

REF: CWWDA/AFD/W1 /2019/ (02)

DATE: 19th February, 2021

TO: ALL BIDDERS

REF: EMERGENCY WORKS FOR INCREASING WATER AVAILABILITY IN LIKONI TENDER NO. CWSB/AFD/W1/2019

# **CLARIFICATION No. 2.**

This is to inform you that we have amended Bills of Quantity (BOQ) due to some technicalities.

We have therefore replaced the earlier BOQ issued under Clarification no. 1 with the updated one attached herewith.

Kindly discard the BOQ issued under Clarification No. 1 and use the availed one for your bidding.

Yours faithfully

CHIEF EXECUTIVE OFFICER

Mombasa Kenya







1.1.1   Contractual Requirements	1.1.1 Contractual Requirements 1.1.1 Performance Security Insurance for loss of or damage to the works, plant, and materials 1.1.3 Insurance for loss of or damage to Works and Contractor's equipment 1.1.4 Insurance for loss of or damage to property (except the works, equipment 1.1.5 Insurance for loss of or damage to property (except the works, plant, materials, and equipment) in connection with the Contract 1.1.5 Insurance for personal injury or death 1.1.6 Establishment and maintenance of Contractor's camp. Including 1.1.1 Insurance for personal injury or death 1.1.6 Establishment and maintenance of Contractor's camp. Including 1.1.1 Facilities for the Engineer's Staff Establishment of Engineer's Staff 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) 2.1.1 Facilities for the Engineer's Office at Tiwi Water Office including electrical power for he whole project period (18 months) 396. Accommodation - 3" Hotel accommodation (incl. Water & Electricity) in single unit bedroom - 1No. Unit for the Resident Engineer and 2 Nr for ARE (1 months) 4. Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-3bedroom)- 1No. Unit for the RE (18 months) 1.2.35, 4. Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-2 bedroom)- 2 No. Unit for the ARE (36 months) 1.800, 1.2.2 Signboards, 1.800, 1.2.3 Signboards, provide 1.2.3 Equipment for Use by the Engineer's Staff  Surveying equipment to Specifications-Provide and Maintain. Revert to Contractor at end of Contract Provision of National Standards and International Standards itset in the General Specifications 1.2.4 Diverse provide(2Nos) Month 18  1.2.4 Stendance Upon the Engineer's Staff  Surveying equipment to specifications 1.2.5 Testing of Materials By Third Party Inspection(natural materials) Surveying engineers in Scape Party, clause 3.16 in ful	ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
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Accommodation - 3" Hotel accommodation (incl. Water & Electricity) in single unit bedroom - 1No. Unit for the Resident Engineer and 2 Nr for ARE (1 months)  Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-3bedroom)- 1No. Unit for the RE (18 months)  Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-2 bedroom)- 2 No. Unit for the ARE (36 months)  1.2.1.4.  1.2.2.1.5. Signboards  1.2.2.2 Signboards  1.2.3.1 Equipment for Use by the Engineer's Staff  1.2.3.2 Equipment for Use by the Engineer's Staff  1.2.3.3.1 Revert to Contractor at end of Contract  Provision of National Standards and International Standards listed in the General Specifications  1.2.4. Attendance Upon the Engineer's Staff  1.2.4.1 Drivers provide(2No)  1.2.4.2 Chainmen provide(3Nos)  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No. 10	Accommodation - 3* Hotel accommodation (incl. Water & Electricity) in single unit bedroom - 1No. Unit for the Resident Engineer and 2 Nr for ARE (1 months)  Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-3bedrooom)- 1No. Unit for the RE (18 months)  Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-2bedrooom)- 2 No. Unit for the ARE (36 months)  2.1.4. Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-2 bedrooom)- 2 No. Unit for the ARE (36 months)  1.2.2 Signboards  2.2.1. Signboards  2.2.2.1 Signboards, provide  2.2.2.2 Maintain signboards for the duration of the contract  1.2.3 Equipment for Use by the Engineer's Staff  3.3.1 Revert to Contractor at end of Contract  2.3.2 Is accommodation of National Standards and International Standards listed in the General Specifications  1.2.4 Attendance Upon the Engineer's Staff  2.4.1 Drivers provide(2No)  Accommodation - Rented and furnished (incl. Water & Electricity) Approved accomodation(single unit-2 bedrooom)- 2 No. Unit for the ARE (36 months)  1.2.4. Attendance Upon the Engineer's Staff  2.4.1 Drivers provide(2Nos)  1.2.2 Accommodation - Rented and furnished (incl. Water & Electricity) Approved accomodation(single unit-3bedroom)- 2 No. Unit for the Recommodation in the Contract and Month 18  2.4.1 Drivers provide(2Nos)  Month 18  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Sump Tests to determine the concrete consistency - in No. 10	1.2.1.1	office furniture and office equipments including water supply and	PS	1	396,000	
Engineer and 2 Nr for ARE (1 months)  Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-3bedrooom)- 1No. Unit for the RE (18 months)  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)  1.2.2.  Signboards  1.2.2.1 Signboards, provide 1.2.2.2 Maintain signboards for the duration of the contract  1.2.3.1 Surveying equipment to Specifications-Provide and Maintain. Revert to Contractor at end of Contract 1.2.3.2 Provision of National Standards and International Standards listed in the General Specifications  1.2.4.1 Drivers provide(2No)  1.2.4.2 Chainmen provide(3Nos)  1.2.4.3 Office messenger provide  Watchmen provide(2Nos)  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  1.2.5 Slump Tests to determine the concrete consistency - in No. 10	Engineer and 2 Nr for ARE (1 months) Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-3bedrooom)- 1No. Unit for the RE (18 months)  Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-2 bedrooom)- 2 No. Unit for the ARE (36 months)  1,235, Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-2 bedrooom)- 2 No. Unit for the ARE (36 months)  1,800,000  1,800,  1,800,000  1,800,  1,22.2  Signboards 2,2.1 Signboards, provide Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-2 bedrooom)- 2 No. Unit for the ARE (36 months)  1,800,000	1212	Accommodation - 3* Hotel accommodation (incl. Water &	Day	30	18 000	396,00
the RE (18 months)  Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-2 bedrooom)- 2 No. Unit for the ARE (36 months)  1.2.2 Signboards  1.2.2.1 Signboards, provide  1.2.2.2 Maintain signboards for the duration of the contract  1.2.3 Equipment for Use by the Engineer's Staff  1.2.3.1 Revert to Contractor at end of Contract  1.2.3.2 Provision of National Standards and International Standards listed in the General Specifications  1.2.4 Attendance Upon the Engineer's Staff  1.2.4.1 Drivers provide(2No)  1.2.4.2 Chainmen provide(3Nos)  1.2.4.3 Office messenger provide  1.2.4.4 Watchmen provide(2Nos)  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  1.2.5 Slump Tests to determine the concrete consistency - in No. 10	the RE (18 months)  Accommodation - Rented and furnished (incl. Water & Electricity) approved accomodation(single unit-2 bedrooom)- 2 No. Unit for the ARE (36 months)  1,800,000  1,800,00		Engineer and 2 Nr for ARE (1 months)  Accommodation - Rented and furnished (incl. Water & Electricity)				540,00
1.2.1.4. approved accomodation(single unit-2 bedrooom)- 2 No. Unit for the ARE (36 months)  1.2.2 Signboards 1.2.2.1 Signboards, provide 1.2.2.2 Maintain signboards for the duration of the contract 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 1.2.3.2 Provision of National Standards and International Standards listed in the General Specifications  1.2.4.1 Drivers provide(2No) 1.2.4.2 Chainmen provide(3Nos) 1.2.4.3 Office messenger provide 1.2.4.4 Watchmen provide(2Nos) 1.2.5 Testing of Materials By Third Party Inspection(natural materials) 1.2.5.1 Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled 1.2.5.2 Slump Tests to determine the concrete consistency - in No. 10	2.1.4. approved accomodation(single unit-2 bedrooom)- 2 No. Unit for the ARE (36 months)  1,800,000	1.2.1.3.		PS	1	1,235,000	1,235,00
1.2.2 Signboards 1.2.2.1 Signboards, provide 1.2.2.2 Maintain signboards for the duration of the contract 1.2.3.2 Equipment for Use by the Engineer's Staff 1.2.3.1 Revert to Contractor at end of Contract 1.2.3.2 Provision of National Standards and International Standards listed in the General Specifications 1.2.4.1 Drivers provide(2No) 1.2.4.2 Chainmen provide(3Nos) 1.2.4.3 Office messenger provide 1.2.4.4 Watchmen provide(2Nos) 1.2.5 Testing of Materials By Third Party Inspection(natural materials) 1.2.5.1 Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled 1.2.5.2 Slump Tests to determine the concrete consistency - in No. 10	1.2.2   Signboards   No   2	1.2.1.4.	approved accomodation(single unit-2 bedrooom)- 2 No. Unit for	PS	1	1,800,000	1 800 00
1.2.2.1 Signboards, provide 1.2.2.2 Maintain signboards for the duration of the contract 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 1.2.3.2 Provision of National Standards and International Standards listed in the General Specifications 1.2.4.1 Drivers provide(2No) 1.2.4.2 Chainmen provide(3Nos) 1.2.4.3 Office messenger provide 1.2.4.4 Watchmen provide(3Nos) 1.2.5 Testing of Materials  By Third Party Inspection(natural materials) 1.2.5.1 Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled 1.2.5.2 Slump Tests to determine the concrete consistency - in No. 10	2.2.1 Signboards, provide						1,000,00
1.2.2.2 Maintain signboards for the duration of the contract  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  1.2.3.2 Provision of National Standards and International Standards listed in the General Specifications  1.2.4 Attendance Upon the Engineer's Staff  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 strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No. 10	Autendance Upon the Engineer's Staff						
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  1.2.3.2 Provision of National Standards and International Standards listed in the General Specifications  1.2.4 Attendance Upon the Engineer's Staff  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 strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No. 10	1.2.3 Equipment for Use by the Engineer's Staff 2.3.1 Surveying equipment to Specifications-Provide and Maintain. Revert to Contractor at end of Contract 2.3.2 Provision of National Standards and International Standards listed in the General Specifications  1.2.4 Attendance Upon the Engineer's Staff 2.4.1 Drivers provide(2No)  2.4.2 Chainmen provide(3Nos)  3.4.3 Office messenger provide 3.4.4 Watchmen provide(2Nos)  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  2.5.1 Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  2.5.2 Slump Tests to determine the concrete consistency - in No. 10			No			
1.2.3.1 Surveying equipment to Specifications-Provide and Maintain. Revert to Contractor at end of Contract 1.2.3.2 Provision of National Standards and International Standards listed in the General Specifications  1.2.4 Attendance Upon the Engineer's Staff 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 strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  1.2.5.2 Slump Tests to determine the concrete consistency - in No 10	2.3.1 Surveying equipment to Specifications-Provide and Maintain. Revert to Contractor at end of Contract  2.3.2 Provision of National Standards and International Standards listed in the General Specifications  1.2.4 Attendance Upon the Engineer's Staff  2.4.1 Drivers provide(2No) Month 18  2.4.2 Chainmen provide(3Nos) Month 18  2.4.3 Office messenger provide Month 18  2.4.4 Watchmen provide(2Nos) Month 18  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  2.5.1 Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  2.5.2 Slump Tests to determine the concrete consistency - in No 10	1.2.2.2	Maintain signboards for the duration of the contract	Month	18		
Surveying equipment to Specifications-Provide and Maintain. Revert to Contractor at end of Contract  1.2.3.2 Provision of National Standards and International Standards listed in the General Specifications  1.2.4 Attendance Upon the Engineer's Staff  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 1.2.4.4 Watchmen provide(2Nos) Month 18  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10	Surveying equipment to Specifications-Provide and Maintain. Revert to Contractor at end of Contract	1.2.3	Equipment for Use by the Engineer's Staff				
1.2.3.2   listed in the General Specifications   LS   1	LS   1	1.2.3.1		LS	1		
1.2.4.1 Drivers provide(2No)  1.2.4.2 Chainmen provide(3Nos)  1.2.4.3 Office messenger provide  1.2.4.4 Watchmen provide(2Nos)  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No. 10	.2.4.1 Drivers provide(2No) Month 18 .2.4.2 Chainmen provide(3Nos) Month 18 .2.4.3 Office messenger provide Month 18 .2.4.4 Watchmen provide(2Nos) Month 18 .2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  2.5.2 Slump Tests to determine the concrete consistency - in No 10	1.2.3.2		LS	1		
1.2.4.1 Drivers provide(2No) 1.2.4.2 Chainmen provide(3Nos) 1.2.4.3 Office messenger provide 1.2.4.4 Watchmen provide(2Nos) 1.2.5 Testing of Materials  By Third Party Inspection(natural materials) Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10	.2.4.1 Drivers provide(2No) Month 18 .2.4.2 Chainmen provide(3Nos) Month 18 .2.4.3 Office messenger provide Month 18 .2.4.4 Watchmen provide(2Nos) Month 18 .2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  2.5.2 Slump Tests to determine the concrete consistency - in No 10	1.2.4	Attendance Upon the Engineer's Staff				
1.2.4.2 Chainmen provide(3Nos)  1.2.4.3 Office messenger provide 1.2.4.4 Watchmen provide(2Nos)  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10	.2.4.2 Chainmen provide(3Nos)  .2.4.3 Office messenger provide  .2.4.4 Watchmen provide(2Nos)  Month  18  .2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10			Month	18		
1.2.4.3 Office messenger provide 1.2.4.4 Watchmen provide(2Nos)  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10	.2.4.3 Office messenger provide .2.4.4 Watchmen provide(2Nos)  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  .2.5.1 Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  2.5.2 Slump Tests to determine the concrete consistency - in No. 10		· ` ` ` '				
1.2.4.4 Watchmen provide(2Nos)  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10	.2.4.4 Watchmen provide(2Nos)  1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  .2.5.1 Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  2.5.2 Slump Tests to determine the concrete consistency - in No 10		. , ,	Month	18		
1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10	1.2.5 Testing of Materials  By Third Party Inspection(natural materials)  Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10		- ·	Month			
Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10	Cube Test - for an appropriate strength to nr satisfied if the requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No. 10	1.2.5	. , ,				
requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10	requirements in BS 5328 Part4, clause 3.16 in fulfilled  Slump Tests to determine the concrete consistency - in No 10		<u> </u>				
Slump Tests to determine the concrete consistency - in No. 10	Slump Tests to determine the concrete consistency - in No. 10	1.2.5.1	Cube Test - for an appropriate strength to nr satisfied if the	No	10		
accordance with BS 1881		1.2.5.2	Slump Tests to determine the concrete consistency - in	No	10		









