kA. Each in its own cmpartment (1 No. for Borehole No.4, 1 No. for BH No.7, and 2 No. spares.	Nr	1		
5.11.3.1.11	2x63 amps, TP, 415 vac, mccbs, I_{CU} =15 kA. Each in its own cmpartment. (Spares)	Nr	1		
5.11.3.1.12	1x3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mccb	Nr	1		
5.11.3.1.13	1x100 amps,1phase, 240 vac class "A" mcbs (staff houses - future)	Nr	1		
5.11.3.1.14	240 ac/24 vdc, 6 amps continuosly rated output converter fully protected	Nr	1		
5.11.3.1.15	1xCooling fan rated 25 watts, 240 vac, 2800 rpm continuously rated installed on the side, 100 mm height from the bottom clw filter and termite-proof, dust-proof stainless steel protection D1.5 mm wiregauze.	Nr	1		
5.11.3.1.16	2x ventillation hole of size 150x100 mm installed on the top opposite sides, 50 mm below top c/w termite-proof, dust-proof filter and grid.	Nr	1		
5.11.3.1.17	1x3 phase, 240 vac resettable digital network analyzer/recorder (voltage, current, kWh, Kva, Pf,Hz, Kw) with LED phase indicators (RED, YELLOW, BLUE) on front panel.	Nr	1		
5.11.3.1.18	100 amps, 6 way, 1 phase, 240 vac DIN distribution board; c/w; 2 No. 10 amps,1 pole, 240 vac class "A" mcbs, 3 No. 20 amps, 1 pole class "A" mcbs, 1 No. Blanking plate.	Nr	1		
5.11.3.1.19	3xAC ammeters range 0-300 amps c/w CTS.	Nr	1		
5.11.3.1.20	1xAC voltmeter (0-500 vac) c/w vss and protection mcbs.	Nr	1		
5.11.3.1.21	250 amps, 415 vac TPN manual changer-over switch c/w pilot indicator lights (KPLC ON, KPLC LOAD ON, GENERATOR ON, GENERATOR LOAD ON)	Nr	1		
5.11.3.1.22	25x3 mm thick copper strip bound along the switchgear panel length (earthing)	SET	1		
5.11.3.2	**ELECTRICAL WIRING OF MAINS POWER CONTROL SWITCHGEAR/OFFICE BUILDING**				
5.11.3.2.01	Remove the existing socket/lighting wiring.	LS	1		
5.11.3.2.02	20 mm diam. GS conduit fixed on the walls and roof members. The cost shall be inclusive of tees, bends, circular boxes with covers, other necessary accessories	m	28		
5.11.3.2.03	1.5 mm^2 single copper cables (Red=50 m, Black=25 m , Green =25 m) laid in GS conduit and terminated at boh ends.	m	90		
5.11.3.2.04	2.5 mm^2 single copper cables (Red=25 m, Black=25 m , Green =25 m) laid in GS conduit and terminated at boh ends.	m	75		
5.11.3.2.05	10 amps, 1l way 2 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	1		
5.11.3.2.06	10 amps, 1 way 1 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	1		
5.11.3.2.07	13 amps, 240 vac, twin switched socket outlet (smc) as Mem, Crabtree or similar quality approved make c/w box stainless steel screws (ringmain circuit).	Nr	2		
5.11.3.2.08	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor compensated, c/w tube, starter mounted on ceiling but 20 mm off the surface using 20 mm diam. GS coupler)	Nr	2		
5.11.3.2.09	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save, corrossion resistant, power factor compensated.	Nr	4		
	TotalPage 4				

PART 5.11 - Electro-Mechanical Works & Pipeworks Borehole 9 (Site-Replacement)					
5.11.1	**BOREHOLE NO. 9**				
5.11.3.2.10	3x2.5 mm^2 single core copper cables wired in 20 mm diameter pvc conduit from consumer unit to fan speed control unit and fan terminals.	m	6		
5.11.3.2.11	3 blade, adjustable slow speed (0-300 rpm), 240 vac ceiling mounted cooling fan c/w speed adjustable control unit completely wired (in conduit).	SET	1		
5.11.3.2.12	Improve lightning protection system	LS	1		
5.11.3.3	**FIRE FIGHTING EQUIPMENT**				
5.11.3.3.1	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	2		
	TOTAL PAGE 5				-
	TOTAL BH 9:- CARRIED TO BILLL 5 SUMMARY SHEET				-

PART 5.12 - Tiwi Boreholes Monitoring System

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.12	**SUPPLY INSTALLTION TESTING AND COMMISSIONING OF REMOTE MONITORING SYSTEM**				
5.12.1	Supply, installation and testing of Local Server, minimum 32 Bit Microcontroller platform, Internal storage memory, Min. 21"LCD display,140VAC – 315VAC Phase to Neutral, 240VAC-VAC phase to phase, Keypad for user interaction Build in Ethernet Media Converter, multy-mode or single mode models with ST or SC connectors. Built in Ethernet Switch and Communication Module, 10-48 VDC power input with removable terminal blocks, inputs 10/100MB Ethernet, outputs RS232 and RS485	Nr	1		
5.12.2	UPS , 240V, back-up 8 hours	Nr	1		
5.12.3	Supply, installation and testing of Software for Local Server	Nr	1		
5.12.4	Cabling in Local Control Room	Nr	1		
5.12.5	GPRS/GSM module	Nr	1		
	TOTAL CARRIED TO BILLL 5 SUMMARY SHEET				-

PART 5.13 - PROVISIONAL BILL: Solar Photo Voltaic System at Boreholes 9, A, 4/7

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
	BOREHOLE 9				
5.13.1	RSI 3 x 380V IP66 22kW 46A	Pc	1		
5.13.2	Solar Panels 270W poly crystalline	Pc	96		
5.13.3	DC Disconnect 1000-40-5	Pc	2		
5.13.4	Manual Changeover switch 160A	Pc	1		
5.13.5	Well Probe Sensor	Set	1		
5.13.6	PV Protect 1000-125	Pc	1		
5.13.7	Surge Protector	Pc	2		
5.13.8	PV Combiner 1000-125-4	Pc	1		
5.13.9	10 mm2 4 core armoured underground cable	m	50		
5.13.10	0.75mm2 Well Probe Cable	m	150		
5.13.11	1.5mm2 Armoured Underground cable for the Well probe	m	30		
5.13.12	10mm2 Twin Flat with Earth for panel interwiring	m	80		
5.13.13	10mm2 Earth Cable	m	20		
5.13.14	Installation Sundry	Unit	1		
5.13.15	5m High Ground mount mild steel support structure	Lump sum	1		
5.13.16	25mm UPVC Airline	m	42		
5.13.18	Earth rod c/w clamp	pc	2		
5.13.19	10mm2 Copper Earth Cable	m	10		
5.13.20	Lightning Arrestor	Set	1		
5.13.21	Non Return Valve (Flap Type) DN75	pc	1		
5.13.22	GI Pipes Class B, DN75 , 6m long with crane sockets	pcs	8		
5.13.23	GI Fittings	LSM	1		
5.13.25	Other Additional costs(Installation costs)	LS	1		
	BOREHOLE 7				
5.13.26	PSk2-40 Controller-controller with DataModule, Sunswit	Pc	1		
5.13.27	Solar Panels 270W poly crystalline	Pc	84		
5.13.28	DC Disconnect 1000-40-5	Pc	2		
5.13.29	Well Probe Sensor	Set	1		
5.13.30	PV Protect 1000-125	Pc	1		
5.13.31	Surge Protect	Pc	2		
5.13.32	PV Combiner 1000-125-4	Pc	1		
5.13.33	PS Communicator with 7Ah Battery and 20W Solar Panel and 1 year license access	Set	1		
5.13.34	10 mm2 4 core armoured underground cable	m	50		
5.13.35	0.75mm2 Well Probe Cable	m	70		
5.13.36	1.5mm2 Armoured Underground cable for the Well probe	m	30		
5.13.37	10mm2 Twin Flat with Earth for panel interwiring	m	80		
5.13.38	10mm2 Earth Cable	m	20		
5.13.39	Installation Sundry	Unit	1		
5.13.40	5m High Ground mount mild steel support structure	Lump sum	1		
5.13.41	25mm UPVC Airline	m	42		
5.13.42	Earth rod c/w clamp	pc	2		
5.13.43	10mm2 Copper Earth Cable	m	10		
5.13.44	60A Manual Change over switch	Pc	1		
5.13.45	Lightning Arrestor	Set	1		
5.13.46	Non Return Valve (Flap Type) DN75mm	pc	1		
5.13.47	GI Pipes Class B, DN75 , 6m long with crane sockets	pcs	8		
5.13.48	Transport	LS	1		
5.13.49	Other Additional costs(Installation costs)	LS	1		
	Total Page 1				