Provide computer equipment digital camera software etc.				REF	UBLIC OF KENYA "3 DEV	ELVO
1.2.5.3   Inspection of pipe, fittings, plant manufacturing by the Employer Inspection of pipe, fittings, plant manufacturing by the Employer Inspection of pipe, fittings, plant manufacturing by the Employer Inspection of pipe, fittings, plant manufacturing by the Employer Institute Employer Institute Employer Institute In	PART 1	- Preliminary and General Items				
Inspection of pipe, fittings, plant manufacturing by the Employer and the Engineer as per Specifications  1.2.6 Testing of Works  Water retaining structures constructed in the project including cleansing and sterilization for channels, chambers, at Kaya Bombo, Marere Headworks etc  1.2.7.1 Temporary Works  1.2.7.2 De-watering  1.2.7.3 De-watering  1.2.7.3 De-watering  1.2.7.4 De-watering  1.2.7.4 De-watering  1.2.7.5 De-watering  1.2.7.5 De-watering  1.2.7.6 De-watering  1.2.7.7 De-watering  1.2.7.7 De-watering  1.2.7.8 De-watering  1.2.7.9 De-watering  1.2.7.9 De-watering  1.2.7.1 De-watering  1.2.7.1 De-watering  1.2.7.1 De-watering  1.2.7.2 De-watering  1.2.7.3 De-watering  1.2.7.4 De-watering  1.2.7.5 De-watering  1.2.7.5 De-watering  1.2.7.6 De-watering  1.2.7.7 De-watering  1.2.7.7 De-watering  1.2.8 PROVISIONAL SUMS  1.2.8.1 Labour (carried from Dayworks Structure (Provisional))  1.2.8.2 Materials (carried from Dayworks Schedule)  1.2.8.3 Plant (carried from Dayworks Schedule)  1.2.8.3 Plant (carried from Dayworks Schedule)  1.2.8.4 Very Depty 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  1.3.4 Provide for insurance and maintenance and operation of the Provide for insurance and maintenance and operation of the Carris of the Contract  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  1.3.6 Compensation and entry upon land  1.3.7 Algorithm of the Contract of Contr	ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
1.2.5.3 and the Engineer as per Specifications  1.2.6.1 Cesting of Works  Water retaining structures constructed in the project including claesing and sterilization for channels, chambers, at Kaya Bombo, Marere Headworks etc  1.2.7.1 Traffic regulation including charges by KENHA/KERRA  1.2.7.2 De-watering  1.2.7.3 Diversion works at headworks during modification and construction of Flow Division Structure (Provisional)  1.2.7.4 Pypass pipework where disruption for more than 12 hours is anticipate (Provisional)  1.2.8 PROVISIONAL SUMS  1.2.8.1 Labour (carried from Dayworks Schedule)  1.2.8.2 Materials (carried from Dayworks Schedule)  1.2.8.3 PRIME COST SUMS  1.3.2 Upkeep and travel for Client's secondment staff  Supply and delivery of 4WD double cabin are with dual air bags in the front and AC for the Resident and Assistant Resident provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer including provision of drivers for the duration of the contract  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer and of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1,2,1,1,2,1,2,1,2,1,3,1,1,3,1,3,1,3,1,3,		By Third Party Inspection(man-made other pipes)				
Nater retaining structures constructed in the project including cleansing and sterilization for channels, chambers, at Kaya Bombo, Marere Headworks etc	1.2.5.3		LS	1	607,500	607,500
Nater retaining structures constructed in the project including cleansing and sterilization for channels, chambers, at Kaya Bombo, Marere Headworks etc	1.2.6	Testing of 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)  1.2.7.4 By-pass pipework where disruption for more than 12 hours is anticipate (Provisional)  1.2.8.1 PROVISIONAL SUMS  1.2.8.1 Labour (carried from Dayworks Schedule)  1.2.8.2 Materials (carried from Dayworks Schedule)  1.2.8.3 Plant (carried from Dayworks Schedule)  1.3 PRIME COST SUMS  1.3.2 Upkeep and travel for Client's secondment staff 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 Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as directed by Engineer.  1.3.9 Supply of operation and maintenance tools and equipment for the LS 1		Water retaining structures constructed in the project including cleansing and sterilization for channels, chambers, at Kaya		1		
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)  1.2.7.4 By-pass pipework where disruption for more than 12 hours is anticipate (Provisional)  1.2.8.1 PROVISIONAL SUMS  1.2.8.1 Labour (carried from Dayworks Schedule)  1.2.8.2 Materials (carried from Dayworks Schedule)  1.2.8.3 Plant (carried from Dayworks Schedule)  1.3 PRIME COST SUMS  1.3.2 Upkeep and travel for Client's secondment staff 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 Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as directed by Engineer.  1.3.9 Supply of operation and maintenance tools and equipment for the LS 1	1 2 7	Temporary Works			1	
1.2.7.2 De-watering 1.2.7.3 Diversion works at headworks during modification and construction of Flow Division Structure (Provisional) 1.2.7.4 By-pass pipework where disruption for more than 12 hours is anticipate (Provisional)  1.2.8.1 By-pass pipework where disruption for more than 12 hours is anticipate (Provisional)  1.2.8.1 Labour (carried from Dayworks Schedule) 1.2.8.2 Materials (carried from Dayworks Schedule) 1.2.8.3 Plant (carried from Dayworks Schedule) 1.3.4 Dykeep and travel for Client's secondment staff 1.3.5 Upkeep and travel for Client's secondment staff 1.3.6 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  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Reverts to Employer at end of Contract Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2.1.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Upply of operation and maintenance tools and equipment for the LS  1.3.9 Supply of operation and maintenance tools and equipment for the Boreholes			DC	4	250,000	250,000
1.2.7.3 Diversion works at headworks during modification and construction of Flow Division Structure (Provisional)  1.2.7.4 By-pass pipework where disruption for more than 12 hours is anticipate (Provisional)  1.2.8 PROVISIONAL SUMS  1.2.8.1 Labour (carried from Dayworks Schedule)  1.2.8.2 Materials (carried from Dayworks Schedule)  1.2.8.3 Plant (carried from Dayworks Schedule)  1.3 PRIME COST SUMS  1.3.2 Upkeep and travel for Client's secondment staff  1.3.3 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  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 keyerist to Employer at end of Contract  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.9 Supply of operation and mintenance tools and equipment for the Boreholes			_		350,000	350,000
1.2.7.4 By-pass pipework where disruption for more than 12 hours is anticipate (Provisional)  1.2.8.1 By-pass pipework where disruption for more than 12 hours is anticipate (Provisional)  1.2.8.1 Labour (carried from Dayworks Schedule)  1.2.8.2 Materials (carried from Dayworks Schedule)  1.2.8.3 Plant (carried from Dayworks Schedule)  1.3.4 PRIME COST SUMS  1.3.5 Upkeep and travel for Client's secondment staff  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  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2.1.3.1,3.1.3.1,3.1.3.1,3.1.3.1,3.1.3.1,3.1.3.1.	1.2.7.2	•		1		
1.2.8. PROVISIONAL SUMS  1.2.8.1 Labour (carried from Dayworks Schedule)  1.2.8.2 Materials (carried from Dayworks Schedule)  1.2.8.3 Plant (carried from Dayworks Schedule)  1.3 PRIME COST SUMS  1.3.2 Upkeep and travel for Client's secondment staff 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  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2.1.33, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land  Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as director by the Engineer.  1.3.9 Supply of operation and maintenance tools and equipment for the Boreholes	1.2.7.3	construction of Flow Division Structure (Provisional)	LS	1		
1.2.8.1 Labour (carried from Dayworks Schedule)  1.2.8.2 Materials (carried from Dayworks Schedule)  1.2.8.3 Plant (carried from Dayworks Schedule)  1.3.4 PRIME COST SUMS  1.3.2 Upkeep and travel for Client's secondment staff 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  1.3.4 Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land  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.  1.3.8 Investigations of internal repair works required for reseviors once emptied as director by the Engineer.  Supply of operation and maintenance tools and equipment for the Boreholes	1.2.7.4		LS	1		
1.2.8.2 Materials (carried from Dayworks Schedule)  1.2.8.3 Plant (carried from Dayworks Schedule)  1.3 PRIME COST SUMS  1.3.2 Upkeep and travel for Client's secondment staff  1.3.3 Upkeep and travel for Client's secondment staff  1.3.4 Upkeep and travel for the Resident and Assistant Resident Engineers- to revert to Employer - including provision of drivers for the duration of the contract  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land  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.  1.3.8 Supply of operation and maintenance tools and equipment for the Boreholes	1.2.8	PROVISIONAL SUMS				
1.2.8.3 Plant (carried from Dayworks Schedule)  1.3 PRIME COST SUMS  1.3.2 Upkeep and travel for Client's secondment staff  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  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as director by the Engineer.  Supply of operation and maintenance tools and equipment for the Boreholes	1.2.8.1	Labour (carried from Dayworks Schedule)	LS	1		
1.3.2 PRIME COST SUMS  1.3.2 Upkeep and travel for Client's secondment staff  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  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as director by the Engineer.  Supply of operation and maintenance tools and equipment for the Boreholes	1.2.8.2	Materials (carried from Dayworks Schedule)	LS	1		
1.3.2 Upkeep and travel for Client's secondment staff  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  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land  Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.9 Supply of operation and maintenance tools and equipment for the Boreholes	1.2.8.3	Plant (carried from Dayworks Schedule)	LS	1		
1.3.2 Upkeep and travel for Client's secondment staff  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  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land  Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.9 Supply of operation and maintenance tools and equipment for the Boreholes						
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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  Provide for insurance and maintenance and operation of the vehicles for the Engineer's staff during construction period (2 cars)  Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land  Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as director by the Engineer.  Supply of operation and maintenance tools and equipment for the Boreholes	1.3.2		LS	1	450,000	450.000
1.3.4 vehicles for the Engineer's staff during construction period (2 Month cars)  1.3.5 Provide computer equipment, digital camera, software etc. Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land LS Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as director by the Engineer.  1.3.9 Supply of operation and maintenance tools and equipment for the Boreholes		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		15,000,000
Reverts to Employer at end of Contract  Allow for profits and overheads on Prime Cost and Provisonal Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, % 1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land  Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as director by the Engineer.  1.3.9 Supply of operation and maintenance tools and equipment for the Boreholes	1.3.4	vehicles for the Engineer's staff during construction period (2 cars)		18	115,000	2,070,000
1.3.5a Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1, %  1.3.2,1.3.3, 1.3.4, 1.3.5, 1.3.11, 1.3.12 and 1.3.13)  1.3.6 Compensation and entry upon land  Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as director by the Engineer.  1.3.9 Supply of operation and maintenance tools and equipment for the Boreholes	1.3.5	Reverts to Employer at end of Contract		1	900,000	900,000
Investigations of existing and proposed off-take connections along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as director by the Engineer.  1.3.9 Supply of operation and maintenance tools and equipment for the Boreholes  1.3.1 LS 1	1.3.5a	Sums(1.2.1.1,1.2.1.2, 1.2.1.3, 1.2.1.4,1.2.5.3, 1.2.7.1,	%			
1.3.7 along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.  1.3.8 Investigations of internal repair works required for reseviors once emptied as director by the Engineer.  1.3.9 Supply of operation and maintenance tools and equipment for the Boreholes  1.3.1 LS 1	1.3.6			1		
emptied as director by the Engineer.  Supply of operation and maintenance tools and equipment for the Boreholes  LS 1  LS 1	1.3.7	along Marere line and Kaya Bombo pipeline location and depth as directed by Engineer.	LS	1		
Boreholes LS 1	1.3.8	emptied as director by the Engineer.	LS	1		
TOTAL PAGE 2	1.3.9	1 1 2 1	LS	1		
		TOTAL PAGE 2				









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	PS	1	720,000	720,000.00
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				





TEM	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.	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 m <sup>3</sup> 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	Proliminary and follow up examinations				
	Preliminary and follow-up examinations  Mobilization and demobilization of the CCTV vehicle including				
2.3.1	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	Mochanical and hydraulic are cleaning. December:				
2.4	Mechanical and hydraulic pre-cleaning - Desanding  Mobilization and demobilization of the desanding facility and				
2.4.1	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	m	40		
	partial sections of 3.0 m	1			
2.4.5	Suction of the sump pipe up to the base plate	LS	1		



ART 2	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	m	40		-
	respective section in order to prevent premature drifting in the substrate as described in the specifications.  Reaction time 45 minutes.				
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).	LS	1		-
	trigation outside of protection zones I and II or discharge into the sewage system. Disposal of any floculated oxide sludge together with other sludge from the waterworks in consultation with the client.				
2.6	Disinfection and well development				-
2.6.2	Performance of a well disinfection according to specifications	LS	1		-
2.6.3	Performance of a pumping test as describe in the specifications.	No	1		-
2.7	Documentation				
	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	No	4		
2.7.1	- 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		
				<b>I</b>	
	TOTAL CARRIED TO GRAND SUMMARY				



DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
Mobilization				
Mobilization/Demobilization of all necessary equipment and staff for proposed tasks to Mombasa/Tiwi	LS	1		
Field Work				
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		
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		
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) Item	Description	Unit	Qty	Rate(KES)	Amount(KES)
4.1	Mobilisation, Setting up & Demobilisation	Onne	Qty	naic(neo)	Amount(NEO)
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 including 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	m³	10		
4.3.7	Clay sealing, back fill and grouting	No	2		
4.3.8	Well development, according to specifications	hr	48		
4.3.9	Well disinfection, according to specifications	No	2		ĺ





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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				
	TOTAL CARRIED TO GRAND SUMMARY				





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

ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
<u>5.1.1</u>	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 m³/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 <sup>2</sup> /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	0.75mm² 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 mm²/2c pvc swa pvc copper cable	m	35		
5.1.1.11	Lay in trench/duct, connect and test 16 mm <sup>2</sup> /4c armoured copper cable	LM	35		
5.1.1.12	Copper cable gland c/w lock-nut and shroud for 16 mm <sup>2</sup> /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 <sup>2</sup> /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 <sup>2</sup> sc copper cable (green)	m	5		
	TOTAL PAGE 1			i	





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PART 5.1	- Electro-Mechanical Works & Pipeworks Borehole A (Si	te-Kep	olacem	ent)	1
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 16mm²/4c and 0.75 mm² sc submerssible cables.				
5.1.1.19		Nr.	1		
5.1.1.20	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr.	1		-
3.1.1.20	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=80m³/hr, Qnom=40m³/hr, Q <sub>T</sub> =8m³/hr and Qmin=1.2m³/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°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +0.25%<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 16mm²/4c 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)	рс	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 5.1.1.23q	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)  Stainless steel ferrules for 16 mm <sup>2</sup> cable	ROLL Nr.	4		+
0zog	New Mains Power Control Swichgear Panel and	INI.	4		
5.4.0	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		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				





RT 5.1	- Electro-Mechanical Works & Pipeworks Borehole A (Sit	te-Rep	olacem	ent)	
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				
5.1.2.14	wiregauze.  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		
		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		<u> </u>		
	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,	Ni	4		
5.1.2.20	GENERATOR LOAD ON etc).  32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid.	Nr	1		
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 <sup>2</sup> 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 <sup>2</sup> 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	Nr	4		
5.1.3.08	screws (ringmain circuit).  36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water tight (IP 20), metal body, corrossion resistant, power factor	INI	4		
	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 (Sit	te-Rei	olacem	ent)	
	Listing incommunity in the many transfer of the community (co.			l	
5.1.3.10	2.5 mm <sup>2</sup> 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		
5.1.3.12	AC/DC POWER SUPPLY	OL.	'		
5.1.3.12.01	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps continuosly rated converter fully protected (overload/short-circuit/reverse voltage and polarity etc c/w RJ45, RS232, RS485 ports, mcbs protected outputs to supply water meter, borehole water level measurement, rising main pressure measurement, PLC, Radio/Data Trans-Receiver Equipment.	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	2		
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 2-wire="" 4-20="" and="" ma="" output="" signal="" system.<="" td="" vdc=""><td>Nr</td><td>1</td><td></td><td></td></ucb<30>	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/cm² and Bar), range 0 - 20 Kg/cm² (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/cm² and Bar).Range (0 - 20 Kg/cm²)/(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	1		
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° C to +55°C,RS	Nr	1		
5.1.5.16	232 interface, TCP/IP protocol stack for M2M Supply and installation of 1.5mm² armoured underground cable for the well probe.	m	35		
	TOTAL PAGE 4		1	1	



E 4 C	Dracoura Dinac and Eittings			
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° 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	LO	'	
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	
		-111	<u> </u>	
	TOTAL PAGE 5			
	1			





ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount (KES
ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES
5.2.1	Electro-Mechanical Works				,
<u> </u>	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 <sup>3</sup> /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 <sup>2</sup> /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	0.75mm² 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 mm²/2c pvc swa pvc				
	copper cable (starter panel to borehole)	m	15		
5.2.1.12	Lay in trench/duct, connect and test 10 mm <sup>2</sup> /4c armoured copper		45		
5.2.1.13	cable  Copper cable gland c/w lock-nut and shroud for 16 mm²/4 core	m	15		
5.2.1.13	pvc swa pvc copper cable.	Nr	2		
5.2.1.14	Copper cable gland c/w lock-nut and shroud for 1.5 mm <sup>2</sup> /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 <sup>2</sup> /4c and 0.75 mm <sup>2</sup> 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	INI	<u> </u>		
	mm <sup>2</sup> /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 mm <sup>2</sup> 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 <sub>max</sub> =80m³/hr, Q <sub>nom</sub> =40m³/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	- <del></del>	•		



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°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL				
	NLHR>4mH2O, +0.25%<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 16mm²/4c cable, water level control electrodes cables and passage of OD25				
F 0 4 04h	mm pvc dipper pipe.	Nr	1		
5.2.1.21b	Boss white (200 gm tin)	рс	2		
5.2.1.21c	450 mm plastic cable tie	Nr	25		
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 <sup>2</sup> cable	Nr	4		
5.2.1.21h	Stainless steel ferrules for 0.75 mm <sup>2</sup> 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			i – –	
	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	LO			
J.L. 1.LLO	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< td=""><td></td><td></td><td></td><td></td></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 <sup>2</sup> and Bar), range 0 - 25 Kg/cm <sup>2</sup> (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		_		
- 0 4 00-	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 <sup>2</sup> and Bar).Range (0 - 30 Kg/cm <sup>2</sup> )/(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	141			
J	DN100 GS pipe.	Nr	1		
5.2.1.22i	Supply, installation, testing and commissioning of 24V DC Power			1	
	Supply Unit, 500VAC Equipped with one input fuse, 187 –				
	264 VAC, 47 to 63 Hz,0°C+45°C,≥ IP20.	Nr	1	ļ	
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-				
	programmable, min 2 digital inputs with frequency range 0- 16 Hz.	Nr	1		
	TOTAL PAGE 2			ļ	



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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M				
	•	Nr	1		
5.2.1.22	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° 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° 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		
5.2.1.23	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		
52.2.02	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.		2		
		m	3		





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				
5.2.3.1.02	Install 3 phase, 415 vac surge divertor c/w protective mcbs.	Item Nr	1		
5.2.3.1.03	Install 15 Kvar, 3 phase, 415 vac, 4 step automatic power				
5.2.3.1.04	capacitor correction bank.  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 <sup>2</sup> 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 <sup>2</sup> 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 <sup>2</sup> sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape.	m	3		
5.2.3.2.11	and main switchgear paner earth bornd tape.  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		
5.2.3.2.12	32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid, wired using 6 mm <sup>2</sup> sc copper cables in 32 mm diameter GS conduit.	No	1		
<b>5.2.4</b> 5.2.4.01	Fire Fighting Equipment 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		
5.2.5	AC/DC POWER SUPPLY				
5.2.5.01	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps continuosly rated converter fully protected (overload/short-circuit/reverse voltage and polarity etc c/w RJ45, RS232, RS485 ports, mcbs protected outputs to supply water meter, borehole water level measurement, rising main pressure measurement, PLC, Radio/Data Trans-Receiver Equipment.	SET	1		
	TOTAL PAGE 4				



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 40m³/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 <sup>2</sup> /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 <sup>2</sup> 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 mm²/2c 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 <sup>2</sup> /4c armoured copper cable	m	20		
5.3.1.1.12	Copper cable gland c/w lock-nut and shroud for 10 mm <sup>2</sup> /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 <sup>2</sup> /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 mm²/4c and 0.75 mm² 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 <sup>2</sup> /4c armoured copper cable, cable glands etc for connection from starter panel to main switch	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).		1		
	TOTAL PAGE 1				





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 <sub>max</sub> =80m <sup>3</sup> /hr, Q <sub>nom</sub> =40m <sup>3</sup> /hr,				
	Q <sub>T</sub> =8m <sup>3</sup> /hr and Q <sub>min</sub> =1.2m <sup>3</sup> /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°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL				
	NLHR>4mH2O, +0.25%<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 <sup>2</sup> /4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nie	1		
5.3.1.1.20b		Nr		-	
	Boss white (200 gm tin)	pc	2		
5.3.1.1.20c	500 mm plastic cable tie	Nr	35	<del>                                     </del>	
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 <sup>2</sup> cable	Nr	4		
5.3.1.1.20h	Stainless steel ferrules for 0.75 mm <sup>2</sup> 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.				
	which, product 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 <sup>2</sup> and Bar), range 0 - 25 Kg/cm <sup>2</sup> (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 <sup>2</sup> and Bar).Range (0 - 30 Kg/cm <sup>2</sup> )/(0 - 30 bar). It shall be				
	c/w all fitting accessories for connecting on ID8x3mm GS tube. It				
E04404	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	Nr	1		
5.3.1.1.21i	DN100 GS pipe.  Supply, installation, testing and commissioning of 24V DC Power	Nr	- 1	<del> </del>	
5.0.1.1.211	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				





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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.3.1.1.211	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° 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				
5.3.1.1.22d	DN100x1200 GS pipe piece (threaded at both ends)	Nr	1		
5.3.1.1.220 5.3.1.1.22e	DN100x300 GS pipe piece (threaded at both ends)	Nr	2		
	, , ,	Nr	1		
5.3.1.1.22f	DN75x90° 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		
5.3.1.1.22I 5.3.1.1.22m	DN100x250 mmL GS pipe piece	Nr	2		
5.3.1.1.22m	DN100x2000 mmL GS pipe piece.	Nr	3		
5.3.1.1.220	DN100 steel Johnson coupling c/w rubber rings. DN100x75 GS reducer.	Nr Nr	1		
5.3.1.1.22p	DN75 steel Johnson coupling c/w rubber rings.	Nr	1		
5.3.1.1.22p	DN75x250 mmL adaptor GS pipe piece,flanged one end and	INI	'		
J.J.1.1.22q	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				
3.3.1.2	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 necessary 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		