	BOREHOLE 4				
5.13.50	PSk2-40 Controller-controller with Data Module, Sunswitch	Pc	1		
5.13.51	Solar Panels 270W poly crystalline	Pc	84		
5.13.52	DC Disconnect 1000-40-5	Pc	2		
5.13.53	Well Probe Sensor	Set	1		
5.13.54	PV Protect 1000-125	Pc	1		
5.13.55	Surge Protect	Pc	2		
5.13.56	PV Combiner 1000-125-4	Pc	1		
5.13.57	PS Communicator with 7Ah Battery and 20W Solar Panel and 1 year license access	Set	1		
5.13.58	10 mm2 4 core armoured underground cable	m	50		
5.13.59	0.75mm2 Well Probe Cable	m	70		
5.13.60	1.5mm2 Armoured Underground cable for the Well probe	m	30		
5.13.61	10mm2 Twin Flat with Earth for panel interwiring	m	80		
5.13.62	10mm2 Earth Cable	m	20		
5.13.63	Installation Sundry	Unit	1		
5.13.64	5m High Ground mount mild steel support structure	Lump sum	1		
5.13.65	25mm UPVC Airline	m	42		
5.13.66	Earth rod c/w clamp	pc	2		
5.13.67	10mm2 Copper Earth Cable	m	10		
5.13.68	60A Manual Change over switch	Pc	1		
5.13.69	Lightning Arrestor	Set	1		
5.13.70	Non Return Valve (Flap Type) DN75	pc	1		
5.13.71	GI Pipes Class B, DN75 , 6m long with crane sockets	pcs	8		
5.13.72	Other Additional costs(Installation costs)	LS	1		
	BOREHOLE A				
5.13.73	RSI 3 x 380V IP66 22kW 46A	Pc	1		
5.13.74	Solar Panels 270W poly crystalline	Pc	96		
5.13.75	DC Disconnect 1000-40-5	Pc	2		
5.13.76	Manual Changeover switch 160A	Pc	1		
5.13.77	Well Probe Sensor	Set	1		
5.13.78	PV Protect 1000-125	Pc	1		
5.13.79	Surge Protect	Pc	2		
5.13.80	PV Combiner 1000-125-4	Pc	1		
5.13.81	10 mm2 4 core armoured underground cable	m	50		
5.13.82	0.75mm2 Well Probe Cable	m	150		
5.13.83	1.5mm2 Armoured Underground cable for the Well probe	m	30		
5.13.84	10mm2 Twin Flat with Earth for panel interwiring	m	80		
5.13.85	10mm2 Earth Cable	m	20		
5.13.86	Installation Sundry	Unit	1		
5.13.87	5m High Ground mount mild steel support structure	Lump sum	1		
5.13.88	25mm UPVC Airline	m	42		
5.13.89	Earth rod c/w clamp	pc	2		
5.13.90	10mm2 Copper Earth Cable	m	10		
5.13.91	Lightning Arrestor	Set	1		
5.13.92	Non Return Valve (Flap Type)DN75	pc	1		
5.13.93	GI Pipes Class B, DN75 , 6m long with crane sockets	pcs	8		
5.13.94	GI Fittings	LSM	1		
5.13.95	Other Additional costs(Installation costs)	LS	1		
	Total Page 2				
	TOTAL CARRIED TO BILLL 5 SUMMARY SHEET				

PART 5 - REHABILITATION AND DRILLING OF BOREHOLES						
BILL No.	**DESCRIPTION**	**UNIT**	**QTY**	**Rate (KES)**	**Amount (KES)CONFIRMED BILLS**	**Amount (KES)PROVISIONAL BILLS**
	BILL 5 SUMMARY SHEET					
	CONFIRMED BILLS					
5.1	BORE HOLE A					
5.2	BORE HOLE C					
5.3	BORE HOLE D2, D3					
5.4	BORE HOLE E					
5.5	BORE HOLE G1, G2					
5.6	BORE HOLE 1					
5.7	BORE HOLE 2					
5.8	BORE HOLE 4, 7					
5.9	BORE HOLE 6.1. 6.2					
5.10	BORE HOLE 8.1, 8.2					
5.11	BORE HOLE 9					
	PROVISIONAL BILLS					
5.12	TIWI BORE HOLE MONITORING SYSTEM					
5.13	BOREHOLE SOLAR PV SYSTEM					
	BILL No. 5- CARRIED TO GRAND SUMMARY					

PART 6 - Collector Mains: Borehole 4&7 and BH A to Connection on Kaya Bombo Main

ITEM	DESCRIPTION	UNIT	QTY	RATE (KES)	AMOUNT(KES)
6.1	**Demolition and Site Clearance**				
6.1.1	**General clearance**				
6.1.1.1	Agricultural land	ha	1		
6.1.2	**Open bush and thicket**				
6.1.2.1	locally disposed	ha	0.4		
6.1.3	**Removal of Trees and Stumps**				
6.1.3.1	Trees girth 500mm-1m locally disposed	No	1		
6.1.3.2	Stumps of diameter 500 mm- 1m	No	1		
6.1.3.3	Stumps of diameter : exc 1m but n.e. 3m locally disposed	No	1		
6.1.4	**CLEARANCE OF PIPELINE WAYLEAVES, DISPOSAL**				
6.1.4.1	Nominal bore: upto 300 mm Pipeline only	m	1663		
6.1.5	**REMOVAL OF ANT AND TERMITE HILLS AND NESTS**				
6.1.5.1	Along pipeline routes, excess material locally disposed	m3	2		
6.1.6	**LANDSCAPING**				
6.1.6.1	Land scaping,plant trees, replant indigenous plants include for environmental impact mitigation	LS	1		
6.2	**PIPE-FITTINGS- SUPPLY(PN12)**				
	Note: Pipes and fittings requirements, sizes, quantities, etc to be determined in liaison with the Engineer prior to ordering				
	WATER MAINS				
	This position includes provision, transporting to site, lowering into trench, laying, alining to line and level, and jointing of pipes.			`	
6.2.1	**HDPE pipes**				
6.2.1.1	HDPE pipes DN150 mm, PE100 PIN 12	m	1663		
6.2.2	**FITTINGS TO HDPE PIPES**				
6.2.2.1	Bend 90°, DN150 PN 12,	No.	1		
6.2.3	**JUNCTIONS AND BRANCHES, ALL FLANGED, MIN PN12**				
6.2.3.1	Tees branch down 6 diameter, 150/150 mm diameter	No	2		
6.2.3.2	Tees branch down 7 diameter, 150/150 mm diameter	No	2		
6.2.4	**JUNCTIONS AND BRANCHES, MAIN PLAIN ENDED, BRANCH FLANGED, MIN PN12**				
6.2.4.1	Tees branch down, 150/150	No	2		
6.2.4.2	Tees branch down, 150/100	No	2		
6.2.4.3	Tees branch down, 150/80	No	2		
6.2.4.4	Tees branch down, 150/50	No	2		
	TOTAL PAGE 1				0.00

PART 6 - Collector Mains: Borehole 4&7 and BH A to Connection on Kaya Bombo Main

ITEM	DESCRIPTION	UNIT	QTY	RATE (KES)	AMOUNT(KES)
6.2.5	**JUNCTIONS AND BRANCHES, MAIN SOCKETED, BRANCH FLANGED FOR AIR VALVES, MIN PN12**				
6.2.5.1	Tees branch down 6 diameter, 150/150 mm diameter	No	5		
6.2.5.2	Main socketed c/w flanged invert level , branch for Washouts, Min PN12, 150/150 mm diameter	No	2		
6.2.5.3	Tapers, double flanged, Min PN12, Concentric, down as stated, 150/80 mm diameter	No	5		
6.2.5.4	Plain ended & Single flanged pieces, Min PN12 - 150 mm dia. Length=1000mm	No	7		
6.2.5.5	Plain ended pipe pieces-length n.e. 1.0 mc/w centre puddle flange, 150 mm dia. Length=1000mm	No	7		
6.2.5.6	Single flanged pipe pieces, 150 mm dia. Length=1000mm	No	7		
6.2.5.7	Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle flange - 50 mm dia. Length = 500 mm	No	7		
6.2.5.8	Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle flange - 80 mm dia. Length = 1000 mm	No	7		
6.2.5.9	Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle flange - 100 mm dia. Length = 1000 mm	No	7		
6.2.5.10	Flexible, straignt coupling to suit steel pipes, 150 mm dia	No	7		
6.2.5.11	Flexible, Wide range/stepped coupling to suit GI/uPVC, 150 mm dia	No	7		
6.2.5.12	Flexible, Flanged adaptor, to suit steel pipes, 150 mm dia	No	7		
6.2.5.13	Flexible, Flanged adaptor, to suit steel pipes, 200 m dia	No	6		
6.2.5.14	Flanged adaptor, flexible to suit GI/uPVC, 80 mm dia	No	4		
6.2.6	**FITTINGS IN UPVC TO SUIT UPVC PIPES**				
6.2.6.1	Bends 45º, double socked, Min. PN16 - DN 160 mm	No	2		
6.2.7	**VALVES,PENSTOCKS, HYDRANTS, METERS**				
6.2.7.1	Gate valves to SSRN 226 c/w T-Keys, Resilient seal series 14 Min PN12 - DN 80 mm	No	2		
6.2.7.2	Gate valves to SSRN 226 c/w T-Keys, Resilient seal series 14 Min PN12 - DN 100 mm	No	2		
6.2.7.3	Butterfly section valves with rising spindle c/w T-keys, Min. PN12 - DN 150 mm	No	2		
6.2.7.4	Flap Valves(Washout) Min PN12 - DN 150 mm	No	4		
6.2.7.5	Air valves, Non-slam air valve or equivalent with Isolating valve 25 mm double air acting and surge suppressing air valve c/w isolating integral valve PN12	No	5		
6.2.7.6	Flanged Float Valves Min PN12 - 150 mm diameter	No	2		
6.2.7.7	Zonal Bulk Meters, Flanged Woltman Type Min PN12 - DN 150 mm	No	2		
6.2.7.8	Meter Strainer, double flanged, Min PN12 - DN 150 mm	No	2		
6.2.8	**METHOD OF MEASUREMENT TYPE A IN METERS**				
	HDPE pipes and fittings				
6.2.8.1	Pipe n.b exc 100mm but n.e. 400mm trenches depth 0-1.0m	m	271		
6.2.8.2	Pipe n.b exc 100mm but n.e. 400mm trenches depth 1-1.5m	m	1092		
6.2.8.3	Pipe n.b exc 100mm but n.e. 400mm trenches depth 1.5-2m	m	300		
	Installation of HDPEwashout pipes				
6.2.8.4	Pipe n.b. exc 100 mm but n.e. 200 mm trenches 1.5-2m	m	36		
	TOTAL PAGE 2				0.00

PART 6 - Collector Mains: Borehole 4&7 and BH A to Connection on Kaya Bombo Main

ITEM	DESCRIPTION	UNIT	QTY	RATE (KES)	AMOUNT(KES)
	PRESSURE TESTING HDPE PIPES AND FITTINGS: Ref Specs. 9.2.6.1				
6.2.8.5	Test pressure exc 12 bars but not exc 16 bars pipe n.b. exc. 100mm but n.e. 400mm	m	1663		
	STERILIZATION AND FLUSHING				
6.2.8.6	Pipe n.b100mm-400mm	m	1663		
	METHOD OF MEASUREMENT TYPE B BY NUMBER				
	Bends, Double Flanged				
	11.25deg, 22.5deg, 45deg, 90deg, Long radious bends				
6.2.8.7	Nb exc.100 but n.e. 400 mm - Not in trenches	No	2		
6.2.8.8	Nb exc.100 but n.e. 400 mm - In trenches depth 1-1.5 m	No	9		
	Bends, Double Socketed				
	11.25deg, 22.5deg, 45deg, 90deg, Long radious bends				
6.2.8.9	Nb. n.e 100 mm in trenches , depth n.e. 1m	No	1		
6.2.8.10	Nb. n.e 100 mm in trenches , depth n.e. 1-1.5m	No	1		
	Junctions and Branches				
	All flanged Tees				
6.2.8.11	Nb exc 200 mm but n.e 400 mm in trenches depth 1-1.5 m	No	1		
6.2.8.12	Nb exc 200 mm but n.e 400 mm in trenches depth 1.5-2 m	No	1		
	Tapers				
6.2.8.13	Nb exc 100 mm but n.e. 200 mm in trenches depth n.e. 1m	No	2		
6.2.8.14	Nb exc 100 mm but n.e. 200 mm in trenches depth 1-1.5m	No	2		
	Single flanged pipe pieces, length n.e. 1.0 m				
6.2.8.15	NB. Exc 100mm but n.e. 200 mm in trenches depth n.e.1m	No	1		
6.2.8.16	NB. Exc 100mm but n.e. 200 mm in trenches depth 1-1.5m	No	1		
	Single flanged pipe pieces, length n.e. 1.0 m - c/w centre puddle flange				
6.2.8.17	Nb- ne 100 mm in trenches, depth n.e 1.0 m	No	1		
6.2.8.18	Nb- ne 100 mm in trenches, depth 1-1.5 m	No	1		
6.2.8.19	Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5 m	No	1		
	Double flanged pipe pieces				
6.2.8.20	Nb.exc 100 mm but ne 400 mm in trenches 1-1.5m	No	7		
6.2.8.21	Nb.exc 100 mm but ne 400 mm in trenches 1.5-2m	No	7		
	Adaptors, detachable Collars Couplings &saddles				
	Flexible, Flanged adaptor, PN 12 to suit steel pipes				
6.2.8.22	Nb. ne 100 mm in trenches, depth n.e 1m	No	2		
6.2.8.23	Nb. ne 100 mm in trenches, depth n 1-1.5m	No	2		
6.2.8.24	Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1 m	No	2		
	Flanged adaptor, flexible to suit GI/uPVC pipes PN12				
6.2.8.25	Nb. Ne 100 mm in trenches, depth ne 1m	No	2		
6.2.8.26	Nb. Ne 100 mm in trenches, depth ne 1-1.5m	No	2		
	TOTAL PAGE 3				0.00

PART 6 - Collector Mains: Borehole 4&7 and BH A to Connection on Kaya Bombo Main

ITEM	DESCRIPTION	UNIT	QTY	RATE (KES)	AMOUNT(KES)
6.3	**PIPEWORK**				
6.3.1	MANHOLE AND OTHER CHAMBERS IN ACCORDANCE WITH STANDARD DRAWINGS				
6.3.1.1	In-situ concrete outfall structure(washout) pipe nom exc. 100, but not ne 200 depth 1.5-2m	No	2		
6.3.1.2	Precast Concrete air valve chamber pipe nb exc . 200 mm, but ne 400 mm depth ne 1.5 m	No	5		
6.3.1.3	Masonry or dense blockwork Bulk Meter chamber pipe - nb not exc 100 mm depth exc1.5m	No	2		
6.3.1.4	Masonry or dense blockwork strainer chamber pipe - nb not exc 100 mm depth exc1.5m	No	2		
6.3.2	**MANHOLE COVERS**				
6.3.2.1	Composite covers 1500 mm dia medium duty, in concrete with key	No	13		
6.3.3	**CROSSINGS**				
6.3.3.1	Fence crossing pipe nom. Bore ne 200-400 mm	No	15		
6.3.3.2	Sewer, ditch or drain crossing pipe nom. Bore ne 200-400 mm(Provisional)	No	3		
6.3.4	**REINSTATEMENT**				
6.3.4.1	Breaking up, temporary and permanent reinstatement of tarmac roads, pipe nom.bore100-400 mm	m	24		
6.3.4.2	Breaking up, temporary and permanent reinstatement of dirt roads, pipe nom.bore100-400 mm	m	18		
6.3.5	**OTHER PIPEWORK ANCILLARIES**				
6.3.5.1	Marker Posts for Sluice valves in accordance with std drgs	No	2		
6.3.5.2	Marker Posts for Air valves in accordance with std drgs	No	5		
6.3.5.3	Marker Posts for Washout valves in accordance with std drgs	No	2		
6.3.5.4	Marker Posts for Pipelines in accordance with std drgs	No	6		
6.3.6	**COVERS AND SURFACE BOXES**				
6.3.6.1	HDPE valve surface boxes, medium duty with locable cover and frame in (500 x 500 x 200) mm class 20 concrete surround as per standard drawing: area 0.1-0.5 m2	No	2		
6.3.6.2	Concrete chamber covers with locable Composite covers and frame 600 mm dia. Medium duty, with key. Area 1-5 m2	No	13		
6.3.6.3	Fixed length Extension Spindles c/w protection sleeve to suit gate valves, Length = 800 mm	No	2		
6.4	**PIPEWORK SUPPORTS & PROTECTION ANCILLARIES TO LAYING & EXCAVATION**				
6.4.1	**EXTRAS TO EXCAVATION AND BACKFILLING**				
6.4.1.1	In pipe trenches excavation or rock class I material (Provisional)	m3	223		
6.4.1.2	In pipe trenches excavation or rock class II material (Provisional)	m3	230		
6.4.1.3	In pipe trenches backfilling with class S2 material (Provisional)	m3	2370		
6.4.1.4	In manhole and chambers excavation of rock class II material (Provisional)	m3	2		
6.4.2	**BEDS**				
6.4.2.1	Selected granular materiall with blended imported and screened class S2 material pipe 200-400 mm (Provisional)	m3	177		
6.4.3	**SURROUNDINGS**				
6.4.3.1	Selected granular material incl upper bedding, side filling and initial backfill with blended imported and screened class S2 material pipe 200-400 mm (Provisional)	m3	237		
6.4.4	**CONCRETE STOOLS AND THRUST BLOCKS CONCRETE CLASS 20**				
	To Horizontal bends				
6.4.4.1	Volume 0.5-1 m3, nom bore 200-400 mm	No	12		
	TOTAL PAGE 4				0.00