#### 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 Rate(KES) Amount(KES) QTY 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<sup>3</sup>/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 Overheads and profits on item 5.3.2.1.01 as specified for Prime 5.3.2.1.02 % Cost sum items 5.3.2.1.03 16 mm<sup>2</sup>/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 DN100 GS steam sockets Nr 13 5.3.2.1.07 DN100x300 mm long GS starter pipe Nr 1 5.3.2.1.09 0.75mm<sup>2</sup> sc double insulated copper cable( brown and black) 130 each 65 metres m 5.3.2.1.10 Lay in trench/duct, connect and test 1.5 mm<sup>2</sup>/2c pvc swa pvc copper cable (starter panel to borehole) m 45 Lay in trench/duct, connect and test 25 mm<sup>2</sup>/4c armoured 45 m copper cable 5.3.2.1.12 Copper cable gland c/w lock-nut and shroud for 25 mm<sup>2</sup>/4 core Nr 2 pvc swa pvc copper cable. Copper cable gland c/w lock-nut and shroud for 1.5 mm<sup>2</sup>/2 core Nr pvc swa pvc copper cable. Supply and install water-tight GS cable junction box of size 5.3.2.1.14 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<sup>2</sup>/4c and 0.75 mm<sup>2</sup> sc submerssible cable. Nr 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<sup>2</sup>/4c armoured copper cable, cable glands etc for SET connection from starter panel to main switchgear. 532116 Nr 1 DN38x150 mmL GS threaded pipe piece (cable entry) 5.3.2.1.17 Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm<sup>2</sup> of 70 m (to be determined after test SET pumping). Supply, installation, testing and commissioning of Electro Magnetic Flow Meter, DN80, Q<sub>max</sub>=80m<sup>3</sup>/hr, Q<sub>nom</sub>=40m<sup>3</sup>/hr, Q<sub>T</sub>=8m<sup>3</sup>/hr and Q<sub>min</sub>=1.2m<sup>3</sup>/hr, 2 battery power supply, IP 68,

Nr

RS232 and RS 485 outputs
TOTAL PAGE 4



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°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL				
	NLHR>4mH2O, +0.25%<4mH2O.	NI.	4		
5.3.2.1.20	Installation Sundries	Nr	1		
5.3.2.1.20a	ID220x4 mm Thick GS Borehole cap with welded DN100 GS				
J.J.Z.1.20a	pipe piece, welded DN38 GS slow bend for passage of				
	10mm <sup>2</sup> /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)	рс	2		
5.3.2.1.20c	550 mm plastic cable tie	Nr	30		
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 <sup>2</sup> cable	Nr	4		
5.3.2.1.20h	Stainless steel ferrules for 0.75 mm <sup>2</sup> 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				
5.3.2.1.21b	works as per the Specifications.	LS	1		
5.3.2.1.210	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				
5.3.2.1.21d	installations.  Supply, installation, testing and commissioning of Amplified	LS	11		
5.3.Z.1.Z1u	Pressure Transmitter with pressure range of 20 bar, over				
	pressure safety of 50 bar, from SS material, and power supply				
	10 <ucb<30 2-wire="" 4-20="" and="" ma="" output="" signal="" system.<="" td="" vdc=""><td>Nr</td><td>1</td><td></td><td></td></ucb<30>	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 <sup>2</sup> and Bar), range 0 - 30 Kg/cm <sup>2</sup> (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/cm² and Bar).Range (0 - 35 Kg/cm²)/(0 - 35 bar). It shall be				
	c/w all fitting accessories for connecting on ID8x3mm GS tube. It	١ ا			
5.3.2.1.21h	shall be c/w stainless steel isolation ball valve.  Single orifice cast steel air valve c/w accessories for mounting on	Nr	11	+	
J.J.Z. I.Z III	DN100 GS pipe.	Nr	1		
	TOTAL PAGE 5		•		







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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M				
		Nr	1		
5.3.2.1.211	Supply and installation of 1.5mm² armoured underground cable		4-		
500100	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				
5.3.2.1.22a	corresponding concrete works.  Disconnection, dismantling and disposal of old pipes, pipe				
5.3.2.1.22a		LS	1		
	fittings, valves, water meter.  Supply, delivery to Site, Install and Test:	LO	- '		
	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		
5.3.2.1.221	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				





] 3.3	.I BOREHOLE DZ				
ITEM	ITEM DESCRIPTION	UNIT	OTV	Dete(KEC)	A
ITEM	ITEM DESCRIPTION	UNII	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				
0.0.0.0	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 SW				
3.3.3	PANEL, ELECTRICAL WIRING OF		OLAIN		
	SWITCHGEAR/OFFICE/SANITATION BUILDING				
	AND FIRE FIGHTING EQUIPMENT				
5.3.3.1	AND THE TIGHT TO EXCHANGE				
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	lte	4		
5.3.3.1.02	and nuts Install 3 phase, 415 vac surge divertor c/w protective mcbs and	Item	1		
0.0.3.1.02	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 <sup>2</sup> single copper cables	m	230		
5.3.3.2.03	(Red=90 m, Black=70 m, Green =70 m).  Re-wire the sockets circuits using 2.5 mm² single copper cables	111	230		
0.0.0.2.00	(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	<b></b>			
	chamber.	Nr	1		
5.3.3.2.10	25 mm <sup>2</sup> sc copper cable laid trench and connected to earth rod		_		
5.3.3.2.11	and main switchgear panel earth bond tape.  32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w	m	3		
0.3.3.2.11	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	SET	1		
	wired (in GS conduit).	SEI	- 1		
5.3.4	Fire Fighting Equipment				
5.3.4.01	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w				
ĺ	pressure gauge wall mounting steel bracket , operating instructions and accessories, fully charged.	Nr	2		
5.3.5	AC/DC POWER SUPPLY	1.41			
2.0.0	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps				
	continuosly rated converter fully protected (overload/short-				
	circuit/reverse voltage and polarity etc c/w RJ45, RS232, RS485				
	ports, mcbs protected outputs to supply water meter, borehole				
	water level measurement, rising main pressure measurement, PLC, Radio/Data Trans-Receiver Equipment.				
	1 Lo, Naciordala Hans-Neceivel Equipment.	SET	1		
	TOTAL PAGE 7				
	t e e e e e e e e e e e e e e e e e e e				







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 <sup>3</sup> /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				
<i></i>	ground level, c/w cable guard.  Overheads and profits on item 5.4.1.2 as specified for Prime	nr	1		
5.4.1.3	Cost sum items	%			
5.4.1.4	10 mm²/4 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	0.75mm² 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 <sup>2</sup> /2c pvc swa pvc copper cable	m	20		
5.4.1.12	Lay in trench/duct, connect and test 10 mm <sup>2</sup> /4c armoured				
	copper cable	m	20		
5.4.1.13	Copper cable gland c/w lock-nut and shroud for 10m <sup>2</sup> /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 <sup>2</sup> /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	4		
5.4.1.17	D15x2.4 metre copper earth rod c/w clamp in a masonry	INI	1		
J. <del>4</del> .1.17	chamber.	Nr	1		
5.4.1.18	35 mm² sc copper cable (green)	m	5		
	TOTAL PAGE 1		-		





<u>ITEM</u>	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 <sup>2</sup> /4c and 0.75 mm <sup>2</sup> sc				
	submerssible cables.	Nr	1		
5.4.1.20	DN38x150 mmL GI threaded pipe piece (cable entry)	Nr	1		
	Supply and installation of Well Probe Sensor complete with				
	well probe cable of size 0.75 mm <sup>2</sup> of 70 m (to be determined after test pumping).				
5.4.1.22	arter test pumping).	SET	1		
5.4.1.22	Supply, installation, testing and commissioning of Electro				
	Magnetic Flow Meter, DN 80, Qmax=80m <sup>3</sup> /hr,				
	Qnom= $40\text{m}^3$ /hr, Q <sub>T</sub> = $8\text{m}^3$ /hr and Qmin= $1.2\text{m}^3$ /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°C, range from 1-100 mH2Og,				
	acuracy + 0.175% FS BSL NLHR>4mH2O, +0.25%<4mH2O.	Nr	1		
	INSTALLATION SUNDRIES				
	ID320x7 mm Thick GS Borehole cap with welded DN100 GS pipe piece, welded DN38 GS slow bend for passage of 10				
	mm <sup>2</sup> /4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.				
		Nr	1		
	Boss white (200 gm tin)	Pc	3		
	550 mm plastic cable tie 20 mm Wx9ML self bonding electrical tape (scotch 23)	Nr ROLL	35 2		
	12 mm Wx12 ML PTFE thread seal tape				
		ROLL	15		
	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
	Stainless steel ferrules for 10 mm <sup>2</sup> cable		4		
	•	Nr			
0.1.1.2 111	Stainless steel ferrules for 0.75 mm <sup>2</sup> 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		
	1xKPLC incommer Current transformers chamber	Nr	1		
5.4.2.3					
5.4.2.3 5.4.2.4	1xKPLC metering equipment chamber incommer Current transformers chamber	Nr	1		
5.4.2.3 5.4.2.4 5.4.2.5	transformers chamber  1x250 amps adjustable triple pole mccb (adjustable range:		1		
5.4.2.3 5.4.2.4 5.4.2.5	transformers chamber		1		



<u>ITEM</u>	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 <sub>CU</sub> =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 <sub>CU</sub> =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	NI.	4		
E 4 2 12	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,				
5 4 5 40	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	141			
	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	LM	44		
5.4.3.3	boxes with covers, other necessary accessories	LIVI	7**		
5.7.5.5	1.5 mm <sup>2</sup> 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 <sup>2</sup> 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				





<u>ITEM</u>	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES
5.4.3.6	13 amps, 240 vac, twin switched socket outlet (smc) as				
3.4.3.0	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	4.5 mm² single some connect cobles wired in 20 mm diameter				
	1.5 mm <sup>2</sup> 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).				
	ian terminais (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 <sup>2</sup> sc copper cable laid trench and connected to earth				
	rod and main switchgear panel earth bond tape	m	3		
F 4 2 42		m	3		
5.4.3.13	AC/DC POWER SUPPLY				
.4.3.13.0°	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps				
	continuosly rated converter fully protected (overload/short-				
	circuit/reverse voltage and polarity etc c/w RJ45, RS232,	SET	1		
5.4.4	Fire Fighting Equipment				
5.4.4.1	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w				
0	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	LO	'		
3.4.3.2	mounted 3 phase, 75 Kva,0.433 Kv/11 Kv ONAN transformer				
	for the site.	Nr	1		
5.4.5.3		- 111			
5.7.5.5	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		•		
5.4.5.6	electrical works that the contractor considers necessary to				
	complete works	LS	1		
5457	·				
5.4.5.7	Painting, varnishing and any other works necessary for				
5.4.5.7	Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new				
5.4.5.7	Painting, varnishing and any other works necessary for	LS	1		



<u>ITEM</u>	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 2-wire="" 4-20="" and="" ma="" output="" signal="" system.<="" td="" vdc=""><td>Nr</td><td>1</td><td></td><td></td></ucb<30>	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/cm² and Bar), range 0 - 20 Kg/cm² (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/cm² and Bar).Range (0 - 20 Kg/cm²)/(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.		1		
5.4.5.12	Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe	Nr	1		
5.4.5.13	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		
5.4.5.14	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				
<u> </u>	commands, -20° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
<b>5.4.5.16 5.4.6</b>	Supply and installation of 1.5mm² armoured underground cable for the well probe  Pressure Pipes and Fittings:	m	20		
5.4.0	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				



<u>ITEM</u>	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				
5.4.6.6	air valve. DN100x1500 mmL GS pipe piece.	Nr	1		
5.4.6.7	DN100x1500 mmL GS pipe piece.  DN100x250 mmL GS pipe piece, flanged on one side and	Nr	1		
5.4.6.7	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	INI			
0	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				-





	BOREHOLE G1				
ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.5.1	Electro-Mechanical Works:			11010(1120)	7 (1.120)
	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:			Γ	
5.5.1.02	Submersible pump set of capacity 48 m <sup>3</sup> /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	0/			
5.5.1.04	Cost sum items	%	F2		
5.5.1.05	16 mm <sup>2</sup> /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	0.75mm² sc double insulated copper cable( brown and black)	141	'		
0.0.1.10	each 45 metres	m	104		
5.5.1.11	Lay in trench/duct, connect and test 1.5 mm <sup>2</sup> /2c pvc swa pvc				
	copper cable	m	25		
5.5.1.12	Lay in trench/duct, connect and test 16 mm <sup>2</sup> /4c armoured		_		
	copper cable	m	25		
5.5.1.13	Copper cable gland c/w lock-nut and shroud for 16m <sup>2</sup> /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 <sup>2</sup> /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	INI	- 1	+	
0.0.1.17	Ichamber.	N.L.	_		
5.5.1.18		Nr	1	+	
ე.ე.1.18	35 mm <sup>2</sup> sc copper cable (green)	m	5		
	TOTAL PAGE 1				<del></del>





	BOREHOLE G1				
<u>ITEM</u>	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 16mm²/4c and 0.75 mm² 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 mm <sup>2</sup> 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°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +0.25%<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 mm²/4c 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)	рс	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 <sup>2</sup> cable	Nr	4		
5.5.1.24h	Stainless steel ferrules for 0.75 mm <sup>2</sup> 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		





	BOREHOLE G1				
ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
III E IVI		ONIT	Q I I	Nate(NLO)	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		
.5.1.25d	DN 100 mm, PN 16 bar Y-strainer	Nr	1		
.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		
.5.1.25g	DN100x250 mmL GS pipe piece, flanged on one side and plain at the opposite end.	Nr	3		
.5.1.25h	DN100x90° GS slow bend	Nr	2		
5.5.1.25i	DN100 GS socket theaded	Nr	4		
i.5.1.25j	DN100 GS equal Tee threaded	Nr	6		
.5.1.25k	DN100 GS hex nipple	Nr	4		
5.5.1.251	DN100 steel Johnson coupling c/w rubber rings.	Nr	3		
.5.1.25m	100mmWx5 mm thick rubber gasket	m	2		
.5.1.25n	DN100x1000 mmL GS pipe piece threaded both ends.	Nr	1		
.5.1.250	DN100x90° GS female threaded elbow.	Nr	2		
.5.1.25p	DN100x6000 mmL GS pipe piece threaaded both ends	Nr	1		
.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		
.5.1.25s	Any other accessories required for the system	LS	1		
5.5.2	Removal Of Old Items And Trenching	LO	'		
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		
5.5.2a	Other Electromechanical Works				
5.5.2a.01	Supply, installation, testing and commissioning of Amplified Pressure Transmitter with pressure range of 0 - 16 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 2-wire="" 4-20="" and="" ma="" output="" signal="" system.<="" td="" vdc=""><td>No.</td><td>1</td><td>_</td><td></td></ucb<30>	No.	1	_	
i.5.2a.02	ID8x3 mm Thick stainless steel tube c/w all necessary mounting fittings, bends etc enclosed in DN20 GS pipe for connection on GS rising main and laid in trenching/duct and connection on pressure switch, pressure transmitter, pressure gauge at the power supply control room.	LM	25		
.5.2a.03	Adjustable Pressure switch in IP54 metal enclosure, with dual				
	scale (Kg/cm² and Bar), range 0 - 20 Kg/cm² (0-20 Bar) connected to SS 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.	No.	1		
.5.2a.04	High quality pressure gauge with dual scale (Kg/cm <sup>2</sup> and				
	Bar).Range (0 - 20 Kg/cm <sup>2</sup> )/(0 - 20 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm SS tube. It shall be c/w stainless steel isolation ball valve.	No.	1		
.5.2a.05	Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe	No.	1		
.5.2a.06	Supply, installation, testing and commissioning of 24V DC	INU.	- 1		
	Power Supply Unit, 500VAC Equipped with one input fuse,187	l			





	BOREHOLE G1				
ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.5.2a.07	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	No.	1		
5.5.2a.08	Supply and installation of 1.5mm² armoured underground cable for the well probe.	LM	25		
	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:				
5.5.3.02	NOTE:				
5.5.3.02	Submersible pump set of capacity 48 m <sup>3</sup> /hr of water against a				
	total head of 125 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 50				
	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	INI	- '		
0.0.0.00	Cost sum items	%	0.05		
5.5.3.04	16 mm²/4 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 <sup>2</sup> 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 <sup>2</sup> /2c pvc swa pvc				
	copper cable	m	45		
5.5.3.12	Lay in trench/duct, connect and test 16 mm <sup>2</sup> /4c armoured				
	copper cable	m	45		
5.5.3.13	Copper cable gland c/w lock-nut and shroud for				
	16 m <sup>2</sup> /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 <sup>2</sup> /2	l	_		
	core pvc swa pvc copper cable	Nr	2		
5.5.3.15	22 Kw, 3 phase, 415 vac, soft starter panel including integral	SET	1		
5.5.3.16	3 phase surge arrestor unit.  Masory earth rod chamber of internal size 250x250 x300 mmH		- 1		
5.5.5.10	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	- · • ·	<u> </u>		
	chamber.	Nr	1		
5.5.3.18	35 mm <sup>2</sup> sc copper cable (green)	m	5		
	TOTAL PAGE 4				





	BOREHOLE G1				
<u>ITEM</u>	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 <sup>2</sup> /4c and 0.75 mm <sup>2</sup> sc				
<i></i>	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 mm <sup>2</sup> 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 <sup>3</sup> /hr, Qnom=40m <sup>3</sup> /hr,				
	Q <sub>T</sub> =8m <sup>3</sup> /hr and Qmin=1.2m <sup>3</sup> /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°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL				
	NLHR>4mH2O, +0.25%<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 <sup>2</sup> /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)		3		
5.5.3.24c	550 mm plastic cable tie	pc 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 (scotch 23)	ROLL	15		
5.5.3.24f	20 mm high quality electrical pvc tape (Red, Yellow, Blue,	KULL	10		
3.3.3.241		ROLL	4		
5.5.3.24g	Black)		4		
	Stainless steel ferrules for 16 mm <sup>2</sup> cable	Nr	4		
5.5.3.24h	Stainless steel ferrules for 0.75 mm <sup>2</sup> 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	NI	4		
5.5.3.25f	for mounting an air valve.  DN100x200 mmL GS adaptable pipe piece threaded both	Nr	1	<del>                                     </del>	
0.0.0.201	lends.	Nr	1		
5.5.3.25g	DN100x250 mmL GS pipe piece, flanged on one side and				
· ·	plain at the opposite end.	Nr	3	ļ <u> </u>	
5.5.3.25h	DN100x90° 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		
5.5.3.251	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		
5.5.3.250	DN100x90° GS female threaded elbow.	Nr	2		



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





	BOREHOLE G1				
<u>ITEM</u>	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				
5.5.4.02	away, dispose excess as advised.  Break existing RC pipe support block.	m No	40		
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.	No 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 mm² 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 mm² 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		
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				
5.5.5.1.07	steel screws (ringmain circuit). 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 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 <sup>2</sup> 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 <sup>2</sup> sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape	m	3		
5.5.5.1.12	32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid, wired using 6 mm <sup>2</sup> sc copper cables in 32 mm diameter GS conduit.  AC/DC POWER SUPPLY		1		





	BOREHOLE G1				
ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
.5.5.1.13.01	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps continuosly rated converter fully protected (overload/short-circuit/reverse voltage and polarity etc c/w RJ45, RS232, RS485 ports, mcbs protected outputs to supply water meter, borehole water level measurement, rising main pressure measurement, PLC, Radio/Data Trans-Receiver Equipment.	SET	1		
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	set	2		
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				





	BOREHOLE G1				
<u>ITEM</u>	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
.5.7.03	Testing and commissioning of the incoming electricity supply and Main Low Voltage Switchboard	LS	1		
.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		
.5.7.05	Allow for all the builders works associated with all the electrical works that the contractor considers necessary to				
.5.7.06	Complete works Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new	LS	1		
.5.7.07	electrical installations  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 2-wire="" 4-20="" and="" ma="" output="" signal="" system.<="" td="" vdc=""><td>LS Nr</td><td>1</td><td></td><td></td></ucb<30>	LS Nr	1		
.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				
.5.7.09	room.  Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm² and Bar), range 0 - 20 Kg/cm² (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.		45		
.5.7.10	High quality pressure gauge with dual scale (Kg/cm <sup>2</sup> and Bar).Range (0 - 20 Kg/cm <sup>2</sup> )/(0 - 20 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It	Nr	1		
.5.7.11	shall be c/w stainless steel isolation ball valve.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe	Nr Nr	1		
.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		
.5.7.13	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	Nr	1		
.5.7.14	Hz Supply and installation of 1.5mm² armoured underground cable for the well probe	m	45		



STTA for Coast Water Works Development Agency for the Launching of the "Improvement of Drinking Water and Sanitation Systems in Mombasa - Mwache Project"
CWSB/AFD/W1/2019
Bill of Quantity



PART 5.5	- Electro-Mechanical Works & Pipeworks	Borehole G1,	G2 (Si	te-Repairs)	
	BOREHOLE G1				
ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
Total Pag		1 0		Trato(Traco)	7 anount (TEO)
TOTAL	BHs G1 & G2:- CARRIED TO BILLL 5 SUM	MARY SHEET			





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

### 5.6.1 Tiwi Borehole No. 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 Gl drop pipes.   LS   1	ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
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 Gl drop pipes.  SUPPLY, DELIVER TO SITE, INSTALL AND TEST:  5.6.1.2 Submersible pump set of capacity 50 m³/hr of water against a total head of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres of 125 metr	5.6.1	Electro-Mechanical Works:				
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 Gl drop pipes.  SUPPLY, DELIVER TO SITE, INSTALL AND TEST:  5.6.1.2 Submersible pump set of capacity 50 m³/hr of water against a total head of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres of 125 metr						
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 Gl drop pipes.  SUPPLY, DELIVER TO SITE, INSTALL AND TEST:  5.6.1.2 Submersible pump set of capacity 50 m³/hr of water against a total head of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres directly coupled to 3 phase, 415 vac motor, with pump of 125 metres of 125 metr		Items below are given for assumed pump capacity, final specifications (e.g.				
5.6.1.1 Remove pump set and 70 metres of DN100 GI drop pipes.  SUPPLY, DELIVER TO SITE, INSTALL AND TEST:  5.6.1.2 Submersible pump set of capacity 50 m³/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.  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 mm²/d core submersible pump flat cable m 75  5.6.1.5 DN8x120 mmL stainless steel water level control electrodes. Pair 1  5.6.1.6 C025 class D uPVC dipper pipe m 75  5.6.1.7 DN100 GI class C threaded water pipe. m 75  5.6.1.9 DN70S/300 mm long GI starter pipe  5.6.1.10 NN100X75 GI reducer (female threaded)  5.6.1.11 0,75mm² sc double insulated copper cable (brown and black) each 75 metres  5.6.1.12 Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable  5.6.1.13 Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable  5.6.1.15 Copper cable gland c/w lock-nut and shroud for 16 mm²/4c armoured copper cable  5.6.1.16 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2 core pvc swa pvc copper cable.  5.6.1.19 Masony earth rod chamber of internal size 250x250 x300 mmH extending 50 mm above the ground. It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks class the minal be constructed from 150x150x450 mmL masony blocks class the minal blocks mounted on the plate, tough rubber cable grommets for 16mm²/4c and 0.75 mm² sc submersible cables.  Nr 1  5.6.1.20 D						
SUPPLY, DELIVER TO SITE, INSTALL AND TEST:  5.6.1.2 Submersible pump set of capacity 50 m³/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.  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 nm²/4 core submersible pump flat cable m 75  5.6.1.5 Doks120 mml. statisliess steel water level control electrodes. Pair 1  5.6.1.6 0D25 class D uPVC dipper pipe m 75  5.6.1.7 DN100 GI class C threaded water pipe. m 75  5.6.1.9 DN100 GI steam sockets Nr 17  5.6.1.10 DN100XF3 Gireaded water pipe. Nr 17  5.6.1.10 Nin00XF3 Gireaded water pipe. Nr 17  5.6.1.11 O.75mm² sc double insulated copper cable (brown and black) each 75  metres  5.6.1.12 Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable m 30  5.6.1.14 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2 core pvc swa pvc copper cable. Nr 2  5.6.1.15 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2 core pvc swa pvc copper cable surge arrestor unit.  5.6.1.16 Valve arrestory of the provided from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be cov 75 mm thick perforated cover (1.24). Nr 1  5.6.1.19 35 mm² sc copper cable (green)  5.6.1.20 Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm those determined blocks mounted on the plate, tough rubber cable grommets for 16mm²/4c and 0.75 mm² sc submersible cables. Nr 1  5.6.1.21 DN38x150 mmL gli 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 mm² of 70 m (to be determined after test pumping). SET 1		depths and have to be identified by the contractor after test pumping				
SUPPLY, DELIVER TO SITE, INSTALL AND TEST:  5.6.1.2 Submersible pump set of capacity 50 m³/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.  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 nm²/4 core submersible pump flat cable m 75  5.6.1.5 Doks120 mml. statisliess steel water level control electrodes. Pair 1  5.6.1.6 0D25 class D uPVC dipper pipe m 75  5.6.1.7 DN100 GI class C threaded water pipe. m 75  5.6.1.9 DN100 GI steam sockets Nr 17  5.6.1.10 DN100XF3 Gireaded water pipe. Nr 17  5.6.1.10 Nin00XF3 Gireaded water pipe. Nr 17  5.6.1.11 O.75mm² sc double insulated copper cable (brown and black) each 75  metres  5.6.1.12 Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable m 30  5.6.1.14 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2 core pvc swa pvc copper cable. Nr 2  5.6.1.15 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2 core pvc swa pvc copper cable surge arrestor unit.  5.6.1.16 Valve arrestory of the provided from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be constructed from 150x150x450 mmL masony blocks (1.36). It shall be cov 75 mm thick perforated cover (1.24). Nr 1  5.6.1.19 35 mm² sc copper cable (green)  5.6.1.20 Supply and installation of Well Probe Sensor complete with well probe cable of size 0.75 mm those determined blocks mounted on the plate, tough rubber cable grommets for 16mm²/4c and 0.75 mm² sc submersible cables. Nr 1  5.6.1.21 DN38x150 mmL gli 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 mm² of 70 m (to be determined after test pumping). SET 1						
Supply   Submersible pump set of capacity 50 m²/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	5.6.1.1	Remove pump set and 70 metres of DN100 GI drop pipes.	LS	1		
125 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 770 metres below ground level.  5.6.1.3 Overheads and profits on item 5.6.1.2 as specified for Prime Cost sum letms.  5.6.1.4 If mm²/4 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 DN6x120 mmL stainless steel water level control electrodes. Pair 1  5.6.1.7 DN100 Gl class C threaded water pipe. m 75  5.6.1.9 DN100 Gl steam sockets Nr 17  5.6.1.10 DN100 Gr class C threaded water pipe. Nr 1  5.6.1.10 DN100 Gr class C threaded water pipe. Nr 1  5.6.1.11 DN100 Gr class C threaded water pipe. Nr 1  5.6.1.12 Lay in trench/duct, clemate threaded) Nr 1  5.6.1.13 Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable m 30  5.6.1.13 Lay in trench/duct, connect and test 1.5 mm²/4c armoured copper cable m 30  5.6.1.14 Copper cable gland c/w lock-nut and shroud for 16 mm²/4 core pvc swa pvc copper cable surge arrestor unit.  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 constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL ma		SUPPLY, DELIVER TO SITE, INSTALL AND TEST:				
125 metres directly coupled to 3 phase, 415 vac motor, with pump suction inlet at 770 metres below ground level.  5.6.1.3 Overheads and profits on item 5.6.1.2 as specified for Prime Cost sum letms.  5.6.1.4 If mm²/4 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 DN6x120 mmL stainless steel water level control electrodes. Pair 1  5.6.1.7 DN100 Gl class C threaded water pipe. m 75  5.6.1.9 DN100 Gl steam sockets Nr 17  5.6.1.10 DN100 Gr class C threaded water pipe. Nr 1  5.6.1.10 DN100 Gr class C threaded water pipe. Nr 1  5.6.1.11 DN100 Gr class C threaded water pipe. Nr 1  5.6.1.12 Lay in trench/duct, clemate threaded) Nr 1  5.6.1.13 Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable m 30  5.6.1.13 Lay in trench/duct, connect and test 1.5 mm²/4c armoured copper cable m 30  5.6.1.14 Copper cable gland c/w lock-nut and shroud for 16 mm²/4 core pvc swa pvc copper cable surge arrestor unit.  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 constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL ma	5.6.1.2	Submersible pump set of capacity 50 m <sup>3</sup> /hr of water against a total head of			•	
suction inlet at 70 metres below ground level.  5.6.1.3 Overheads and profits on item 5.6.1.2 as specified for Prime Cost sum litems  5.6.1.4 16 mm²/4 core submersible pump flat cable m 75  5.6.1.5 0N6x120 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 0N100 GL class C threaded water pipe. m 72  5.6.1.8 DN100 GL class C threaded water pipe. m 72  5.6.1.9 DN5x300 mm long GI starter pipe Nr 1  5.6.1.10 NN100xF3 of Teduber (female threaded)  5.6.1.11 0.75mm² sc double insulated copper cable (brown and black) each 75 m 150  metres metres  5.6.1.12 Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable  5.6.1.13 Lay in trench/duct, connect and test 1.6 mm²/4c armoured copper cable m 30  5.6.1.14 Copper cable gland c/w lock-nut and shroud for 16 mm²/4 core pvc swa pvc copper cable.  5.6.1.15 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2c ore pvc swa pvc copper cable.  5.6.1.16 22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.  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 constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3.6). It shall be constructed from 150x150x450 mmL						
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5.6.1.7 DN100 GI class C threaded water pipe.  5.6.1.8 DN100 GI steam sockets  5.6.1.9 DN100 GI steam sockets  Nr 17  5.6.1.9 DN750300 mm long GI starter pipe  Nr 1  5.6.1.10 DN100X75 GI reducer (female threaded)  5.6.1.11 DN100X75 GI reducer (female threaded)  5.6.1.12 Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable  Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable  5.6.1.13 Lay in trench/duct, connect and test 1.6 mm²/4c armoured copper cable  5.6.1.14 Copper cable gland c/w lock-nut and shroud for 16 mm²/4 core pvc swa pvc copper cable.  5.6.1.15 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2c ore pvc swa pvc copper cable.  5.6.1.16 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2c ore pvc swa pvc copper cable.  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 cov 75 mm thick perforated cover (1:2:4).  5.6.1.18 D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.  5.6.1.19 35 mm² sc copper cable (green)  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 16mm²/4c and 0.75 mm² sc submerssible cables.  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 mm² of 70 m (to be determined after test pumping).	5.6.1.5		Pair			
5.6.1.8 DN100 GI steam sockets 5.6.1.9 DN75x300 mm long GI starter pipe 5.6.1.10 DN75x300 mm long GI starter pipe 5.6.1.11 0.75mm² sc double insulated copper cable( brown and black) each 75 metres 5.6.1.12 Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable m 30 5.6.1.13 Lay in trench/duct, connect and test 1.6 mm²/4c armoured copper cable m 30 5.6.1.14 Copper cable gland c/w lock-nut and shroud for 16 mm²/4 core pvc swa pvc copper cable Selection for the surge of the surge						
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5.6.1.10 DN100x75 GI reducer (female threaded) 5.6.1.11 0.75mm² sc double insulated copper cable( brown and black) each 75 metres  5.6.1.12 Lay in trench/duct, connect and test 1.5 mm²/2c pvc swa pvc copper cable  5.6.1.13 Lay in trench/duct, connect and test 1.6 mm²/4c armoured copper cable  5.6.1.14 Copper cable gland c/w lock-nut and shroud for 16 mm²/4c ore pvc swa pvc copper cable.  5.6.1.15 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2 core pvc swa pvc copper cable.  5.6.1.16 22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.  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 constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 mmL masonry blocks (1:3:6). It shall be constructed from 150x150x450 m						
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Lay in trench/duct, connect and test 16 mm²/4c armoured copper cable m 30  5.6.1.14 Copper cable gland c/w lock-nut and shroud for 16 mm²/4 core pvc swa pvc copper cable.  5.6.1.15 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2 core pvc swa pvc copper cable pvc copper cable  5.5.1.16 22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.  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).  5.6.1.18 D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.  5.6.1.19 35 mm² sc copper cable (green)  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 16mm²/4c and 0.75 mm² sc submerssible cables.  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 mm² of 70 m (to be determined after test pumping).		Lay in trench/duct, connect and test 1.5 mm <sup>2</sup> /2c pvc swa pvc copper cable	m	30		
copper cable.  5.6.1.15 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2 core pvc swa pvc copper cable gland c/w lock-nut and shroud for 1.5 mm²/2 core pvc swa pvc copper cable  5.5.1.16 22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.  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).  5.6.1.18 D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.  5.6.1.19 35 mm² sc copper cable (green)  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 16mm²/4c and 0.75 mm² 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 mm² of 70 m (to be determined after test pumping).	5.6.1.13	Lay in trench/duct, connect and test 16 mm²/4c armoured copper cable	m	30		
5.6.1.15 Copper cable gland c/w lock-nut and shroud for 1.5 mm²/2 core pvc swa pvc copper cable  5.5.1.16 22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.  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  5.6.1.18 D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.  5.6.1.19 35 mm² sc copper cable (green)  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 16mm²/4c and 0.75 mm² sc submerssible cables.  Nr  1 DN38x150 mmL GI threaded pipe piece (cable entry)  Nr  1 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	5.6.1.14		Nr	2		
pvc copper cable  5.5.1.16  22 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.  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).  5.6.1.18  D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.  5.6.1.19  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 16mm²/4c and 0.75 mm² sc submerssible cables.  Nr  1  5.6.1.21  DN38x150 mmL GI threaded pipe piece (cable entry)  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	5.6.1.15					
surge arrestor unit.  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).  5.6.1.18 D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.  5.6.1.19 35 mm² sc copper cable (green)  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 16mm²/4c and 0.75 mm² sc submerssible cables.  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 mm² of 70 m (to be determined after test pumping).			Nr	2		
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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).  5.6.1.18 D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.  5.6.1.19 35 mm² sc copper cable (green)  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 16mm²/4c and 0.75 mm² 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 mm² of 70 m (to be determined after test pumping).			SET	1		
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	56117	1	OL1			
masonry blocks (1.3:6). It shall be c/w 75 mm thick perforated cover (1:2:4).  5.6.1.18 D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.  Nr 1  5.6.1.19 35 mm² sc copper cable (green) m 5  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 16mm²/4c and 0.75 mm² sc submerssible cables.  Nr 1  5.6.1.21 DN38x150 mmL GI threaded pipe piece (cable entry)  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	0.0					
5.6.1.18 D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.  5.6.1.19 35 mm² sc copper cable (green)  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 16mm²/4c and 0.75 mm² 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 mm² of 70 m (to be determined after test pumping).						
5.6.1.9 35 mm² 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 16mm²/4c and 0.75 mm² sc submerssible cables.  Nr 1  5.6.1.21 DN38x150 mmL GI threaded pipe piece (cable entry)  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		masonry blocks (1:3:6). It shall be c/w 75 mm thick periorated cover (1:2:4).		1		
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 16mm²/4c and 0.75 mm² sc submerssible cables.  Nr 1  5.6.1.21 DN38x150 mmL GI threaded pipe piece (cable entry)  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						
Supply and install water-tight GS cable junction box of size 125x125x9Umm 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 16mm²/4c and 0.75 mm² sc submerssible cables.  Nr 1  5.6.1.21 DN38x150 mmL GI threaded pipe piece (cable entry)  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		35 mm <sup>2</sup> sc copper cable (green)	m	5		
5.6.1.21 DN38x150 mmL GI threaded pipe piece (cable entry)  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	5.6.1.20	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				
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 mm² of 70 m (to be determined after test pumping).  SET 1		cable grommets for 16mm <sup>2</sup> /4c and 0.75 mm <sup>2</sup> sc submerssible cables.	Nr	1		
cable of size 0.75 mm² of 70 m (to be determined after test pumping).		DN38x150 mmL GI threaded pipe piece (cable entry)				
	5.6.1.22		SET	1		
		TOTAL PAGE 1	021			





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5.6.1.23					
3.0.1.23	Supply, installation, testing and commissioning of Electro Magnetic Flow				
	Meter, DN 80, Qmax=80m <sup>3</sup> /hr, Qnom=40m <sup>3</sup> /hr, Q <sub>T</sub> =8m <sup>3</sup> /hr and				
	Qmin=1.2m <sup>3</sup> /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°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O,				
	1-100 HinzOg, actiacy + 0.175% F3 B3L NERR>4HinzO,				
		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 <sup>2</sup> /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 mm² cable	Nr	4		
	Starriess steer retruies for 10 mm cable	IVI	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 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		
5.6.2.2	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				
5005	chamber	Nr	1		
5.6.2.5	1x250 amps adjustable triple pole mccb (adjustable range: 0.7l <sub>N</sub> , 0.8l <sub>N</sub> ,				
	$0.9I_N$ , $1.0I_N$ set at $0.8I_N$ where $I_N$ = rated current of mccb = 250 amps).	Nr	1		
5.6.2.6		INI	- 1		
0.0.2.0	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 <sub>CII</sub> =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 <sub>CU</sub> =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	NIE	4		
5.6.2.12	mccb terminals.  2x100 amps,1phase, 240 vac class "A" mcbs (staff houses)	Nr	1		
5.6.2.13		Nr	-	1	1
0.0.2.10	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.				
	proof, dust-proof stainless steel protection DT.3 mm wheyauze.	Nr	1		
	TOTAL PAGE 2	L		<u> </u>	