PART 6 - Collector Mains: Borehole 4&7 and BH A to Connection on Kaya Bombo Main

ITEM	DESCRIPTION	UNIT	QTY	RATE (KES)	AMOUNT(KES)
	To Vertical bends at Crest				
6.4.4.2	Volume 0.1-0.2 m3 nom bore 100-200 mm(Provisional)	No	1		
6.4.4.3	Volume 0.5-1 m3 nom bore 100-200 mm(Provisional)	No	1		
	To Junctions				
6.4.4.4	Volume 0.5-1m3, bore 200-400 mm	No	2		
	To Tapers				
6.4.4.5	Volume 0.1-0.2 m3, nom bore 200-400 mm	No	6		
	To Valves				
6.4.4.6	Volume n.e. 0.1 m3 for valve n.b. not exc 100 mm	No	13		
	TOTAL PAGE 5				0.00
	TOTAL CARRIED TO GRAND SUMMARY				0.00

PART 6A:
MARERE HEADWORKS IMPROVEMENT- EXPANSION OF FLOW DIVISION/CHLORINATION CHAMBER (as per Tech Spec chapter 16 and drawing N° 1220/K/002A))

ITEM	DESCRIPTION	UNIT	QTY	RATE (KES)	AMOUNT(KES)
6A.1	**Demolition and Site Clearance**	LS	1		
6A.1.1	Demolition of existing masonry weir/scour chamber (approx. dimensions 1200x1200mm)				
6A.1.2	Disconnection of connected pipework (2x DN160 uPVC discharge pipes, DN50 steel scour pipe and gate valve)				
6A.1.3	Removal of demolition material, cleaning and preparation of ground for new structure				
6A.1.4	Demolition of the existing RC side wall of the existing chlorine dosing chamber (approximate length= 2000mm)				
6A.3	**Concrete construction & masonry work**	LS	1		
6A.3.1	Volume n.e. 50-100 m3				
6A.3.2	Expand RC chlorine dosing chamber by 500 mm lengthwise to make it a proportional flow division chamber for the flows into the existing DN500 and the new DN250 pipes; Ensure water tightness according to specifications for water retaining structures				
6A.3.3	New cover to fit to expanded RC chlorine dosing chamber and to allow manual adjustment of both gate valves comfortably				
6A.3.4	Reconstruction of the entire weir/sour chamber (1200 x 1200 mm, masonry)				
6A.4	**PIPE- FITTINGS- SUPPLY-(PN10)**	LS	1		
6A.4.1	Extension of existing 2x DN 160 uPVC drainage pipes to reconstructed and replaced weir/scour chamber. Supply, connect to existing pipes				
6A.4.2	DN50 steel scour pipe and gate valve - supply and installation between new chlorine dosing chamber and new weir/scour chamber				
	Valves, Penstocks, Hydrants, Meters				
6A.4.3	Gate Valves to SSRN 226 c/w T-keys, Resilient seal series 14 - 250 mm diameter plus 2 T-Keys	No	1		
6A.4.3	Gate Valves to SSRN 226 c/w T-keys, Resilient seal series 14 - 500 mm diameter plus 2 T-Keys	No	1		
	Bill 6a: TOTAL CARRIED TO GRAND SUMMARY				-

PART 7 - Transmission Pipeline (Marere Pipeline)

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
7.1	**Demolition and Site Clearance**				
7.1.1	**General clearance**				
7.1.1.1	Agricultural land	ha	4		
7.1.2	**Open bush and thicket**				
7.1.2.1	locally disposed	ha	4		
7.1.3	**Dense bush and thicket**				
7.1.3.1	locally disposed	ha	4		
7.1.4	**Forest**				
7.1.4.1	locally disposed	ha	4		
7.1.5	**Removal of Trees and Stumps**				
7.1.5.1	Trees girth 500mm-1m - locally disposed	No	1		
7.1.5.2	Trees girth 1-2m - locally disposed	No	2		
7.1.5.3	Stumps of diameter 500 mm- 1m	No	3		
7.1.5.4	Stumps of diameter : exc 1m but n.e. 3m locally disposed	No	1		
7.1.6	**CLEARANCE OF PIPELINE WAYLEAVES, DISPOSAL LOCALLY**				
7.1.6.1	Nominal bore: upto 300 mm, Pipeline only:	m	6368		
7.1.7	**REMOVAL OF ANT AND TERMITE HILLS AND NESTS**				
7.1.7.1	Along pipeline routes, excess material locally disposed-	m3	100		
7.1.8	**LANDSCAPING**				
7.1.8.1	Land scaping,plant trees, replant indigenous plants include for environmental impact mitigation	No	10		
7.2	**PIPE-FITTINGS- SUPPLY(HDPE PIN25)**				
	Note: Pipes and fittings requirements, sizes, quantities, etc to be determined in liaison with the Engineer prior to ordering				
	WATER MAINS				
7.2.1	**HDPE pipes**				
7.2.1.1	(a) Pipes HDPE-PE100 , PN25 - 250 mm	m	2844		
	(b) Pipes HDPE-PE100, PN25 - 200 mm	m	3524		
7.2.1.2	Double flanged pipe pieces, L=0.5 m - 250 mm	No	1		
7.2.1.3	Double flanged pipe pieces, L=1.0 m - 200 mm	No	1		
7.2.1.4	Double flanged pipe c/w puddle flange pieces, L=1.0 m - 250 mm	No	1		
7.2.1.5	Washout Outfall Pipes, Supply of UPVC Pipes, PVC-U S&S to SSRN 300- Min PN10 - 160 mm diameter	m	200		
	TOTAL PAGE 1				0.00

PART 7 - Transmission Pipeline (Marere Pipeline)

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
7.2.3	**JUNCTIONS AND BRANCHES, ALL FLANGED, MIN PN25**				
7.2.3.1	Tees branch - 250/200 mm diameter	No	1		
7.2.3.2	Tees branch - 200/200 mm diameter	No	1		
7.2.4	**JUNCTIONS AND BRANCHES, MAIN PLAIN ENDED, BRANCH FLANGED, MIN PN25**				
7.2.4.1	Tees branch - 250/150	No	2		
7.2.4.2	Tees branch - 250/100	No	2		
7.2.4.3	Tees branch - 200/80	No	2		
7.2.4.4	Tees branch - 200/50	No	2		
7.2.5	**JUNCTIONS AND BRANCHES, MAIN SOCKETED, BRANCH FLANGED FOR AIR VALVES, MIN PN25**				
7.2.5.1	Tees branch - 250/150 mm diameter	No	5		
7.2.5.1	Tees branch - 200/150 mm diameter	No	6		
7.2.6	a) Main socketed c/w flanged invert level , branch for Washouts, Min PN25 - 250/150 mm diameter	No	5		
	b) Main socketed c/w flanged invert level , branch for Washouts, Min PN25 - 200/150 mm diameter	No.	6		
7.2.7	a) Tapers, double flanged, Min PN25, Concentric, down as stated - 250/80 mm diameter	No	5		
	b) Tapers, double flanged, Min PN25, Concentric, down as stated - 200/80 mm diameter	No	6		
7.2.8	**Plain ended & Single flanged pieces, Nominal lengths as stated, Min PN25**				
7.2.8.1	Plain ended pieces - 250 mm dia. Length=1000mm	No	2		
7.2.8.2	Plain ended pipe pieces-length n.e. 1.0 mc/w centre puddle flange - 250 mm dia. Length=1000mm	No	1		
7.2.8.3	Single flanged pipe pieces - 150 mm dia. Length=1000mm	No	3		
7.2.8.4	Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle flange - 50 mm dia. Length = 500 mm	No	12		
7.2.8.5	Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle flange - 80 mm dia. Length = 1000 mm	No	3		
7.2.8.6	Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle flange - 100 mm dia. Length = 1000 mm	No	3		
7.2.8.7	Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle flange - 150 mm dia. Length = 1000 mm	No	14		
7.2.8.8	Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle flange - 200 mm dia. Length = 1000 mm	No	6		
7.2.9	**Adaptors, detachable, Collars couplings & saddles, Min PN25**				
7.2.9.1	Flexible, straight coupling to suit steel pipes - 250 mm dia	No	2		
7.2.9.2	Flexible, straight coupling to suit steel pipes - 200 mm dia	No	2		
7.2.9.3	Flexible, Wide range/stepped coupling to suit GI/UPVC - 150 mm dia	No	8		
7.2.9.4	Flexible, Flanged adaptor, to suit steel pipe - 50 mm dia	No	12		
7.2.9.5	Flexible, Flanged adaptor, to suit steel pipe - 80 mm dia	No	3		
7.2.9.6	Flexible, Flanged adaptor, to suit steel pipe - 100 mm dia	No	3		
7.2.9.7	Flexible, Flanged adaptor, to suit steel pipe - 150 mm dia	No	14		
7.2.9.8	Flexible, Flanged adaptor, to suit steel pipe - 200 m dia	No	6		
7.2.9.9	Flanged adaptor, flexible to suit GI/uPVC - 50 mm dia	No	3		
7.2.9.10	Flanged adaptor, flexible to suit GI/uPVC - 80 mm dia	No	3		
7.2.9.11	Flanged adaptor, flexible to suit GI/uPVC - 100 mm dia	No	2		
7.2.9.12	Flanged adaptor, flexible to suit GI/uPVC - 150 mm dia	No	12		
7.2.9.13	Flanged adaptor, flexible to suit GI/uPVC - 200 m dia	No	3		
	TOTAL PAGE 2				

PART 7 - Transmission Pipeline (Marere Pipeline)

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
7.2.10	**FITTINGS IN UPVC TO SUIT UPVC PIPES**				
7.2.10.1	Bend, double socked, Min. PN16 - 45º DN 160 mm	No	10		
7.2.11	**VALVES, PENSTOCKS, HYDRANTS, METERS**				
7.2.11.1	Gate valve to SSRN 226 c/w T-Keys, Resilient seal series 14 Min PN25 - DN 50 mm	No	1		
7.2.11.2	Gate valve to SSRN 226 c/w T-Keys, Resilient seal series 14 Min PN25 - 80 mm dia	No	1		
7.2.11.3	Gate valve to SSRN 226 c/w T-Keys, Resilient seal series 14 Min PN25 - 100 mm dia	No	2		
7.2.11.4	Gate valve to SSRN 226 c/w T-Keys, Resilient seal series 14 Min PN25 - 150 mm dia	No	21		
7.2.11.5	Gate valve to SSRN 226 c/w T-Keys, Resilient seal series 14 Min PN25 - 200 m dia	No	21		
7.2.11.6	Butterfly section valves with rising spindle c/w T-keys, Min. PN25 - DN 250 mm	No	5		
7.2.11.7	Butterfly section valves with rising spindle c/w T-keys, Min. PN25 - DN 200 mm	No	6		
7.2.11.8	Flap Valves(Washout) Min PN25 - 150 mm diameter	No	11		
7.2.11.9	Air valves, Non-slam air valve or equivalent with Isolating valve - 25mm double air acting and surge suppressing air valve, c/w isolating integral valve PN25	No	12		
7.2.11.10	Master Meter(Electromagnetic), According to specifications, MinPN25 - 200 mm dia	No	2		
7.2.11.11	Master Strainer, double flanged, Min PN25 - 250 mm dia	No	2		
7.2.11.12	Master Strainer, double flanged, Min PN25 - 200 mm dia	No	1		
7.3	**PIPEWORK**				
	PIPES, SEWERS &FITTINGS-INSTALL				
7.3.1	**METHOD OF MEASUREMENT TYPE A IN METERS**				
7.3.1.1	HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth 1-1.5m	m	53		
7.3.1.2	HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth 1-1.5m	m	340		
7.3.1.3	HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth 1.5-2m	m	1200		
7.3.1.4	HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth 2-3m	m	3822		
7.3.1.5	HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth 3-4m	m	628		
7.3.1.6	HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth 4-6m	m	200		
7.3.1.7	HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm on concrete piers varied height(0.5-2m)	m	132		
	Replacement of Existing Air Valves at Mwache River Creek				
7.3.1.8	Removal of existing air valve and replacing with Non-slam air valve or equivalent with Isolating valve - 25 mm double air acting and surge suppressing air valve, c/w isolating integral valve PN25	No.	2		
	Installation of Flow Control Valve at Kaya Bombo Junction				
7.3.1.9	Allow for removal of existing DN500 gate valve and replacing with DN500 Flow Control Valve PIN25 including all excavations, Chamber chamber modifications,supply and installation of fittings as instructed by the Engineer and as shown on Drg 1220/K/010/A	No.	1		
	Installation of uPVC washout pipes				
7.3.1.10	Pipe n.b. exc 100 mm but n.e. 200 mm trenches 1.5-2m	m	200		
	PRESSURE TESTING HDPE PIPES; Ref. Specs 9.2.6.1				
7.3.1.11	Test pressure exc 25 bars but not exc 40 bars - pipe n.b. exc. 200mm but n.e. 400mm	m	6368		
	STERILIZATION AND FLUSHING				
7.3.1.12	Pipe n.b 200mm-400mm	m	6368		
	TOTAL PAGE 3				

PART 7 - Transmission Pipeline (Marere Pipeline)

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
7.3.2	**METHOD OF MEASUREMENT TYPE B BY NUMBER**				
	Bends, Double Flanged				
	11.25deg, 22.5deg, 45deg, 90deg, Long radious bends				
7.3.2.1	Nb exc.200 but n.e. 400 mm - Not in trenches	No	1		
7.3.2.2	Nb exc.200 but n.e. 400 mm - In trenches depth 1-1.5 m	No	1		
	Bends, Double Socketed				
	11.25deg, 22.5deg, 45deg, 90deg, Long radious bends				
7.3.2.3	Nb. N.e 100 mm in trenches , depth n.e. 1m	No	2		
7.3.2.4	Nb. N.e 100 mm in trenches , depth n.e. 1-1.5m	No	3		
	11.25deg, 22.5deg, 45deg, 90deg, Long radious bends				
7.3.2.5	Nb. Exc 100 but n.e. 200 mm in trenches 1-1.5 m	No	8		
7.3.2.6	Nb. Exc 100 but n.e. 200 mm in trenches 1.5-2 m	No	19		
	11.25deg, 22.5deg, 45deg, 90deg, Long radious bends				
7.3.2.7	Nb. Exc 200 mm but n.e 400 mm in trenches 1-1.5m	No	16		
7.3.2.8	Nb. Exc 200 mm but n.e 400 mm in trenches 1.5-2m	No	19		
	Junctions and Branches				
7.3.2.9	All flanged Tees - Nb exc 200 mm but n.e 400 mm in trenches depth 1-1.5 m	No	1		
7.3.2.10	All flanged Tees - Nb exc 200 mm but n.e 400 mm in trenches depth 1.5-2 m	No	2		
7.3.2.11	Main Plan ended, Branch flanged in trenche - Nb exc 200 mm but n.e 400 mm in trenches depth 1-1.5 m	No	2		
7.3.2.12	Main Plan ended, Branch flanged in trenche - Nb exc 200 mm but n.e 400 mm in trenches depth 1.5-2 m	No	3		
7.3.2.13	Main socketed, Branch flanged - Nb exc 200 mm but n.e 400 mm in trenches depth 1-1.5 m	No	11		
7.3.2.14	Main socketed, Branch flanged - Nb exc 200 mm but n.e 400 mm in trenches depth 1.5-2 m	No	10		
7.3.2.15	Main Socketed, Branch flanged, invert level - Nb exc 200 mm but n.e 400 mm in trenches depth 1-1.5 m	No	11		
7.3.2.16	Main Socketed, Branch flanged, invert level - Nb exc 200 mm but n.e 400 mm in trenches depth 1.5-2 m	No	10		
	Tapers				
7.3.2.17	Nb exc 100 mm but n.e. 200 mm in trenches depth n.e. 1m	No	11		
7.3.2.18	Nb exc 100 mm but n.e. 200 mm in trenches depth 1-1.5m	No	10		
	Pipe pieces and bellmouths				
7.3.2.19	Plain ended pieces, Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m	No	1		
7.3.2.20	Plain ended pieces, Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m	No	1		
7.3.2.21	Plain ended pieces, length n.e. 1m c/w centre puddle flange - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m	No	1		
7.3.2.22	Single flanged pipe pieces, length n.e. 1.0 m - NB. Exc 100mm but n.e. 200 mm in trenches depth n.e.1m	No	2		
7.3.2.23	Single flanged pipe pieces, length n.e. 1.0 m - NB. Exc 100mm but n.e. 200 mm in trenches depth 1-1.5m	No	2		
7.3.2.24	Single flanged pipe pieces, c/w centre puddle flange - Nb- ne 100 mm in trenches, depth n.e 1.0 m	No	3		
7.3.2.25	Single flanged pipe pieces, c/w centre puddle flange - Nb- ne 100 mm in trenches, depth 1-1.5 m	No	11		
7.3.2.26	Single flanged pipe pieces, c/w centre puddle flange - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5 m	No	7		
7.3.2.27	Double flanged pipe pieces - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m	No	1		
7.3.2.28	Double flanged pipe pieces - Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m	No	2		
	TOTAL PAGE 4				

PART 7 - Transmission Pipeline (Marere Pipeline)

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
	Adaptors, detachable Collars Couplings &saddles				
7.3.2.29	Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m	No	6		
7.3.2.30	Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m	No	5		
7.3.2.31	Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1m	No	7		
7.3.2.32	Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5m	No	7		
7.3.2.33	Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n.e 1m	No	6		
7.3.2.34	Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n 1-1.5m	No	4		
7.3.2.35	Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1 m	No	6		
7.3.2.36	Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5 m	No	6		
7.3.2.37	Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m	No	5		
7.3.2.38	Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m	No	3		
7.3.2.39	Flanged adaptor, flexible to suit GI/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1m	No	6		
7.3.2.40	Flanged adaptor, flexible to suit GI/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1-1.5m	No	5		
7.3.2.41	Flanged adaptor, flexible to suit GI/uPVC pipes PN16 - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5 m	No	6		
	TOTAL PAGE 5				