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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.					
5.0.0.40	400 sees Course Ambass 040 cas DIN distribution beauty story 0 No. 40	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					
5.0.0.04	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		02.	·			
	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 <sup>2</sup> single copper cables (Red=80		100			
5.6.3.3	m, Black=50 m , Green =50 m).  Re-wire the sockets circuits using 2.5 mm <sup>2</sup> single copper cables	m	180			
5.6.3.3	Re-wire the sockets circuits using 2.5 mm <sup>-</sup> single copper capies  (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		100			
0.0.0.	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 <sup>2</sup> single core copper cables wired in 20 mm diameter pvc conduit	141	- 1			
0.0.0.10	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).					
5.0.0.40		set	1			
5.6.3.12	35 mm <sup>2</sup> sc copper cable laid trench and connected to earth rod and main	Nr	3			
5.6.3.13	switchgear panel earth bond tape  AC/DC POWER SUPPLY	141	3			
0.0.0.10	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps continuosly rated					
3.0.0.10.01	converter fully protected (overload/short-circuit/reverse voltage and polarity					
	etc) c/w RJ45, RS232, RS485 ports, mcbs protected outputs to supply					
	water meter, borehole water level measurement, rising main pressure					
	measurement, PLC, Radio/Data Trans-Receiver Equipment.	0==				
50041	FIDE FIGURING FOUNDMENT	SET	1			
5.6.3.14	FIRE FIGHTING EQUIPMENT					
5.6.3.14.01	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 3					
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Section   MoDification   Section						
MODIFICATION OF EXISTING BOREOLE No. 1. STARTER PANNEL  5.6.4.1 Fix 3 phase, 415 vac surge divertor o'w protective mobs on incomer mode terminals (reminals)  8.6.4.2 Rewire nearly and label the starter panel.  8.5.5 Defects Electro-Mechanical Works  1.5.6.5.1 Improve lightning protection system  5.6.5.1 Improve lightning protection system  5.6.5.2 Supply, installation, testing and commissioning of pole mounted 3 phase, 75 Kva.0.433 K/v/11 Kvo NNAN transformer for the site.  8.6.5.3 Disconnection and handing over to the Employer the entire existing electrical installations  5.6.5.4 Testing and commissioning of the incoming electricity supply and Main Low Voltage Switchboard  5.6.5.5 Pagnation of all design technical and working drawings for the works for appropriation of all design technical and working drawings for the works for appropriation of all design technical and working drawings for the works for appropriation of all design technical and working drawings for the works for appropriation of all design technical and working drawings for the works for appropriation of all design technical and working drawings for the works for appropriation of all design technical and working drawings for the works for appropriation of all design technical and working drawings for the works for appropriation of all design technical and working drawings for the works for appropriation of all design technical and working drawings for the works for appropriation of all design technical and working drawings for the works that the contractor considers necessary to complete works  5.6.5.5 Painting, varnishing and any other works necessary for making good all the district of a surface of the surface of the drawing drawing and all drawing drawing and any other works necessary for making good all the district of a surface of the surface of t						
terminals   Nr   1	5.6.4	MODIFICATION OF EXISTING BOREOLE No. 1 STARTER PANNEL				
5.6.5.0 Other Electro-Mechanical Works  5.6.5.1 Improve lightning protection system  5.6.5.1 Improve lightning protection system  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.  5.6.5.3 Disconnection and handing over to the Employer the entire existing electrical installations  5.6.5.4 Testing and commissioning of the incoming electricity supply and Main Low deterrical installations  5.6.5.5 Testing and commissioning of the incoming electricity supply and Main Low deterrical installations  5.6.5.5 Testing and commissioning of the incoming electricity supply and Main Low deterrical installation of works as per the specifications.  5.6.5.6 Allow for all the builders works associated with all the electrical works for sprotection of all developing to commencement of installation of works as per the specifications.  5.6.5.6 Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works  5.6.5.7 Parting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations  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-LCR-20 VDC and signal output 4-20 m.A 2-wire system.  5.6.5.9 Installation (SS bube clw all necessary mounting fittings, bends et enclosed in DN15 Gl pipe for connection on Gl rising main and laid in trenchingduct and connection on pressure switch, pressure gauge at the power supply control room.  7.6.5.5.10 Adjustable Pressure switch in IPS4 metal enclosure, with dual scale (Kg/cm² and Bar), range 0 - 20 Kg/cm² (0-20 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket. It shall have integral 2NO-2NC axillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  7.6.5.5.11 High quality pressure gauge - IPS4	5.6.4.1		Nr	1		
S.6.5.1 Improve lightning protection system  S.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  S.6.5.3 Disconnection and handing over to the Employer the entire existing electrical installations  Testing and commissioning of the incoming electricity supply and Main Low Uses of the site.  Testing and commissioning of the incoming electricity supply and Main Low Uses.  Testing and commissioning of the incoming electricity supply and Main Low Uses.  Testing and commissioning of the incoming electricity supply and Main Low Uses.  Testing and commissioning of the incoming electricity supply and Main Low Uses.  Testing and commissioning of the incoming electricity supply and Main Low Uses.  Testing and commissioning of the incoming electricity supply and Main Low Uses.  Testing and commissioning of the incoming electricity supply and Main Low Uses.  Testing and the supply incoming electricity supply and Main Low Uses.  Testing and commissioning of the incoming electricity supply and Main Low Uses.  Testing and the supply incoming electricity supply and Main Low Uses.  Testing and any other works associated with all the electrical works that the contractor considers necessary to complete works.  Testing and any other works associated with all the electrical works that the contractor considers necessary to complete works.  Supply, installation, testing and commissioning of Amplified Pressure Testing and town and the properties of the properties of the properties and the properties	5.6.4.2					
Supply, installation, testing and commissioning of pole mounted 3 phase, 75 Kv.a. 0.433 Kv/11 Kv ONAN transformer for the site.  5.6.5.3 Disconnection and handring over to the Employer the entire existing dectrical installations  6.6.5.4 Testing and commissioning of the incoming electricity supply and Main Low Voltage Switchboard.  7.6.5.5 Preparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.  5.6.5.6 Painting, varnishing and any other works mecessary for making good all the contractor considers necessary to complete works.  5.6.5.7 Painting, varnishing and any other works necessary for making good all the contractor considers necessary to complete works.  5.6.5.7 Painting, varnishing and any other works necessary for making good all the contractor considers necessary to complete works.  5.6.5.7 Painting, varnishing and any other works necessary for making good all the contractor considers necessary to complete works.  5.6.5.7 Painting, varnishing and any other works necessary for making good all the contractor considers necessary to complete works.  5.6.5.7 Painting, varnishing and any other works necessary for making good all the contractor considers necessary to complete works.  5.6.5.7 Painting, varnishing and any other works necessary for making good all the contractor considers are result of the new electrical installations.  5.6.5.8 Supply, installation, testing and commissioning of Amplified Pressure 1 to 2 to	5.6.5	Other Electro-Mechanical Works				
Supply, installation, testing and commissioning of pole mounted 3 phase, 75 Kva, 0.433 Kv11 Kv ONAN transformer for the issue.  5.6.5.3 Disconnection and handing over to the Employer the entire existing electrical installations with the commissioning of the incoming electricity supply and Main Low Voltage Switchboard Voltage	5.6.5.1	Improve lightning protection system	LS	1		
Disconnection and handing over to the Employer the entire existing electrical installations   LS   1	5.6.5.2					
electrical installations  5.6.5.4 Testing and commissioning of the incoming electricity supply and Main Low Voltage Switchboard  5.6.5.5 Perparation of all design technical and working drawings for the works for approval prior to commencement of installation of works as per the Specifications.  5.6.5.6.6 Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works  5.6.5.7 Painting, vamishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations  5.6.5.8 Tansmitter 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.  5.6.5.9 IDSx3 mm Thick GS tube of wall 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.  5.6.5.10 Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm² and Bar), range 0 - 20 Kg/cm² (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.  6.6.5.11 High quality pressure gauge - IP54 (indoor mounting), with dual scale (Kg/cm² and Bar), Range (0 - 20 Kg/cm²)/(0 - 20 bar). It shall be c/w stainless steel isolation ball valve.  7.6.5.12 Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe  7.6.5.13 Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe  7.6.5.14 Supply, installation and testing of flout / Output interface module (I/O), min. A harding inputs of the control of the con	5653	'	Nr	1		
Voltage Switchboard  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.  5.6.5.6. Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works  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  5.6.5.8 Painting, varnishing and ony other works necessary for making good all the disturbed areas as a result of the new electrical installations  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.  10.6.5.9 ID8x3 mm Thick GS tube of wall necessary mounting fittings, bends etc in trenching/duct and connection on pressure switch, pressure gauge at the power supply control room.  5.6.5.10 Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm² and Bar), range 0 - 20 Kg/cm² (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.  5.6.5.11 High quality pressure gauge - IP54 (indoor mounting), with dual scale (Kg/cm² and Bar), Range (0 - 20 Kg/cm² )(0 - 20 Bar). It shall be c/w stainless steel isolation ball valve.  5.6.5.12 Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe  5.6.5.13 Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse, 187 – 264 VAC, 47 to 63 Hz. Cyc		electrical installations	LS	1		
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S.6.5.6   Allow for all the builders works associated with all the electrical works that the contractor considers necessary to complete works	5.6.5.5	approval prior to commencement of installation of works as per the	LS	1		
5.6.5.1 Painting, varnishing and any other works necessary for making good all the disturbed areas as a result of the new electrical installations  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.  1.08x3 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.  5.6.5.10 Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm² and Bar), range 0 - 20 Kg/cm² (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.  5.6.5.11 High quality pressure gauge - IP54 (indoor mounting), with dual scale (Kg/cm² and Bar), Range (0 - 20 Kg/cm²)/(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.  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.  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  5.6.5.15 Supply, installation and testing of Class 10 GPRS Modern, Dual-Band E-GS MCPRS 9000 800 MHz, GPRS multi-slot class 10, 1 We 900 00 MHz, 1We 10 10 10 10 10 10 10 10 10 10 10 10 10	5.6.5.6	Allow for all the builders works associated with all the electrical works that	10	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-L/CB-30 VDC and signal output 4-20 mA 2-wire system.  5.6.5.9 IDN3 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.  5.6.5.10 Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm² and Bar), range 0 - 20 Kg/cm² (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.  5.6.5.11 High quality pressure gauge - IP54 (indoor mounting), with dual scale (Kg/cm² and Bar), Range (0 - 20 Kg/cm²)/(0 - 20 bar). It shall be c/w stainless steel isolation ball valve.  5.6.5.12 Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe  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, °C+45°Cz. 1920.  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 Supply and installation and testing of Class 10 GPRS Modem, Dual-Band E-GMG/PRS 90/1800 MHz, GPRS multi-slot class 10, 1W8 900 MHz, 1W 90	5.6.5.7	, ,				
Transmitter with pressure range of 16 bar, over pressure safety of 50 bar, from SS material, and power supply 10-UCB30 VDC and signal output 4-20 mA 2-wire system.  108x3 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.  5.6.5.10 Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm² and Bar), range 0 - 20 Kg/cm² (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.  Fig. 6.5.5.11 High quality pressure gauge - IP54 (indoor mounting), with dual scale (Kg/cm² and Bar). Range (0 - 20 Kg/cm²)/(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.  Fig. 6.5.5.12 Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe  S.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, C°45°C,2 IP20, 42°C,045°C,2 IP20, 42°C,045°C,2 IP20, 42°C,0	5658		LS	1		
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.  5.6.5.10 Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm² and Bar), range 0 - 20 Kg/cm² (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.  Thigh quality pressure gauge - IP54 (indoor mounting), with dual scale (Kg/cm² and Bar), Range (0 - 20 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe  S.6.5.12 Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe  Nr 1  S.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,  S.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  S.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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M  Supply and installation of 1.5mm² armoured underground cable for the well probe  Supply and installation of 1.5mm² armoured underground cable for the well probe  Supply installation of 1.5mm² armoured underground cable for the well probe  Supply installation of 1.5mm² armoured underground cable for the well probe  Supply installation of 1.5mm² armoured underground cable for the well probe  Supply installation of 1.5mm² armoured underground cable for the well probe  Allow for all the builders works associated with all		Transmitter with pressure range of 16 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 2-wire="" 4-20="" and="" ma="" output="" signal="" system.<="" td="" vdc=""><td>Nr</td><td>1</td><td></td><td></td></ucb<30>	Nr	1		
5.6.5.10 Adjustable Pressure switch in IP54 metal enclosure, with dual scale (Kg/cm² and Bar), range 0 - 20 Kg/cm² (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.  5.6.5.11 High quality pressure gauge - IP54 (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 20 Kg/cm²)/(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.  5.6.5.12 Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe  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,2 IP20.  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  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, Chortol via AT commands, -20° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M  5.6.5.16 Supply and installation of 1.5mm² armoured underground cable for the well probe  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  Allow for all the builders works associated with all the electrical works that	0.0.0.0	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				
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High quality pressure gauge - IP54 (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 20 Kg/cm²)/(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.    Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe   Nr   1	3.0.3.10	and Bar), range 0 - 20 Kg/cm² (0-20 Bar) connected to GS copper tube and fixed firmly on the wall by GS bracket It shall have integral 2NO+2NC				
(Kg/cm² and Bar).Range (0 - 20 Kg/cm²)/(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.  5.6.5.12 Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe  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,  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  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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M  5.6.5.16 Supply and installation of 1.5mm² armoured underground cable for the well probe  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  5.6.5.18 Allow for all the builders works associated with all the electrical works that	F C F 11	1547 1 6 7 11 1	nr	1		
5.6.5.12 Single orifice cast steel air valve c/w accessories for mounting on DN100 GI pipe  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,  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  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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M  S.6.5.16 Supply and installation of 1.5mm² armoured underground cable for the well probe m 30  S.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  S.6.5.18 Allow for all the builders works associated with all the electrical works that	5.6.5.11	(Kg/cm² and Bar).Range (0 - 20 Kg/cm²)/(0 - 20 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless	Ne	1		
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,  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  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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M  5.6.5.16 Supply and installation of 1.5mm² armoured underground cable for the well probe  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	5.6.5.12	Single orifice cast steel air valve c/w accessories for mounting on DN100 GL	INI	-		
Unit, 500VAC Equipped with one input fuse,187 – 264 VAC, 47 to 63 Hz,0°C+45°C,≥ IP20,  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  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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M  S.6.5.16 Supply and installation of 1.5mm² armoured underground cable for the well probe  S.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  S.6.5.18 Allow for all the builders works associated with all the electrical works that		pipe	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  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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M  5.6.5.16 Supply and installation of 1.5mm² armoured underground cable for the well probe  7.6.5.17 Preparation of all design technical and working drawings for the works for approval prior to commencement of installation on works as per the Specifications  8.5.6.5.18 Allow for all the builders works associated with all the electrical works that	5.6.5.213	Unit, 500VAC Equipped with one input fuse, 187 – 264 VAC, 47 to 63	Nr	1		
GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W @ 900 MHz,1W @ 1800 MHz,Control via AT commands, -20° C to +55°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	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				
interface,TCP/IP protocol stack for M2M  5.6.5.16 Supply and installation of 1.5mm² armoured underground cable for the well probe  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  5.6.5.18 Allow for all the builders works associated with all the electrical works that	5.6.5.15	GSM/GPRS 900/1800 MHz,GPRS multi-slot class 10,1W @ 900 MHz,1W @				
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	F C F 1C	interface,TCP/IP protocol stack for M2M	Nr	1		
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		probe	m	30		
5.6.5.18 Allow for all the builders works associated with all the electrical works that	5.6.5.17	approval prior to commencement of installation on works as per the	LS	1		
	5.6.5.18	Allow for all the builders works associated with all the electrical works that				
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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: 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.			
F C C O	, , , , , , , , , , , , , , , , , , , ,			
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° 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			
		<del>                                     </del>		





ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES
5.7.1	Electro-Mechanical Works	<b></b>	٠	()	
	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 m³/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 <sup>2</sup> /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		
	DN100 GI class C threaded water pipe.	m	60		
	DN100 GI steam sockets	Nr	14		
	DN75x300 mm long GI starter pipe	Nr	1		
	DN100x75 GI reducer (female threaded)	Nr	1		
.7.1.11	0.75mm <sup>2</sup> sc double insulated copper cable( brown and black) each 65				
	metres	m	130		
.7.1.12	Lay in trench/duct, connect and test 1.5 mm <sup>2</sup> /2c pvc swa pvc copper				
	cable	m	20		
.7.1.13	Lay in trench/duct, connect and test 25 mm <sup>2</sup> /4c armoured copper cable	m	20		
.7.1.14	Copper cable gland c/w lock-nut and shroud for 25 mm <sup>2</sup> /4 core pvc swa	- '''	20		
.7.1.14	pvc copper cable.	Nr	2		
.7.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm <sup>2</sup> /2 core pvc swa				
	pvc copper cable.	Nr	2		
.7.1.16	30 Kw, 3 phase, 415 vac, soft starter panel including integral				
.,	3 phase surge arrestor unit.				
	o prisod ourge arroader arms	SET	1		
.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		
.7.1.18	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
	35 mm <sup>2</sup> sc copper cable (green)	m	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 <sup>2</sup> /4c and 0.75 mm <sup>2</sup>				
	sc submerssible cables.	Nr	1		
.7.1.21	sc submerssible cables.  DN38x150 mmL GI threaded pipe piece (cable entry)	Nr Nr	1		





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	OL:	•		
	Qmin=1.2m <sup>3</sup> /hr, 2 battery power supply, IP 68, RS232 and RS 485 outputs.	Nr	1		
	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor 0-70°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O,	Nr	1		
.7.1.25	+o.25%<4mH2O. INSTALLATION SUNDRIES	141	'		
7.1.25a	ID320x7 mm Thick GS Borehole cap with welded DN100 GI pipe piece, welded DN44 GI slow bend for passage of 25mm²/4c cable, water level control electrodes cables and passage of OD25 mm pvc dipper pipe.	Nr	1		
7.1.25b	Boss white (200 gm tin)	Pc	3		
	550 mm plastic cable tie	Nr	50		
	20 mm Wx9ML self bonding electrical tape (scotch 23)	Roll	2		
	12 mm Wx12 ML PTFE thread seal tape	Roll	15		
	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	Roll	4		
	Stainless steel ferrules for 16 mm <sup>2</sup> cable	Nr	4		
	10 amps cable terminal block	Nr	3		
	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)	Nie	2		
	,	Nr Nr	2		
5.7.2.3	63 amps, 415 vac TP mcbs (Legrand, DPX)  12 Kvar, 3 phase, 415 vac, 4 step central automatic power capacitor	INI			
5.7.2.5	correction bank c/w 100 amps TP supply mccb, contactors, fuses, programmable electronic PF controller relay, 74 μFcapacitors etc.				
		SET	1		
	3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mccb	SET	1		
	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.				
	terrine proof, dust proof stanness steer protestion 2 1.0 mm who gause.	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.				
5.7.2.7	25x3 mm thick copper strip bound along the switchgear panel length (earthing)	Nr 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 <sup>2</sup> single copper cables (Red=15 m, Black=10 m , Green =10 m).	m	35		
5.7.3.3	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.		1		
	TOTAL PAGE 2	140	- '	-	



ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
E 7 2 4					
5.7.3.4	Re-wire the sockets circuits using 2.5 mm <sup>2</sup> single copper cables (Red= 4				
	m, Black=4 m , Green = 4 m)	m	12		
5.7.3.5	10 amps, I way 2 gang switch (IVY white, flush) as Mem, Crabtree or				
	similar quality approved make.	Nr	1		
5.7.3.6	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	1		
5.7.3.7	36 wattsx1200 mmL single fluorescent lighting fitting, energy save, water	INI	- 1		
0	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)				
<i>-</i>		Nr	1		
5.7.3.8	20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save,				
	corrossion resistant, power factor compensated.	Nr	4		
5.7.3.9	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		
5.7.3.10	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber	Nr	1		
5.7.3.11	25 mm <sup>2</sup> sc copper cable laid trench and connected to earth rod and main				
	switchgear panel earth bond tape.	m	3		
5.7.3.12	· · · · · · · · · · · · · · · · · · ·	111	3		
7.7.5.12	AC/DC POWER SUPPLY				
7.3.12.0	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps continuosly				
	rated converter fully protected (overload/short-circuit/reverse voltage	No.	1		
7 3 13	and polarity etc c/w RJ45, RS232, RS485 ports, mcbs protected outputs. FIRE FIGHTING EQUIPMENT	INU.	- '		
	5 Kg Class ABC Powder steel cylinder fire extinguisher, c/w pressure				
.7.0.10.0	gauge wall mounting steel bracket, operating instructions and				
	accessories, fully charged.				
5.7.4		No.	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	LO	'		
0	one rated 100 amps, 415vac)				
F 7 F	,	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 and="" signal<="" td="" vdc=""><td></td><td></td><td></td><td></td></ucb<30>				
	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		
		111	20		





ITEM	DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES
					,
5.7.5.9	Adjustable Pressure switch in IP54 metal enclosure, with dual scale				
3.1 .0.0	(Kg/cm <sup>2</sup> and Bar), range 0 - 20 Kg/cm <sup>2</sup> (0-20 Bar) connected to GS				İ
	copper tube and fixed firmly on the wall by GS bracket It shall have				Ì
	integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless				Ì
	steel isolation ball valve.				Ì
		Nr	1		
5.7.5.10	High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm <sup>2</sup>				İ
	and Bar).Range (0 - 20 Kg/cm <sup>2</sup> )/(0 - 20 bar). It shall be c/w all fitting				İ
	accessories for connecting on ID8x3mm GS tube. It shall be c/w				İ
	stainless steel isolation ball valve.	Nr	1		İ
.7.5.11	Single orifice cast steel air valve c/w accessories for mounting on DN100				
	GI pipe	Nr	1		İ
.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	Nr	1		Ì
.7.5.13	Hz,0°C+45°C,≥ IP20, Supply, installation and testing of Input /Output interface module (I/O),	INI			
	min. 4 analog inputs 0-10V, 0-20mA, 4-20mA programmable, min 2				İ
75	digital inputs with frequency range 0-16 Hz	Nr	1		
.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				1
	MHz,1W @ 1800 MHz,Control via AT commands, -20° C to +55°C,RS				İ
	232 interface,TCP/IP protocol stack for M2M	Nr	1		
.7.5.15	Supply and installation of 1.5mm² armoured underground cable for the				İ
	well probe	m	25		
5.7.6	Pressure Pipes and Fittings:				
	Modification of the connection between the new pump, the suction				İ
	and the discharge pipes and fittings, and for corresponding concrete works.				İ
5.7.6.1					
3.7.0.1	Disconnection, dismantling and disposal of old pipes, pipe fittings, valves, water meter.	LS	1		İ
	Supply, delivery to Site, Install and Test:		·		
	NOTE: i). All				
	Valves, pipes, pipe fittings, water meter shall be new.				Ì
	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.				İ
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 flotr statin, non-retain 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.				
5.7.6.6	DN100x500 mmL GS pipe piece.	Nr Nr	2		
5.7.6.7	DN100x250 mmL GS pipe piece, flanged on one side and plain at the	INI			
	opposite end.	Nr	1		
5.7.6.8	DN100x90° GS slow bend	Nr	3		
5.7.6.9	DN100 GS socket	Nr	3		
.7.6.10	DN100 double flanged GS equal Tee	Nr	1		
.7.6.11	DN100 steel Johnson coupling c/w rubber rings.	Nr	4		
.7.6.12	100mmWx5 mm thick rubber gasket	m	2		
.7.6.13		Nr	1		
.7.6.14	DN100x600 mmL GS pipe piece.	Nr	2		
5.7.7	Any other accessories required for the system  Removal Of Old Items and Trenching	LS	1		
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				1
	to ground level after laying of cable. Cart away, dispose excess as		00		1
5.7.7.2	advised.	M	20		
5.7.7.3	Break existing RC pipe support block.  Excavate to expose and remove a section of existing DN 100 GS	Nr	1		
٥.١.١.٥	Borehole-Rising main inter-connection pipe work. Trim the trenching to				1
	size 500 mmW900 mm depth. Back fill to ground level after laying of				1
	cable. Cart away , dispose excess as advised.	m	3		1
	TOTAL PAGE 4				



## 5.8.1 **BOREHOLE NO. 4**

ITEM	ITEM DESCRIPTION	UNIT	QTY	Rate(KES)	Amount(KES)
5.8.1.1	Electro-Mechanical Works			` ′	` '
0.0					
	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 <sup>3</sup> /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	141	1	+	
0.0.1.1.00	Cost sum items	%			
5.8.1.1.04	16 mm <sup>2</sup> /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 N-	52 14		
5.8.1.1.08	DN100 Steel steam sockets	Nr Nr	14		
5.8.1.1.09 5.8.1.1.10	DN75x300 mm long GI starter pipe DN100x75 GI reducer (female threaded)	Nr	1		
5.8.1.1.11	0.75mm <sup>2</sup> sc double insulated copper cable( brown and black)	INI	- '		
5.0.1.1.11	each 58 metres	m	116		
5.8.1.1.12	Lay in trench/duct, connect and test 1.5 mm <sup>2</sup> /2c pvc swa pvc	1111	110		
5.0.1.1.12	copper cable (starter panel to borehole)	m	20		
5.8.1.1.13	Lay in trench/duct, connect and test 16 mm²/4c armoured copper	- '''	20		
0.0.1.1.10	cable	m	20		
5.8.1.1.14	Copper cable gland c/w lock-nut and shroud for 16 mm <sup>2</sup> /4 core		20		
0.0.1.1.14	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 <sup>2</sup> /2 core	141			
0.0.1.1.10	pvc swa pvc copper cable.	Nr	2		
5.8.1.1.16	30 Kw, 3 phase, 415 vac, soft starter panel including integral 3	. *!			
0.0.1.1.10	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 <sup>2</sup> 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 <sup>2</sup> /4c and 0.75 mm <sup>2</sup> sc submerssible cables.	Nr	1		
5.8.1.1.21	DN38x150 mmL GI threaded pipe piece (cable entry)	Nr	1	+	
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	1			ĺ	ĺ
5.8.1.1.22	Supply and installation of Well Probe Sensor complete with well				
	probe cable of size 0.75 mm <sup>2</sup> 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=80m³/hr, Qnom=40m³/hr,				
	Q <sub>T</sub> =8m <sup>3</sup> /hr and Qmin=1.2m <sup>3</sup> /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°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL				
	NLHR>4mH2O, +0.25%<4mH2O.	Nr	1		
5.8.1.1.25	Installation Sundries				
	ID320x7 mm Thick GS Borehole cap with welded DN100 GI pipe				
0.0200	piece, welded DN38 GS slow bend for passage of 16mm²/4c 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)	рс	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	1	_
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 <sup>2</sup> cable	Nr	4	<del>                                     </del>	+
5.8.1.1.25h	Stainless steel ferrules for 0.75mm <sup>2</sup> cable	Nr	3	<del>                                     </del>	+
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				
	Other Electro-Injectianical 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				
= 0.4.4.001	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	LO	'		
0.0200	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< td=""><td></td><td></td><td></td><td></td></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,	INI			
	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 <sup>2</sup> and Bar), range 0 - 25 Kg/cm <sup>2</sup> (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.				
	TO amps, 270 vac, stamicss steel isolation ball valve.	Nr	1		
5.8.1.1.26g	High quality pressure gauge - (indoor mounting), with dual scale				
	(Kg/cm <sup>2</sup> and Bar).Range (0 - 25 Kg/cm <sup>2</sup> )/(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		<u> </u>
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				
5.0.4.1.001		Nr	1	ļ	+
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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.8.1.1.261	Supply and installation of 1.5mm <sup>2</sup> armoured underground cable for				
	the well probe		00		1
	the well probe	m	20		
	TOTAL PAGE 2	m	20		





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	11	
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 DN100x1200 mmL GS pipe piece.	m Nr	<u>2</u>	
5.8.1.1.27i 5.8.1.1.27i	DN100 GS equal Tee	Nr	1	
5.8.1.1.27k	DN100x600 mmL GS pipe piece.	Nr	2	
	DN150x100 mm GS reducer.	Nr	1	
	DN100 CS anti-slam, Non-Return valve .	Nr	1	
	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.	-	45	
5.8.1.2.02	Break existing RC pipe support block.	m Nr	15 1	
5.8.1.2.03	Excavate, expose and remove a section of existing DN 100 GI	141	1	
	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 m³/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 <sup>2</sup> /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 <sup>2</sup> 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 <sup>2</sup> /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 <sup>2</sup> /4c armoured copper				
	cable	m	70		
5.8.2.1.14	Copper cable gland c/w lock-nut and shroud for 25 mm <sup>2</sup> /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 <sup>2</sup> /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 <sup>2</sup> sc copper cable (green)	m	2		
5.8.2.1.20	Supply and install water-tight GS cable junction box of size			Ι Τ	
	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 <sup>2</sup> /4c, 16mm <sup>2</sup> /4c and 0.75 mm <sup>2</sup> sc submerssible cables.				
		Nr	1		
5.8.2.1.21	DN38x150 mmL GI threaded pipe piece (cable entry)	Nr	1		
	1				



		<b>l</b> 1		I	I
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 <sup>3</sup> /hr, Qnom=40m <sup>3</sup> /hr,				
	Q <sub>T</sub> =8m <sup>3</sup> /hr and Qmin=1.2m <sup>3</sup> /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°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL				
	NLHR>4mH2O, +0.25%<4mH2O.	Na	4		
E 0 0 4 0E	Installation Conduine	No	1		
5.8.2.1.25	Installation Sundries	Nin	4		
5.8.2.1.25a	ID320x7 mm Thick GS Borehole cap with welded DN100 GI pipe Boss white (200 gm tin)	Nr	2		
5.8.2.1.25b 5.8.2.1.25c	550 mm plastic cable tie	pc 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 <sup>2</sup> cable	Nr	4	1	
5.8.2.1.25h	Stainless steel ferrules for 0.75 mm <sup>2</sup> cable	Nr	3	1	
5.8.2.1.25i	10 amps cable terminal block	Nr	3		
5.8.2.1.25j	80 amps cable terminal block	Nr	4	1	
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			1	
	works for approval prior to commencement of installation of works			1	
	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< td=""><td></td><td></td><td></td><td></td></ucb<30<>				
	VDC and signal output 4-20 mA 2-wire system.	NI=	1		
5.8.2.1.26e	ID8x3 mm Thick GS tube c/w all necessary mounting fittings,	Nr	- 1		
3.0.2.1.206	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 <sup>2</sup> and Bar), range 0 - 25 Kg/cm <sup>2</sup> (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				
	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	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale	Nr	1		
5.8.2.1.26g	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(0 - 25 bar). It shall be	Nr	1		
5.8.2.1.26g	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(0 - 25 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It	Nr	1		
5.8.2.1.26g	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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 Nr	1		
5.8.2.1.26g 5.8.2.1.26h	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on	Nr	1		
5.8.2.1.26h	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.				
J	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  Supply, installation, testing and commissioning of 24V DC Power	Nr	1		
5.8.2.1.26h	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  Supply, installation, testing and commissioning of 24V DC Power Supply Unit, 500VAC Equipped with one input fuse, 187 – 264	Nr Nr	1		
5.8.2.1.26h 5.8.2.1.26i	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  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		
5.8.2.1.26h	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  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.  Supply, installation and testing of Input /Output interface module	Nr Nr	1		
5.8.2.1.26h 5.8.2.1.26i	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  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.  Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA	Nr Nr	1		
5.8.2.1.26h 5.8.2.1.26i	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  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.  Supply, installation and testing of Input /Output interface module (I/O), min. 4 analog inputs 0-10V, 0-20mA, 4-20mA	Nr Nr	1 1 1		
5.8.2.1.26h 5.8.2.1.26i 5.8.2.1.26j	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  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.  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 Nr	1		
5.8.2.1.26h 5.8.2.1.26i	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  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.  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  Supply, installation and testing of Class 10 GPRS Modem, Dual-	Nr Nr	1 1 1		
5.8.2.1.26h 5.8.2.1.26i 5.8.2.1.26j	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  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.  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  Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class	Nr Nr	1 1 1		
5.8.2.1.26h 5.8.2.1.26i 5.8.2.1.26j	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  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.  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  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, -	Nr Nr Nr	1 1 1		
5.8.2.1.26h 5.8.2.1.26i 5.8.2.1.26j	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  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.  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  Supply, installation and testing of Class 10 GPRS Modem, Dual-Band E-GSM/GPRS 900/1800 MHz,GPRS multi-slot class	Nr Nr	1 1 1		
5.8.2.1.26h 5.8.2.1.26i 5.8.2.1.26j	bracket It shall have integral 2NO+2NC auxillary contacts rated 10 amps, 240 vac, stainless steel isolation ball valve.  High quality pressure gauge - (indoor mounting), with dual scale (Kg/cm² and Bar).Range (0 - 25 Kg/cm²)/(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.  Single orifice cast steel air valve c/w accessories for mounting on DN100 GS pipe.  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.  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  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, -	Nr Nr Nr	1 1 1		



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				
3.8.2.1.270	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	INI		
J.U.Z. 1.Z/U	valve	Nr	1	
5.8.2.1.27d	DN100x1500 mmL GS pipe piece.	Nr	1	
5.8.2.1.27e		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	
5.8.2.1.271	DN100 CS anti-slam, Non-Return valve .	Nr	1	
• • • • • • • • • • • • • • • • • • • •	DN100 GI hex nipple	Nr	8	
5.8.2.1.27n	DN100 steel union	Nr	1	
5.8.2.1.27o		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		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			
		_		



NEW MAINS POWER CONTROL SWITCHGEAR PANEL	5.8.3. NEW MAINS POWER CONTROL SWITCHGEAR PANEL, ELECTRICAL  AND FIRE FIGHTING EQUIPMENT						
compartmented, indoor, surface metal clad mainis power control panel (P20), 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;  5.8.3.1.02   Karya Power & Lighting Company CUT-OUTS chamber   Nr. 1    5.8.3.1.03   Tay Power & Lighting Company CUT-OUTS chamber   Nr. 1    5.8.3.1.05   NaVPLC incommer Current transformers chamber   Nr. 1    5.8.3.1.05   NaVPLC metering equipment chamber incommer Current transformers chamber   Nr. 1    5.8.3.1.05   NaVPLC metering equipment chamber incommer Current transformers chamber   Nr. 1    5.8.3.1.06   NaVPLC metering equipment chamber incommer Current transformers chamber   Nr. 1    5.8.3.1.06   NaVPLC metering equipment chamber incommer Current transformers chamber   Nr. 1    5.8.3.1.06   NaVPLC metering equipment chamber incommer Current of mocb = 250 amps).   Nr. 1    5.8.3.1.06   NaVPLC metering equipment chamber   Nr. 1    5.8.3.1.07   NavPLC metering expose the Nr. 1   Nr. 1    5.8.3.1.08   NavPLC metering expose the Nr. 1   Nr. 1    5.8.3.1.09   NavPLC metering expose the Nr. 1   Nr. 1    5.8.3.1.00   NavPLC metering expose the Nr. 1   Nr. 1    5.8.3.1.01   NavPLC metering expose the Nr. 1   Nr. 1    5.8.3.1.02   NavPLC metering expose the Nr. 1   Nr. 1    5.8.3.1.10   NavPLC metering expose the Nr. 1   Nr. 1    5.8.3.1.11   NavPLC metering expose the Nr. 1   Nr. 1    5.8.3.1.11   NavPLC metering expose the Nr. 1   Nr. 1    5.8.3.1.11   NavPLC metering expose the Nr. 1    5.8.3.1.12   NavPLC metering expose the Nr. 1    5.8.3.1.13   NavPLC metering expose the Nr. 1   Nr. 1    5.8.3.1.14   NavPLC metering expose the Nr. 1    5.8.3.1.15   NavPLC metering expose the Nr. 1    5.8.3.1.16   NavPLC metering expose the Nr. 1    5.8.3.1.17   NavPLC metering expose the Nr. 1    5.8.3.1.18   Nr. 1   Nr. 1    5.8.3.1.19   Nr. 1    5.8.3.1.11   Nr. 1   Nr. 1    5.8.3.1.11   Nr. 1   Nr. 1    5.8.3.1.12   Nr. 1   Nr. 1    5.8.3.1.13   Nr. 1   Nr. 1	.8.3.1						
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: 0.71 <sub>m</sub> , 0.94, 1.01 <sub>m</sub> , 0.94, 1.01 <sub>m</sub> ) set at 0.08, where l <sub>m</sub> rated current of mccb = 250 amps).         Nr         1           5.8.3.1.06         1x26 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           5.8.3.1.10         2x25 amps, TP, 415 vac, mccbs. I <sub>CU</sub> = 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           5.8.3.1.11         1x3 phase, 415 vac surge divertor c/w protective mcbs on main 25 amps, 125 a	5.8.3.1.01	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	Nr	1			
5.8.3.1.04 1xKPLC metering equipment chamber incommer Current transformers chamber 5.8.3.1.05 (1x250 amps adjustable triple pole mccb (adjustable range: 0.71 <sub>k</sub> , 0.81 <sub>k</sub> , 0.9k, 1.0k, set at 0.81 <sub>k</sub> , where 1 <sub>k</sub> = rated current of mccb = 250 amps).  5.8.3.1.06 (1x25 Kvar, 3 phase, 415 vac, 5 step central automatic power capacitor correction bank c/w 100 amps IP supply mccb, contactors, fuses, programmable electronic PF controllerrelay etc.  5.8.3.1.07 (1xsingle phase, 240 vac kWh energy registering meter) 5.8.3.1.08 (4x260 amps high conductivity rectangular bare copper bus-bar conductors 5.8.3.1.09 (2x125 amps, TP, 415 vac, mccbs, 1 <sub>cu</sub> = 25 kA. Each in its own compartment (1 No. for Borehole No.4, 1 No. for BH No.7, and 2 No. spares.  5.8.3.1.10 (2x125 amps, TP, 415 vac, mccbs, 1 <sub>cu</sub> = 15 kA. Each in its own compartment. (Spares) 5.8.3.1.11 (1x3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mcb 5.8.3.1.12 (2x100 amps, phase, 240 vac class "A" mcbs (staff houses) 5.8.3.1.13 (1x3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mcb 5.8.3.1.14 (2x100 amps, phase, 240 vac class "A" mcbs (staff houses) 5.8.3.1.15 (1x3 phase, 240 vac resettable digital network analyzer/recorder vac ventilation hole of size 150x100 mm installed on the top oppoposite sides, 50 mm below top c/w termite-proof, dust-proof internal grade and symthe-proof, dust-proof of starless and series of the side (1 No. 1) amps (1 No. 1) phase, 240 vac class "A" mcbs, 3 No. 20 amps, 1 No. 1 1 1 3 phase, 240 vac resettable digital network analyzer/recorder values, current, kMh, kv.a, Pt.Hz, kw) with LED phase indicators (RED, YELLOW, BLUE) on front panel.  5.8.3.1.16 (1x3 phase, 240 vac resettable digital network analyzer/recorder values, current, kMh, kv.a, Pt.Hz, kw) with LED phase indicators (RED, YELLOW, phase, 240 vac class "A" mcbs, 3 No. 20 amps, 1 No. 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			Nr				
transformers chamber			Nr	1			
0.8		transformers chamber	Nr	1			
5.8.3.1.06  1.8.25 KVar. 3 phase, 415 vac, 5 step central automatic power capacitor correction bank c/w 100 amps TP supply mcob, contactors, tuses, programmable electronic PF controllerrelay etc.  1. 1  5.8.3.1.07  1. 1 xisingle phase, 240 vac kWh energy registering meter)  1. 1 xisingle phase, 240 vac kWh energy registering meter)  1. 1 xisingle phase, 240 vac kWh energy registering meter)  1. 1 xisingle phase, 240 vac kWh energy registering meter)  1. 1 xisingle phase, 240 vac kWh energy registering meter)  1. 1 xisingle phase, 240 vac kWh energy registering meter)  1. 1 xisingle phase, 240 vac kWh energy registering meter)  1. 1 xisingle phase, 240 vac kWh energy registering meter)  1. 1 xisingle phase, 240 vac, mcobs, I <sub>CU</sub> =25 kA. Each in its own compartment (1 No. for Borehole No.4, 1 No. for BH No.7, and 2 No. spares.  1. 1 xisingle phase, 240 vac, mcobs, I <sub>CU</sub> =15 kA. Each in its own compartment. (Spares)  1. 1 xisingle phase, 240 vac class 'A' mcbs (staff houses)  1. 1 xisingle phase, 240 vac class 'A' mcbs (staff houses)  1. 1 xisingle phase, 240 vac class 'A' mcbs (staff houses)  1. 1 xisingle phase, 240 vac class 'A' mcbs (staff houses)  1. 1 xisingle phase, 240 vac class 'A' mcbs (staff houses)  1. 1 xisingle phase, 240 vac class 'A' mcbs (staff houses)  1. 1 xisingle phase, 240 vac class 'A' mcbs (staff houses)  1. 1 xisingle phase, 240 vac class 'A' mcbs (staff houses)  1. 1 xisingle phase, 240 vac class 'A' mcbs, 1 No. 1 xisingle phase, 240 vac vac vac vac vac vac vac vac vac vac	5.8.3.1.05	$0.8I_N$ , $0.9I_N$ , $1.0I_N$ set at $0.8I_N$ where $I_N$ = rated current of mccb =	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 <sub>Cu</sub> =25 kA. Each in its own compartment (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 <sub>Cu</sub> =15 kA. Each in its own compartment (2kgares)   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 waits, 240 vac, 2800 pm continuously rated installed on the side, 100 mm height from the bottom clw filter and termite-proof, dust-proof stainless steel protection   Nr   1   5.8.3.1.14   2x ventilation 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 cresettable 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 class "A" mcbs, 3 No. 20 amps, 1 pole class "A" mcbs, 1 No. Blanking plate.   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   3xAC ammeters range 0-300 amps c/w CTS.   Nr   1   5.8.3.1.19   1xAC voltmeter (0-500 vac) c/w vss and protection mcbs.   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)   Setting the condition of the switch gear panel length (earthing)   Setting the condition of the switch gear panel length (earthing)   Setting the condition of the switch gear panel length (earthing)   Setting the condition of the switch gear panel length (earthing)   Setting pocket/siting wifning.   LS   1   5.8.3.2   1   1   1   1   1   1   1   1	5.8.3.1.06	capacitor correction bank c/w 100 amps TP supply mccb,					
5.8.3.1.08  4x260 amps high conductivity rectangular bare copper bus-bar conductors  5.8.3.1.09  2x125 amps, TP, 415 vac, mccbs, I <sub>Cu</sub> =25 kA. Each in its own cmpartment (1 No. for Borehole No.4, 1 No. for BH No.7, and 2 No. spares.  5.8.3.1.10  2x80 amps, TP, 415 vac, mccbs, I <sub>Cu</sub> =15 kA. Each in its own cmpartment. (Spares)  5.8.3.1.11  1x3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mccb  5.8.3.1.12  2x100 amps, 1phase, 240 vac class "A" mcbs (staff houses)  7x	583107	1xsingle phase 240 yac kWh energy registering meter)					
Conductors			Nr	1			
cmpartment (1 No. for Borehole No.4, 1 No. for BH No.7, and 2 No. spares.   Nr   2		conductors	Nr	1			
5.8.3.1.10 2x63 amps, TP, 415 vac, mccbs, I <sub>CU</sub> =15 kA. Each in its own cmpartment. (Spares)  5.8.3.1.11 1x3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mccb  5.8.3.1.12 2x100 amps, 1phase, 240 vac class "A" mcbs (staff houses)  7.8.3.1.12 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.  7.8.3.1.14 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.  7.8.3.1.15 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.  7.8.3.1.16 100 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.  7.8.3.1.17 1xAC voltmeter (0-500 vac) c/w vss and protection mcbs.  7.8.3.1.18 1xAC voltmeter (0-500 vac) c/w vss and protection mcbs.  7.8.3.1.19 32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w lisolator, base and screw top lid.  7.8.3.1.20 250 amps, 415 vac TPN manual changer-over switch c/w pilot indicator lights ( KPLC ON, KPLC LOAD ON, GENERATOR ON, GENERATOR LOAD ON)  7.8.3.1.21 Remove the existing socket/lighting wiring.  7.8.2.2 Remove the existing socket/lighting wiring.  7.8.2.2 Remove the existing socket/lighting wiring.  7.8.2.3 Light in GS conduit fixed on the walls and roof members. The cost shall be inclusive of tees, bends, circular boxes with covers, other necessary accessories  8.8.2.1 Remove the existing socket/lighting wiring.  8.8.3.2.3 Light in GS conduit fixed on the walls and roof members. The cost shall be inclusive of tees, bends, circular boxes with covers, other necessary accessories	5.8.3.1.09	cmpartment (1 No. for Borehole No.4, 1 No. for BH No.7, and 2	Nr	1			
5.8.3.1.11  1x3 phase, 415 vac surge divertor c/w protective mcbs on main 250 amps mccb  5.8.3.1.12	5.8.3.1.10						
250 amps mccb  2x100 amps, lphase, 240 vac class "A" mcbs (staff houses)  Nr 1  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.  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.  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.  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.  5.8.3.1.19  32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid.  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)  5.8.3.1.21  5.8.3.2.  Remove the existing socket/lighting wiring.  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 mm² single copper cables (Red=150 m, Black=120 m, Green = 120 m) laid in GS conduit and terminated at boh ends	500111		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.  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.  7x yphase, 240 vac resettable digital network analyzer/recorder (voltage, current, kWh, Kva, Pf,Hz, Kw) with LED phase indicators (RED, YELLOW, BLUE) on front panel.  8x yphase, 240 vac dass "A" mcbs, 3 No. 20 amps, 1 pole class "A" mcbs, 1 No. Blanking plate.  9x year year year year year year year year	5.6.3.1.11		Nr	1			
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.  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  5.8.3.1.19  3z amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid.  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)  5.8.3.1.21  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.  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  10 mm² single copper cables (Red=150 m, Black=120 m, Green 120 m) laid in GS conduit and terminated at both ends			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   LS   1   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	5.8.3.1.13	rated installed on the side, 100 mm height from the bottom clw filter and termite-proof, dust-proof stainless steel protection	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.  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.  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.  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)  5.8.3.1.21  25x3 mm thick copper strip bound along the switchgear panel length (earthing)  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.  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  108  15.8.2.3  1.5 mm² single copper cables (Red=150 m, Black=120 m, Green = 120 m) laid in GS conduit and terminated at boh ends	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					
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.  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.  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)  5.8.3.1.21 25x3 mm thick copper strip bound along the switchgear panel length (earthing)  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  1.5 mm² single copper cables (Red=150 m, Black=120 m, Green =120 m) laid in GS conduit and terminated at hoh ends	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		1			
5.8.3.1.17 3xAC ammeters range 0-300 amps c/w CTS.  5.8.3.1.18 1xAC voltmeter (0-500 vac) c/w vss and protection mcbs.  5.8.3.1.19 32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid.  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)  5.8.3.1.21 25x3 mm thick copper strip bound along the switchgear panel length (earthing)  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.  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  1.5 mm² single copper cables (Red=150 m, Black=120 m, Green = 120 m) laid in GS conduit and terminated at boh ends	5.8.3.1.16	No. 10 amps,1 pole, 240 vac class "A" mcbs, 3 No. 20 amps, 1					
5.8.3.1.18 1xAC voltmeter (0-500 vac) c/w vss and protection mcbs.  5.8.3.1.19 32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid.  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)  5.8.3.1.21 25x3 mm thick copper strip bound along the switchgear panel length (earthing)  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.  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  5.8.2.3 1.5 mm² single copper cables (Red=150 m, Black=120 m, Green = 120 m) laid in GS conduit and terminated at hoh ends	5.8.3.1.17						
5.8.3.1.19 32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base and screw top lid.  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)  5.8.3.1.21 25x3 mm thick copper strip bound along the switchgear panel length (earthing)  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.  5.8.2.2 Unm 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  1.5 mm² single copper cables (Red=150 m, Black=120 m, Green = 120 m) laid in GS conduit and terminated at boh ends	5.8.3.1.18	1xAC voltmeter (0-500 vac) c/w vss and protection mcbs.					
indicator lights ( KPLC ON, KPLC LOAD ON, GENERATOR ON, GENERATOR LOAD ON)  5.8.3.1.21  25x3 mm thick copper strip bound along the switchgear panel length (earthing)  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.  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  1.5 mm² single copper cables (Red=150 m, Black=120 m, Green = 120 m) laid in GS conduit and terminated at hob ends		isolator, base and screw top lid.					
length (earthing)   SET   1		indicator lights ( KPLC ON, KPLC LOAD ON, GENERATOR ON, GENERATOR LOAD ON)	Nr	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.  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  5.8.2.3 1.5 mm² single copper cables (Red=150 m, Black=120 m, Green =120 m) laid in GS conduit and terminated at boh ends	5.8.3.1.21		SET	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 mm² single copper cables (Red=150 m, Black=120 m, Green =120 m) laid in GS conduit and terminated at bob ends		Electrical Repairs of Mains Power Control Switchgear/Office/Chemical Dosing Room					
The cost shall be inclusive of tees, bends, circular boxes with covers, other necessary accessories  1.5 mm² single copper cables (Red=150 m, Black=120 m , Green = 120 m) laid in GS conduit and terminated at bob ends			LS	1			
5.8.2.3 1.5 mm <sup>2</sup> single copper cables (Red=150 m, Black=120 m , Green	J.U.Z.Z	The cost shall be inclusive of tees, bends, circular boxes with	m	108			
	5.8.2.3						





		ı		I	
5.8.2.4	2.5 mm <sup>2</sup> 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				
	10 amps, I way 1 gang switch (smc) as Mem, Crabtree or similar quality approved make c/w box and ss screws	Nr	1		
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	Nr	2		
	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 <sup>2</sup> sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape.	m	5		
5.8.2.12	Improve lightning protection system	LS	1		
5.8.3.	AC/DC POWER SUPPLY				
5.8.3.01	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps continuosly rated converter fully protected (overload/short-circuit/reverse voltage and polarity etc c/w RJ45, RS232, RS485 ports, mcbs protected outputs to supply water meter, borehole water level measurement, rising main pressure measurement, PLC, Radio/Data Trans-Receiver Equipment.	SET	1		
5.8.4	Fire Fighting Equipment	OLI			
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		
					_
				-	
Ciwi DU DEUADII DO	D. Corrected				



STTA for Coast Water Works Development Agency for the Launching of the "Improvement of Drinking Water and Sanitation Systems in Mombasa - Mwache Project" CWSB/AFD/W1/2019
Bill of Quantity



TOTAL PAGE 8		
TOTAL BHs 4 & 7:- CARRIED TO BILLL 5 SUMMARY SHEET		





# 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 <sup>3</sup> /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.	NI-	1		
5.9.1.1.02	Overheads and profits on item 5.9.1.1.02 as specified for Prime Cost	Nr	1		
5.9.1.1.02	Isum items	%			
5.9.1.1.03	10 mm²/4 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 <sup>2</sup> 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 <sup>2</sup> /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 <sup>2</sup> /4c armoured copper		30		
5.9.1.1.14	cable Copper cable gland c/w lock-nut and shroud for 16 mm²/4 core pvc	m	30		
	swa pvc copper cable.	Nr	2		
5.9.1.1.15	Copper cable gland c/w lock-nut and shroud for 1.5 mm <sup>2</sup> /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				
5.9.1.1.17	phase surge arrestor unit.  Masory earth rod chamber of internal size 250x250 x300 mmH	SET	1		
5.9.1.1.17	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		
5.9.1.1.19a	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 <sup>2</sup> /4c and 0.75 mm <sup>2</sup> sc submerssible cable.	Nr	1		
5.9.1.1.19b	35 mm <sup>2</sup> 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	SET	1		
5.9.1.1.22	Supply, installation, testing and commissioning of Electro Magnetic				
	Flow Meter, DN80, Q <sub>max</sub> =80m³/hr, Q <sub>nom</sub> =40m³/hr, Q <sub>T</sub> =8m³/hr and				
	Q <sub>min</sub> =1.2m <sup>3</sup> /hr, 2 battery power supply, IP 68, RS232 and RS 485				
	outputs.	Nr	1		
	TOTAL PAGE 1				





	T			1	T
504400	Completion testing and completion of the description				
5.9.1.1.23	Supply, installation, testing and commissioning of Hydrostatic Level Transmitter with integrated Pt 100 temperature sensor				
	0-70°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL	NI-			
504404	NLHR>4mH2O, +0.25%<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 <sup>2</sup> /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) 550 mm plastic cable tie	pc Nr	2 40		
5.9.1.1.24d 5.9.1.1.24d	20 mm Wx9ML self bonding electrical tape (scotch 23)	ROLL	2		
5.9.1.1.24u 5.9.1.1.24e	12 mm Wx12 ML PTFE thread seal tape	ROLL	10		
5.9.1.1.24e	12 Hilli WX12 WL 1 11 L tillead Seal tape	NOLL	10		
3.3.1.1.241	20 mm high quality electrical pvc tape (Red, Yellow, Blue, Black)	ROLL	4		
5.9.1.1.24g	Stainless steel ferrules for 10mm <sup>2</sup> cable	Nr	4		
5.9.1.1.24h	Stainless steel ferrules for 10/11/11 cable  Stainless steel ferrules for 0.75 mm² cable	Nr	2		
5.9.1.1.24ii	10 amps cable terminal block	Nr	3		
5.9.1.1.24i	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				
5.9.1.1.25a	works for approval prior to commencement of installation of works as				
	per the Specifications.	LS	1		
5.9.1.1.25b					
0.0.1.1.200	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 and<="" td="" vdc=""><td></td><td></td><td></td><td></td></ucb<30>				
	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.		00		
504405	Adicateble Description in IDEA matel analysis at 11 description	m	30		
5.9.1.1.25f	Adjustable Pressure switch in IP54 metal enclosure, with dual scale				
	(Kg/cm <sup>2</sup> and Bar), range 0 - 25 Kg/cm <sup>2</sup> (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,	p=	1		
5.9.1.1.25g	stainless steel isolation ball valve. High quality pressure gauge - (indoor mounting), with dual scale	nr	- 1		
J.S. 1. 1.25g	(Kg/cm <sup>2</sup> and Bar).Range (0 - 30 Kg/cm <sup>2</sup> )/(0 - 30 bar). It shall be c/w				
	(Kg/cm <sup>-</sup> and Bar).Range (0 - 30 Kg/cm <sup>-</sup> )/(0 - 30 bar). It shall be c/w all fitting accessories for connecting on ID8x3mm GS tube. It shall be				
	all fitting accessories for connecting on ID8x3mm GS tube. It shall be c/w stainless steel isolation ball valve.				
E 0 4 4 05'		Nr	1		
5.9.1.1.25h	Single orifice cast steel air valve c/w accessories for mounting on	Nie	1		
51.1.25i	DN75 GS pipe. Supply, installation, testing and commissioning of 24V DC Power	Nr	- 1		
J I. I.ZƏI	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	141			
	I U I AL FAGE 2				I





	T	1	1	1	I
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 C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.9.1.1.25	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.				
	<ul> <li>ii). Unless otherwise stated, valves, pipes, pipe fittings, water meter shall be double flanged, drilled and supplied c/w high</li> </ul>				
	tensile strength stainless steel bolts, nuts and washers.  iii). Cutting and adjustment of pipework on site to fit.				
5.9.1.1.26b	DN100x90° 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		
	DN100x75 GS reducer.	Nr	1		
	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° 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		
5.9.1.1.26	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	m	20		
5.9.1.2.02	excess as advised.  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.		20		
		m	5		
	TOTAL DAGE 0				
	TOTAL PAGE 3	ĺ	ĺ	l	