PART 7 - Transmission Pipeline (Marere Pipeline)

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
7.4	**PIPEWORK**				
7.4.1	MANHOLE AND OTHER CHAMBERS IN ACORDANCE WITH STANDARD DRAWINGS				
7.4.1.1	In-situ concrete outfall structure(washout) pipe nom exc. 100 but not ne 200 depth 1.5-2m	No	11		
7.4.1.2	Precast Concrete air valve chamber pipe nb exc . 200 mm but ne 400 mm depth ne 1.5 m	No	12		
7.4.1.3	Masonry or dense blockwork Bulk Meter chamber pipe nb not exc 100 mm depth exc1.5m	No	2		
7.4.1.4	Masonry or dense blockwork Master Meter chamber pipe nb not exc 100 mm depth exc1.5m	No	2		
7.4.1.5	Masonry or dense blockwork strainer chamber pipe - nb not exc 100 mm depth exc1.5m	No	3		
7.4.2	**MANHOLE COVERS**				
7.4.2.1	Composite covers 1500 mm dia medium duty, in concrete with key	No	43		
7.4.2.2	Precast concrete: Area 1-2 m2(rate only)	No	43		
7.4.3	**CROSSINGS**				
7.4.3.1	River, stream or canal, Pemba river crossing with 80-90m, pipe nom DN 200-500 mm, undercrossing pipe with a width equal to DN + 500 mm from each side, the pipe should be burried to a depth of 1000mm + DN (150 mm stone packing in mortar, 50 mm Mortar base, 250 mm reinforced concrete class C25/30 for ceiling, bottom slab, as per general drawing. the work shall include the excavation, bedding, concrete and backfilling	No	1		
7.4.3.2	Fence crossing - pipe nom. Bore ne 200-400 mm(Provisional)	No	1		
7.4.3.3	Sewer, ditch or drain crossing - pipe nom. Bore ne 200-400 mm (Provisional)	No	5		
7.4.4	**REINSTATEMENT**				
7.4.4.1	Breaking up, temporary and permanent reinstatement of tarmac roads, pipe nom.bore200-400 mm (Provisional)	m	3		
7.4.4.2	Breaking up, temporary and permanent reinstatement of dirt roads, pipe nom.bore200-400 mm (Provisional)	m	1		
7.4.5	**OTHER PIPEWORK ANCILLARIES**				
7.4.5.1	Marker Posts for Sluice valves in accordance with std drgs	No	24		
7.4.5.2	Marker Posts for Air valves in accordance with std drgs	No	11		
7.4.5.3	Marker Posts for Washout valves in accordance with std drgs	No	10		
7.4.5.4	Marker Posts for Pipelines in accordance with std drgs	No	31		
7.5	**COVERS AND SURFACE BOXES**				
7.5.1	HDPE valve surface boxes, medium duty with locable cover and frame in (500 x 500 x 200) mm class 20 concrete surround as per standard drawing: area 0.1-0.5 m2	No	10		
7.5.2	Concrete chamber covers with locable Composite covers and frame 600 mm dia. Medium duty, with key. Area 1-5 m2	No	46		
7.5.3	Fixed length Extension Spindles c/w protection sleeve to suit gate valves, Length = 800 mm	No	24		
	TOTAL PAGE 6				

PART 7 - Transmission Pipeline (Marere Pipeline)

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
7.6	**PIPEWORK SUPPORTS & PROTECTION ANCILLARIES TO LAYING & EXCAVATION**				
7.6.1	EXTRAS TO EXCAVATION AND BACKFILLING				
7.6.1.1	In pipe trenches excavation or rock class I material	m3	728		
7.6.1.2	In pipe trenches excavation or rock class II material	m3	1395		
7.6.1.3	In pipe trenches backfilling with class S2 material	m3	6000		
7.6.1.4	In manhole and chambers excavation of rock class II material	m3	930		
7.6.2	**BEDS**				
7.6.2.1	Selected granular materiall with blended imported and screened class S2 material pipe 200-400 mm	m3	11440		
7.6.3	**SURROUND**				
7.6.3.1	Selected granular material incl upper bedding, side filling and initial backfill with blended imported and screened class S2 material pipe 200-400 mm	m3	850		
7.6.4	**CONCRETE STOOLS AND THRUST BLOCKS CONCRETE**				
	CLASS 20				
	To Horizontal bends				
7.6.4.1	Volume 0.5-1 m3, nom bore 200-400 mm	No	20		
	To Vertical bends at Crest				
7.6.4.2	Volume 0.1-0.2 m3 nom bore 100-200 mm	No	6		
7.6.4.3	Volume 0.5-1 m3 nom bore 100-200 mm	No	3		
	To Vertical bends at Trough				
7.6.4.4	Volume 0.1-0.2 m3, nom bore 100-200 mm	No	5		
7.6.4.5	Volume 0.5-1 m3, nom bore 100-200 mm	No	5		
	To Junctions				
7.6.4.6	Volume 0.5-1m3, bore 200-400 mm	No	30		
	To Tapers				
7.6.4.7	Volume 0.1-0.2 m3, nom bore 200-400 mm	No	43		
	To Valves				
7.6.4.58	Volume n.e. 0.1 m3 for valve n.b. not exc 100 mm	No	43		
7.7	**MISCELLANEOUS**				
7.7.1	T-keys for valve operation				
7.7.1.1	Provide T-keys for the operatiob of Sluice Valves. Length=800 mm c/w tapered handle tip for surface box opening. Keys to suit extended spindle top provided	No	5		
	TOTAL PAGE 7				
	TOTAL CARRIED TO GRAND SUMMARY -				

PART 8 -
Chlorine Dosing Unit at Kaya Bombo and Magodzoni (quantities are for 2 units)

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
8.1	**DEMOLITION AND SITE CLEARANCE**				
8.1.1	**SITE CLEARANCE**				
8.1.1.1	Excavation of topsoil depth n.e. 250 mm	m³	5.16		
8.1.2	**EXCAVATIONS**				
8.1.2.1	Excavation in normal material (maximum depth 0.25 to 0.5 m)	m³	12.5		
8.1.2.2	Excavation in normal material (maximum depth 0.5 to 1 m)	m³	12.5		
8.1.2.3	Excavation in normal material (maximum depth 1m to 2 m)	m³	25		
8.1.2.4	Item for excavation in rock (depth not exceeding 0.25 m)	m³	0.49		
8.1.2.5	Item for excavation in rock (maximum depth 0.25 to 0.5m)	m³	0.49		
8.1.2.6	Item for excavation in rock (maximum depth 0.5 to 1 m)	m³	0.98		
8.1.2.7	Item for excavation in rock (maximum depth 1 to 2 m)	m³	0.67		
8.1.2.8	Trimming of excavated surfaces in top soil	m²	25		
8.1.2.9	Trimming of excavated surfaces in rock	m²	1		
8.1.2.10	Preparation of excavated surface in rock, material other than topsoil, rock or artificial hard material	m²	25		
8.1.2.11	Preparation of excavated surafce in rock	m²	1.00		
8.1.2.12	Disposal of surplus excavated materials other than topsoil, rock or artificial hard material/ to designated site within free haul distance of 5.0 km	m²	5		
8.1.2.13	Ditto but rock	m³	1		
8.1.2.14	Filling to structures: selected excavated materials other than rock or top soil	m³	10		
8.1.2.15	Imported rock compacted on site	m³	1		
8.2	**Concrete work**				
8.2.1	Provision of Concrete, designed mix for ordinary structural concrete				
8.2.1.1	Class 15	m³	1.25		
8.2.1.2	Class 25/20	m³	21.5		
8.2.2	**Placing**				
8.2.2.1	Mass Blinding thickness not exceeding 50 mm	m³	1.25		
8.2.3	**Place Reinforced Concrete**				
8.2.3.1	Bases, footings, pile caps and ground slabs thickness between 150 mm to 300 mm thick	m³	1.60		
8.2.3.2	Reinforced concrete in beams (cross section) 0.1 - 0.26 m²	m³	3.52		
8.2.3.3	Reinforced concrete in slabs	m³	16.5		
8.3	**Formwork**				
8.3.1	Rough formwork to edges of floor slab 0.2 - 0.40 m	m²	25.00		
	Fair Faced Fomwork				
8.3.2	Plane, bertical; 0.2 - 0.4 m wide	m²	50.4		
8.4	**Reinforcement**				
	Steel Reinforced - High yield steel bars to BS 4449				
8.4.1	Y-8	t	0.5		
8.4.2	Y-16	t	1.48		
8.4.3	Fabrick mesh reinforcement,	m²	20.64		
	TOTAL PAGE 1				

PART 8 -
Chlorine Dosing Unit at Kaya Bombo and Magodzoni (quantities are for 2 units)

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
8.5	**Walling, Dense concrete block, solid block to BS 2028 type A**				
8.5.1	150 mm thick vertical straight walls	m²	10.88		
8.5.2	230mm thick vertical straight walls	m²	66.60		
8.5.3	Ancillaries				
8.5.3.1	200 mm wide damp proof course	m	19.80		
8.5.4	Miscellaneous				
8.5.4.1	Hardcore fill	m³	7.50		
8.5.4.2	250µm damp proof membrane	m²	20.64		
8.5.5	Suspended ceilings				
8.5.5.1	Depth of suspension not exceeding 150 mm	m²	25		
8.5.6	Carpentry and joinery				
8.5.6.1	Structural and carcassing timber; Trussed rafters and roof trusses span 14.8 m; double tie beam and rafters 50 mm x 150 mm; struts 100 x 50 and purlins 75 x 50	No	3		
8.5.6.2	Supply and installation of metal walkway connecting Chemical Dosing Unit to the reservoir as shown on the drawings	LS	2		
8.6	**Finishes**				
8.6.1	Floors; Porcelain chemical resistant non slippery tiles laid on a 40 mm cement sand mortar bedding ratio 1:3 cement to sand	m²	25.50		
8.6.2	Walls, internal cement sand plaster thickness 12 mm of cement sand ratio 1:3	m²	88.36		
8.6.3	Walls, external cement sand plaster thickness 20 mm of cement sand of ratio 1:3	m²	66.60		
8.6.4	Allow for fabrication, supply and installation of handrail as shown on drawings	No	2		
8.6.5	3 coats of Weatherguard paint to smooth plastered blockwork external upper surfaces inclined at an angle not exceeding 30 degrees to the horizontal	m²	66.6		
8.6.6	3 coats of Weatherguard paint to smooth plastered blockwork internal upper surfaces inclined at an angle not exceeding 30 degrees to the horizontal	m²	88.36		
8.6.7	Profiled IT5 sheet in one layer upper surface inclined at an angle not exceeding 30 degrees to the horizontal	m²	40.35		
8.6.8	3 coats of Oil paint to Timber surfaces width not exceeding 300	m	20.68		
8.6.9	Plastic gutters 100 mm	m	19.60		
8.6.10	Fitting to gutters	No	4.00		
8.6.11	Downpipes 100 mm	m	7.40		
8.6.12	Fittings to downpipes; 90 degrees bends	No	4.00		
8.7	**Mixing Tanks and Dosers**				
8.7.1	Construction of Chemical Mixing Tanks including electric stirrers, installing and commissioning including all pipeworks, fittings and valves and 6mm thick disolving tray	LS	2		
8.7.2	Supply all materials construction of concrete pipe ducts as per drawings and installation of PE chemical pipes as specified including excavations and making good.	LS	2		
8.7.3	Supply and installation of electric agitators as specified on drawings	No	2		
	TOTAL PAGE 2				

PART 8 -
Chlorine Dosing Unit at Kaya Bombo and Magodzoni (quantities are for 2 units)

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
8.7.4	Gravity solution feeder, constant level tank with inlet connector, repentor, outer funnel and 50 mm tubing for outlet. Includes valves and chemical resistant tubing. Flow upto 15-20 ml/s	No	2		
8.8	**Walkway**				
8.8.1	Provide all materials and construct walkway to connect the dosing structure to the tank as shown on drawings. Length of walkway is 2.0 m. Include for installation of handrails along the walkway.	LS	1		
8.9	**PIPEWORK-PIPES, AND FITTINGS- SUPPLY**				
8.9.1	uPVC pipes to SSRN 301, Class PN6, with socket and spigot joints to SSRN 0				
8.9.1.1	Nominal bore: 90 mm, nominal length- 6000 mm	No	24		
8.9.1.2	Nominal bore: 25mm, nominal length 6000 mm	No	12		
8.9.2	UPVC pipe fittings to SSRN 302, Junctions and branches, main flanged				
8.9.2.1	Tee, equal, branch as main nb 90 mm	No	2		
8.9.2.2	Tee, equal, branch as main, nb 25 mm	No	2		
8.9.3	**Bends, double socket, to SSRN 0**				
8.9.3.1	Short radius, 90 degrees, nb 90 mm	No	2		
8.9.3.2	Short radius, 90 degrees, nb, 25 mm	No	2		
8.9.4	**Standard Couplers and end pieces**				
8.9.4.1	Threaded- p.e.coupler 90 mm x 3"	No	8		
8.9.5	**Valves, penstocks, hydrants, meters**				
8.9.5.1	Flanged, non-rising spindle with handwheel nb, 80 mm	No	4		
8.9.6	**Valves**				
8.9.6.1	Tap threaded 25 mm	No	8		
8.10	**PIPEWORK- PIPES AND FITTINGS - INSTALL**				
8.10.1	**METHOD OF MEASUREMENT TYPE B**				
	UPVC pipes and fittings				
8.10.1.1	Pipes not in trenches, nom bore not exc 110 mm	No	40		
8.10.1.2	Bends not in trenches, nom.bore: not exc. 110 mm	No	4		
8.10.1.3	Junctions: Not in trenches, nom. Bore not exc 110 mm	No	4		
8.10.1.4	Couplers: Not in trenches, nom. Bore not exc. 100 mm	No	8		
8.10.1.5	Valves: Not in trenches, nom bore not exc 110 mm	No	12		
	TOTAL PAGE 3				
	TOTAL CARRIED TO GRAND SUMMARY -				

PART 9 - Provisional Bill : Small Works

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
9.1	**Rehabilitation of 1140 m³ Kaya Bombo reservoir**				
	Ref. Drawing No..1210/008A-009A				
9.1.1	**Removal of Sediments and Cleaning**				
9.1.1.1	Cleaning of reservoir with high pressure water jet and/or high pressure air	LS	1		
9.1.1.2	Identification and repair of major concrete defects and cracks	LS	1		
9.1.2	**OTHER**				
9.1.2.1	Supply all materials and rehabilitate reservoir wall and ensure water tightness in accordance with specifications. Include for cleaning the internal wall faces, surface preparation and application of waterproof plastering(with silica agent) over the entire wall face(approx. 540 m2). Include for cleaning external wall, surface preparation and repaint the entire outer wall face of the tank(approximately 520 m2). Include for repair for bottom slab, sections of spalled concrete by applying epoxy mortar or other equally approved materials. Include for construction of (50x100 mm) edge beam around the bottom slab approximately 50 m as per drawing.	LS	1		
9.1.2.2	Remove existing sealant, clean and prepare 20mm groove around the tank perimeter and apply polysulphide sealand with a gun as per detail on drawing and ensure reservoir is water tight in accordance with Specifications.	m	50		
9.2	**Construction of VIP Latrines- 9Nos**				
	Locations to be indicated by the Engineer				
	VIP Latrines - Masonry building will be constructed in accordance with drawing No.1230/K/017A				
9.2.1	Excavate in normal soil below ground level, include for timbering, dewatering during construction of the foundation for the walls, to the dimension and levels as shown on the drawings, backfilling and compacting after completion of the works upto the required levels and cart away the surplus materials to be used on site or elsewhere or dumped away as directed, complete as specified and shown on the drawings.	m3	160		
9.2.2	Extra over 1.01 for excavation in Class I material(Rock)	m3	22.00		
9.2.3	Ditto but for Class III Material	m3	16.00		
9.2.4	Provide, lay and compact hardcore as Special below the kiosk floor or in other places as directed to the dimensions and levels as shown on the drawings.	m3	8		
9.2.5	Provide, mix, place and compact concrete(1:4:8 mix) as blinding layer 50 mm think under the bottom of pit as shown on the drawing	m2	160.00		
9.2.6	Provide, mix, place and compact class 20 in the foundations, floor and lintel(reinforced), include for formwork shuttering , reinforcement and all required materials and workmanship complete as specified on the drawings.	m3	35		
	TOTAL PAGE 1				-

PART 9 - Provisional Bill : Small Works

ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
9.2.7	Provide and build dressed masonry walls with quarry stone using 1:3 cement sand mortarfor the laterines walls and pit to the required dimensions and shapes as specified on the drawings.	m2	320.00		
9.2.8	Provide all materials and install doors to the required dimensions as detailed on the drawings, inclde for door frame, hinges, locks and keys, materials and workmanship to make it complete.	No	10		
9.2.9	Provide all materials and install windows as specified. Include for frames, hinges, screws,and workmanship to make it complete.	No	10.00		
9.2.10	Provide all materials and construct roof to the VIP latrine as specified on drawings	No	10.00		
9.2.11	Provide all materials and apply one undercoat and 3 finishing coats to the walls, doors and windows both externally and internally of the VIP latrines	m2	600.00		
9.2.12	Provide all all materials and lay non-slip floor tiles as specified.	m2	40		
9.3	**FENCING AND GATE- 10 Nos Sites**				
9.3.1	Excavate for post holes, provide all materials and construct chain link fence on concrete posts at 3m centres all as per details on Drg. No. 1230/k/015A-016A, including straining posts at every 10th post and additional posts at corners	m	3200		
9.3.2	Provide all materials and construct metal gate 3600mm widex 2000mm high with 1 Nr. 915mm wide pedestrian gate including 3 Nr. Pillars all as detailed on Drg. No. 1230/K/015A-016A	No	10		
	TOTAL PAGE 2				
	TOTAL CARRIED TO GRAND SUMMARY - Provisional Sum				-