# 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				
	CURRY PERIOD TO CITE MOTAL AND THE	LS	1	1	
	SUPPLY, DELIVER TO SITE, INSTALL AND TEST:			<b>.</b>	
5.9.2.1.02	NOTE:			-	
5.9.2.1.02	Submersible pump set of capacity 11 m³/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			1	
0.0.2.1.00	sum items	%			
5.9.2.1.04	oun tene	,,,		1	
	46				
	16 mm <sup>2</sup> /4 core submersible pump flat cable				
		m	75	ļl	
5.9.2.1.05	DN6x120 mmL stainless steel water level control electrodes.	Pair	1	<b>↓</b>	
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	1	
5.9.2.1.11	0.75mm <sup>2</sup> 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 <sup>2</sup> /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 <sup>2</sup> /4c armoured copper				
	cable	m	170		
5.9.2.1.14	Copper cable gland c/w lock-nut and shroud for 16 mm <sup>2</sup> /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 <sup>2</sup> /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				1 1	
2.0.2	D15x2.4 metre copper earth rod c/w clamp in a masonry chamber.	Nr	1		
5.9.2.1.18	16 mm <sup>2</sup> sc copper cable (green)	m	5	1	
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 <sup>2</sup> /4c, and 0.75 mm <sup>2</sup> 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			1	
	probe cable of size 0.75 mm² of 70 m (to be determined after test				
	pumping).	SET	1		
	1 0/	SEI		<del>                                     </del>	
	TOTAL PAGE 4			] ]	
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5.9.2.1.22				1
	Supply, installation, testing and commissioning of Electro Magnetic			
	Flow Meter, DN80, Qmax=80m <sup>3</sup> /hr, Q <sub>nom</sub> =40m <sup>3</sup> /hr, Q <sub>T</sub> =8m <sup>3</sup> /hr and			
	Q <sub>min</sub> =1.2m <sup>3</sup> /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	141		
	Transmitter with integrated Pt 100 temperature sensor 0-70°C,			
	range from 1-100 mH2Og, acuracy + 0.175% FS BSL	Nr	1	
	Installation Sundries	141		
	ID220x4 mm Thick GS Borehole cap with welded DN75 GS pipe			
	piece, welded DN38 GI slow bend for passage of 16mm <sup>2</sup> /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)	рс	2	
	450 mm plastic cable tie	Nr	50	
	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 <sup>2</sup> cable	Nr	4	
5.9.2.1.24h	Stainless steel ferrules for 0.75 mm <sup>2</sup> cable	Nr	2	
	10 amps cable terminal block	Nr	3	
	30 amps cable terminal block	Nr	4	
	Other Electro-mechanical Works - BH 6.2			
	Preparation of all design technical and working drawings for the	LS	1	
5.9.2.1.25a	works for approval prior to commencement of installation of works as	LS	'	
	per the Specifications.			
	· · ·			
5.9.2.1.25b	Allow for all the builders works associated with all the electrical	LS	1	
	works that the contractor considers necessary to complete works.			
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.			
	an the distances areas as a result of the flow crossing instantations.			
		LS	1	
E 0 0 4 0E 1	Completion to the control of Acceptance of Acceptance of Acceptance			
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			
	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 and<="" td="" vdc=""><td></td><td></td><td></td></ucb<30>			
	Transmitter with pressure range of 20 bar, over pressure safety of 50	Nr	1	
	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 and<="" td="" vdc=""><td></td><td>1</td><td></td></ucb<30>		1	
	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 2-wire="" 4-20="" and="" ma="" output="" signal="" system.<="" td="" vdc=""><td></td><td>1</td><td></td></ucb<30>		1	
5.9.2.1.25e	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 2-wire="" 4-20="" all="" and="" bends<="" c="" fittings,="" gs="" id8x3="" ma="" mm="" mounting="" necessary="" output="" signal="" system.="" td="" thick="" tube="" vdc="" w=""><td></td><td>1</td><td></td></ucb<30>		1	
5.9.2.1.25e	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 2-wire="" 4-20="" all="" and="" and<="" bends="" c="" connection="" dn15="" enclosed="" etc="" fittings,="" for="" gs="" id8x3="" in="" ma="" main="" mm="" mounting="" necessary="" on="" output="" pipe="" rising="" signal="" system.="" td="" thick="" tube="" vdc="" w=""><td></td><td>1</td><td></td></ucb<30>		1	
5.9.2.1.25e	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 2-wire="" 4-20="" all="" and="" at="" bends="" c="" connection="" control="" dn15="" duct="" enclosed="" etc="" fittings,="" for="" gauge="" gs="" id8x3="" in="" laid="" ma="" main="" mm="" mounting="" necessary="" on="" output="" pipe="" power="" pressure="" rising="" room.<="" signal="" supply="" switch,="" system.="" td="" the="" thick="" trenching="" tube="" vdc="" w=""><td></td><td>1</td><td></td></ucb<30>		1	
5.9.2.1.25e	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 2-wire="" 4-20="" adjustable="" all="" and="" at="" bends="" c="" connection="" control="" dn15="" dual="" duct="" enclosed="" enclosure,="" etc="" fittings,="" for="" gauge="" gs="" id8x3="" in="" ip54="" laid="" ma="" main="" metal="" mm="" mounting="" necessary="" on="" output="" pipe="" power="" pressure="" rising="" room.="" scale<="" signal="" supply="" switch="" switch,="" system.="" td="" the="" thick="" trenching="" tube="" vdc="" w="" with=""><td>Nr</td><td>•</td><td></td></ucb<30>	Nr	•	
5.9.2.1.25e	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 2-wire="" 4-20="" adjustable="" all="" and="" at="" bends="" c="" connection="" control="" dn15="" dual="" duct="" enclosed="" enclosure,="" etc="" fittings,="" for="" gauge="" gs="" id8x3="" in="" ip54="" laid="" ma="" main="" metal="" mm="" mounting="" necessary="" on="" output="" pipe="" power="" pressure="" rising="" room.="" scale<="" signal="" supply="" switch="" switch,="" system.="" td="" the="" thick="" trenching="" tube="" vdc="" w="" with=""><td>Nr</td><td>•</td><td></td></ucb<30>	Nr	•	
5.9.2.1.25e	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 2-wire="" 4-20="" all="" and="" at="" bends="" c="" connection="" control="" dn15="" duct="" enclosed="" etc="" fittings,="" for="" gauge="" gs="" id8x3="" in="" laid="" ma="" main="" mm="" mounting="" necessary="" on="" output="" pipe="" power="" pressure="" rising="" room.<="" signal="" supply="" switch,="" system.="" td="" the="" thick="" trenching="" tube="" vdc="" w=""><td>Nr</td><td>•</td><td></td></ucb<30>	Nr	•	
5.9.2.1.25e 5.9.2.1.25f	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 (0="" (kg="" -="" 0="" 2-wire="" 25="" 4-20="" adjustable="" all="" and="" at="" bar)="" bar),="" bends="" c="" cm²="" connected="" connection="" control="" dn15="" dual="" duct="" enclosed="" enclosure,="" etc="" fittings,="" for="" gauge="" gs="" gs<="" id8x3="" in="" ip54="" kg="" laid="" ma="" main="" metal="" mm="" mounting="" necessary="" on="" output="" pipe="" power="" pressure="" range="" rising="" room.="" scale="" signal="" supply="" switch="" switch,="" system.="" td="" the="" thick="" to="" trenching="" tube="" vdc="" w="" with=""><td>Nr</td><td>•</td><td></td></ucb<30>	Nr	•	
5.9.2.1.25e 5.9.2.1.25f	Transmitter with pressure range of 20 bar, over pressure safety of 50 bar, from SS material, and power supply 10 <ucb<30 (0="" (kg="" -="" 0="" 2-wire="" 25="" 4-20="" adjustable="" all="" and="" at="" bar)="" bar),="" bends="" bracket.="" by="" c="" cm²="" connected="" connection="" control="" copper="" dn15="" dual="" duct="" enclosed="" enclosure,="" etc="" firmly="" fittings,="" fixed="" for="" gauge="" gs="" have<="" id8x3="" in="" ip54="" it="" kg="" laid="" ma="" main="" metal="" mm="" mounting="" necessary="" on="" output="" pipe="" power="" pressure="" range="" rising="" room.="" scale="" shall="" signal="" supply="" switch="" switch,="" system.="" td="" the="" thick="" to="" trenching="" tube="" vdc="" w="" wall="" with=""><td>Nr m</td><td>165</td><td></td></ucb<30>	Nr m	165	





5.9.2.1.25g	High quality pressure gauge - (indoor mounting), with dual scale			
	(Kg/cm <sup>2</sup> and Bar).Range (0 - 30 Kg/cm <sup>2</sup> )/(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	
59.2.1.25i	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.	N		
5.9.2.1.25j		Nr	1	
0.0.2.1.20	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°			
	C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1	
5.9.2.1.25	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° 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	
				<del>                                     </del>
5.9.21.26g	DN75x90° GS slow bend	Nr	2	



5 0 2 1 26h	DN75 GS hex nipple	Nr	4	
5.9.2.1.26ii 5.9.2.1.26i	DN75 GS nex nipple DN75 GS union (threaded)	Nr	3	
5.9.2.1.26i 5.9.2.1.26j	, ,	Nr	3	
	DN75 stainless steel non-slam, Non-Return valve (threaded)		1	
5.9.2.1.26k	DN75 steel Johnson coupling c/w rubber rings.	Nr	2	
5.9.2.1.26l 5.9.2.1.26m	DN75xPN20 gate valve c/w handwheel. DN75, PN 20 bar Y-strainer	Nr 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	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			
0.0.0				
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	
<b>5.9.3.2</b> 5.9.3.2.01	Remove the existing socket/lighting wiring.			
5.9.3.2.02	20 mm diam. GS conduit fixed on the walls and roof members. The	LS	1	
0.0.0.2.02	cost shall be inclusive of tees, bends, circular boxes with covers,			
50000	other necessary accessories	m	100	
5.9.3.2.03 5.9.3.2.04	1.5 mm² single copper cables (Red=130 m, Black=100 m , Green	m	330	
5.9.3.2.04	2.5 mm <sup>2</sup> 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			
5.9.3.2.06	quality approved make c/w box and ss screws  10 amps, I way 1 gang switch (smc) as Mem, Crabtree or similar	Nr	1	
3.3.3.2.00	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)			
500000	200 methor 2000 metal. I ED throughout lighting thing (IDEA) and any	Nr	4	
5.9.3.2.09	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			
500010	2	Nr	1	
5.9.3.2.12	25 mm <sup>2</sup> sc copper cable laid trench and connected to earth rod and main switchgear panel earth bond tape.	m	5	
5.9.3.2.13	32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator, base		J	
	and screw top lid, wired using 6 mm <sup>2</sup> sc copper cables in 32 mm diameter			
	GS conduit.	No.	1	
5.9.3.2.14	Improve lightning protection system	LS	4	
5.9.3.3	AC/DC POWER SUPPLY			
5.9.3.3.01	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps continuosly rated converter fully protected (overload/short-			
	circuit/reverse voltage and polarity etc c/w RJ45, RS232, RS485			
	ports, mcbs protected outputs to supply water meter, borehole water			
	level measurement, rising main pressure measurement, PLC, Radio/Data Trans-Receiver Equipment.	SET	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	141		
TOTAL B	Hs 6.1 & 6.2:- CARRIED TO BILLL 5 SUMMARY SHEET	l	!	





### 5.10.1 BOREHOLE NO. 8.2

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5.10.1.1.22	Installation Sundries				
	ID320x4 mm Thick GS Borehole cap with welded DN50 GS pipe				
0.10.1.1. <u>L</u>	piece, welded DN38 GS slow bend for passage of 10mm²/4c 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)	рс	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 <sup>2</sup> cable	Nr	4		
5.10.1.1.22h	Stainless steel ferrules for 0.75 mm² cable		3		
5.10.1.1.22ii		Nr	4		
	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				
5.10.1.1.23c	Painting, varnishing and any other works necessary for making good	LS	1	1	
J. 10. 1. 1.23C	all the disturbed areas as a result of the new electrical installations.				
	and an analysis of the new electrical modellicality.	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 and="" signal<="" td="" vdc=""><td>N.I.</td><td></td><td></td><td></td></ucb<30>	N.I.			
5.10.1.1.23e	output 4-20 mA 2-wire system.  ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends	Nr	1		
5.10.1.1.23e	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.				
5.10.1.1.22f	Adjustable Pressure switch in IP54 metal enclosure, with dual scale	m	30		
5.10.1.1.221	(Kg/cm <sup>2</sup> and Bar), range 0 - 25 Kg/cm <sup>2</sup> (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 <sup>2</sup> and Bar).Range (0 - 30 Kg/cm <sup>2</sup> )/(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		NI=	1		
5.10.1.1.22i	DN75 GS pipe. Supply, installation, testing and commissioning of 24V DC Power	Nr	- 1		
5.10.1.1.221	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		141			
,	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.				
E 10 1 1 001:	. , , ,	Nr	1	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° C to +55°C,RS				
	232 interface,TCP/IP protocol stack for M2M	Nr	1		
5.10.1.1.231	Supply and installation of 1.5mm² armoured underground cable for the				
F 40 4 4 0 1	well probe	m	30		
<b>5.10.1.1.24</b>	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			ĺ	



	Owner delivered Office 1 and 1 and 1				
	Supply, delivery to Site, Install and Test:				
5 40 4 4 0 4 b	DNIES 000 OL 1 1 1 1 1 1 1				
5.10.1.1.24b	DN50x90° GI slow bend with a bore for pressure gauge DN50 GI socket with bore for mounting air valve	Nr	1		
5.10.1.1.24c 5.10.1.1.24d	DN75x50 GI reducer (female threaded)	Nr Nr	1		
5.10.1.1.24u 5.10.1.1.24e		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		
5.10.1.1.24	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					
5.10.2.1.02	Submersible pump set of capacity 23 m <sup>3</sup> /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	%	0.05		
5.10.2.1.04	16 mm <sup>2</sup> /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 Nr	1		
5.10.2.1.10 5.10.2.1.11	DN100x75 GS reducer (female threaded) 0.75mm² 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 <sup>2</sup> /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 mm²/4c armoured copper cable	m	25		
5.10.2.1.14	Copper cable gland c/w lock-nut and shroud for 16 mm <sup>2</sup> /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 <sup>2</sup> /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 5.10.2.1.19a	16 mm² sc copper cable (green) 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 16mm²/4c and 0.75 mm² sc submerssible cable.	m Nr	5		
5.10.2.1.1b	DN38x150 mmL GS threaded pipe piece (cable entry)	Nr	1		
5.10.2.1.10	18.5 Kw, 3 phase, 415 vac, soft starter panel including integral 3 phase surge arrestor unit.	SET	1		
	po priaco ourgo arrodor unit.	-			





		1			
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	SEI	- 1		
5.10.2.1.22	Flow Meter, DN80, Qmax=80m <sup>3</sup> /hr, Q <sub>nom</sub> =40m <sup>3</sup> /hr, Q <sub>T</sub> =8m <sup>3</sup> /hr and				
	Q <sub>min</sub> =1.2m <sup>3</sup> /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°C,				
	range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O,				
	+o.25%<4mH2O.	Nr	1		
	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 <sup>2</sup> /4c cable,				
	water level control electrodes cables and passage of OD25 mm pvc	Nr	4		
5.10.2.1.24b	dipper pipe. Boss white (200 gm tin)	Pc	2		
	450 mm plastic cable tie	Nr	50		
5.10.2.1.24d		ROLL	2		
5.10.2.1.24e		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 <sup>2</sup> cable	Nr	4		
5.10.2.1.24h	Stainless steel ferrules for 0.75 mm <sup>2</sup> cable	Nr Nr	3		
5.10.2.1.24i 5.10.2.1.24j	10 amps cable terminal block 30 amps cable terminal block	Nr	4		
J. 10.2.1.2-ij	30 amps cable terminal block	141	_		
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	LO	-		
0.10.2.1.200	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 and="" signal<="" td="" vdc=""><td>Nr</td><td>1</td><td></td><td></td></ucb<30>	Nr	1		
5.10.2.1.25e	output 4-20 mA 2-wire system.  ID8x3 mm Thick GS tube c/w all necessary mounting fittings, bends	INI	- 1		
0.10.2.1.200	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 <sup>2</sup> and Bar), range 0 - 25 Kg/cm <sup>2</sup> (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	141	- '		
0.10.2.1.20g	(Kg/cm² and Bar).Range (0 - 30 Kg/cm²)/(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	١	١		
5 40 0 4 05°	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		
		T	<u> </u>	1	



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° C to +55°C,RS 232 interface,TCP/IP protocol stack for M2M	Nr	1	
5.10.2.1.25	Supply and installation of 1.5mm <sup>2</sup> armoured underground cable for the well probe	m	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.			
5.10.2.1.26a	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° GS slow bend with a bore for pressure gauge	Nr	1	
	DN75 GS socket with bore for mounting air valve	Nr	1	
	DN75x50 GS reducer (threaded)	Nr	1	
	DN75x1500 GS pipe piece (threaded at both ends)	Nr	1	
	DN75x300 GS pipe piece (threaded at both ends	Nr	1	
5.10.21.26g	DN75x90° GS slow bend	Nr	2	
	DN75 CS hex nipple	Nr	4	
	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	
	DN75, PN 20 bar Y-strainer	Nr	1	
	DN100x75 GS reducer	Nr	2	
	DN100x200 mmL GS pipe piece	Nr	2	
	DN100x250 mmL GS pie piece	Nr	2	
	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			
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## 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				
5.10.3.1.02	blows the compartment.  Replace the existing 125 mps, 3 phase mccb on power control	ITEM	1		
3.10.3.1.02	switchgear panel feeding starter for BH. No. 8.2 with one rated 63	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				
5.10.3.1.05	3x2.5 mm <sup>2</sup> single core copper cables wired in 20 mm diameter pvc	SET	1		
5.10.3.1.06	conduit from consumer unit to fan speed control unit and fan  Remove the defective cooling fan. Install a new one rated 25	m	6		
5.10.5.1.06	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.				
<b>5</b> 40 0 0	,	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 <sup>2</sup> single copper cables (Red=50 m, Black=25 m , Green =25 m)	m	28		
5.10.3.2.04	laid in GS conduit and terminated at boh ends.	m	90		
5.10.3.2.04	2.5 mm <sup>2</sup> 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, 1I 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  13 amps, 240 vac, twin switched socket outlet (smc) as Mem,	Nr	1		
5.10.5.2.07	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				
5.10.3.2.09	surface using 20 mm diam. GS coupler)  20 wattsx300 mmL LED fluorescent lighting fitting (IP54), energy save,	Nr	2		
5.10.3.2.10	corrossion resistant, power factor compensated.  3x2.5 mm² single core copper cables wired in 20 mm diameter pvc conduit from consumer unit to fan speed control unit and fan	Nr	4	1	
	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	SET	4		
5.10.3.2.12	32 amps, TPN + E (5-pin), 415 vac, socket outet (smc) c/w isolator,	SEI		<del> </del>	
	base and screw top lid, wired using 6 mm <sup>2</sup> sc copper cables in 32 mm diameter GS conduit.	No	1		
5.10.3.2.13	Improve lightning protection system	LS	3		
5.10.3.3	AC/DC POWER SUPPLY				
5.10.3.3.01	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps continuosly rated converter fully protected (overload/short-circuit/reverse voltage and polarity etc c/w RJ