PART 10 - Provisional Sums -Confirmed:
SCHEDULE OF DAYWORK RATES AND SPECIFIED QUANTITIES FOR DAYWORK

ITEM	BRIEF DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
	Dayworks are subject to the Conditions of Contract and the Specifications of the Contract.				
	NOTE: THE WHOLE OF THIS BILL IS PROVISIONAL.				
	THE QUANTITIES INDICATED ARE THE MINIMUM AND DO NOT INCLUDE TRAVEL AND INSTALLATION TIMES FOR EQUIPMENT AND MACHINERY				
10.1	**Labour**				
	The rates inserted herein shall include for all costs such as insurance, travelling time, overtime, accommodation, use and maintenance of small tools of trade, supervision, overheads and profit. Only time engaged upon work shall be paid for.				
10.1.1	Unskilled labourer	Hr	1,200		
10.1.2	Electrician	Hr	400		
10.1.3	Stone mason	Hr	400		
10.1.4	Carpenter	Hr	400		
10.1.5	Concretor	Hr	400		
10.1.6	Certified welder	Hr	400		
10.1.7	Pipelayer	Hr	400		
10.1.8	Painter	Hr	400		
10.1.9	Engineering surveyor	Hr	400		
10.1.10	Foreman	Hr	400		
10.1.11	Watchman (including use of firewood, lights, day, night, Sunday and Public Holiday watching)	Hr	2,000		
10.1.12	Qualified engineering supervisor	Hr	1,600		
10.1.13	Qualified water supply technician (min. 15 years experience)	Hr	1,200		
10.2	**Plant and Equipment**				
	The rates inserted herein shall include for all operational and maintenance costs, fuel, oil, grease, operators, turnboys, supervision, overhead and profits. Only the time actually employed on works shall be paid for and the rates shall include for idle time.				
10.2.1	Compressor complete (3.0 m³/minute)	Hr	600		
10.2.2	Mobile generator 15kVA	Hr	1,200		
10.2.3	Concrete vibrator (petrol or diesel)	Hr	600		
10.2.4	Concrete mixer 14/10 (including batch weighing gear and drag feed shovel)	Hr	600		
10.2.5	Dumper 0.38 m³	Hr	600		
10.2.6	Compactor / roller, dead weight 9 tonnes	Hr	100		
10.2.7	Lorry (tipper) 5 tonne	Hr	400		
10.2.8	Lorry (tipper) 7 tonne	Hr	200		
10.2.9	Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.)	Hr	600		
10.2.10	Oxy-acetylene cutting and welding set, including oxygen and acetylene	Hr	300		
10.2.11	Electric welding set including electrodes	Hr	300		
10.2.12	4-WD pickup 1 tonne	Hr	1,600		
10.2.13	Jack hammer 25 kg	Hr	200		
10.2.14	Mobile crane 5 tonnes	Hr	800		
10.2.15	Air compressor (5,000 l/min)	Hr	400		
10.2.16	Pressure testing equipment (including diesel engine for pump)	Hr	400		
10.2.17	Acoustic ground microphones for leak detection	Hr	480		
10.3	**Materials**				
	All materials shall comply with the Specifications. The rates inserted herein shall include for delivery to site, storage, handling, overheads and profits. The quantities indicated herein are only the minimum.				
10.3.1	Quick drying hydraulic mortar for leak repairs	Kg	300		
10.3.2	Ordinary portland cement	Kg	600		
10.3.3	Mild steel (any size from 8mm to 25mm dia.)	Kg	200		
	TOTAL PAGE 1				-

PART 10 - Provisional Sums -Confirmed:
SCHEDULE OF DAYWORK RATES AND SPECIFIED QUANTITIES FOR DAYWORK

ITEM	BRIEF DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
10.3.4	High tensile steel (any size from 8mm to 15mm dia.)	Kg	200		
10.3.5	Reinforcement fabric mesh size A142 weighing 2.22 kg/m2.	m^2	100		
10.3.6	Building sand	m^3	100		
10.3.7	Coarse aggregate for concrete	m^3	200		
10.3.8	Use of shuttering timber	m^2	100		
10.3.9	Imported murram fill	m^3	100		
10.3.10	Concrete block 200 mm thick	No	100		
10.3.11	Concrete block 150 mm thick	No	200		
10.3.12	Hard core	m^3	500		
10.3.13	Concrete ogee pipe, DN 300 mm	m	500		
10.3.14	Concrete Class 15/20	m^3	200		
10.3.15	Concrete Class 20/20	m^3	200		
10.3.16	Concrete Class 25/20	m^3	200		
10.3.17	Lubricants	L	50		
10.3.18	Chlorinated paint	L	50		
10.3.19	Emulsion paint	L	50		
10.3.20	Gloss paint	L	50		
10.3.21	Super petrol	L	3,000		
10.3.22	Diesel	L	2,000		
10.3.23	HDPE pipe, PN 10 bars, DN 40 mm	m	2,000		
10.3.24	HDPE pipe, PN 10 bars, DN 25 mm	m	4,000		
10.3.25	HDPE pipe, PN 10 bars, DN 20 mm	m	6,000		
10.3.26	Steel compression coupling, PN 10 bars, Straight DN 40 mm	No	200		
10.3.27	Steel compression coupling, PN 11 bars, Straight DN 150 mm	No	400		
10.3.28	Steel compression coupling, PN 12 bars, Straight DN 100 mm	No	600		
10.3.29	Steel compression coupling, PN 12, Reducer DN 150-100 mm	No	200		
10.3.30	Steel compression coupling, PN 12, Reducer DN 150 / 75 mm	No	400		
10.3.31	Steel compression coupling, PN 12, Reducer DN150 / 50mm	No	600		
10.4	**Transportation**				
	Hourly rates including km-lump-sums				
10.4.1	Vehicles	Hr	80		
10.4.2	Trucks	Hr	80		
	TOTAL PAGE 2				-
	TOTAL CARRIED TO Grand Summary - Dayworks				-

GRAND SUMMARY

Contract Name: **EMERGENCY WORKS FOR INCREASING WATER AVAILABILITY IN LIKONI**

NCB No. **Contract No. CWSB/AFD/W1/2019**

	DESCRIPTION	PAGE	AMOUNT (KES): CONFIRMED SCOPE AMOUNTS	AMOUNT (KES): PROVISIONAL BILLS ONLY
CONFIRMED BILLS				
Bill No. 1	Preliminary and General Items			
Bill No. 2	Combined Hydraulic- Chemical Borehole Rehabilitation			
Bill No. 4	Drilling,Construction, Testing Pumping of 2No. Boreholes (1Nr at A nd and 1nr at 9)			
Bill No. 5	Rehabilitation and Equiping of Boreholes and Installation of Monitoring System**(Bills 5.1-5.11)**			
Bill No. 6	Collection Mains: BH 4, 7 and BH A to Connection on Kaya Bombo Main			
Bill No. 6A	Marere Headworks Improvements- Expansion of Flow Division/Chlorination Chamber			
Bill No. 7	Marere Parallel Pipeline Construction			
Bill No. 8	Chlorine Dosing Unit at Kaya Bombo and Magodzoni			
Bill No.10	Schedule of Dayworks			
	Sub-Total Bill No.1, 2,4, 5.1-5.11, 6, 6A, 7, 8 and 10:	**A**		
	Add Provisional Sum for Contingency Allowance(=10% *A)	B		
	Sub-Total 1(A+B)	C		
	Allow for all Local Taxes and Duties including 16% VAT on sub-total (C)	D		
	SUB-TOTAL CONFIRMED BILLS(C+D)	E		
PROVISIONAL BILLS				
Bill No. 3	Geophysical Investigations			
Bill No. 5.12	Tiwi Borehole Monitoring System			
Bill No. 5.13	Solar PV at Borehole A, 4/7 and 9			
Bill No.9	Small Works (Rehabilitation of 1140 m3 reservoir, VIP Latrines, Fencing and Gates)			
	Sub-Total Bill No. 3. 5.12. 5.13 and 9 : To Provisional Bill Column	**F**		
	Add Provisional Sum for Contingency Allowance(=10% *F)	G		
	Sub-Total 1(F+G)	H		
	Allow for all Local Taxes and Duties including 16% VAT on sub-total (H)	I		
	SUB-TOTAL PROVISIONAL BILLS(H+I)	J		
	Bid Price (E + J) (Carried forward to Letter of Bid)			

Bidder's Name:

Bidder's Signature:

Date: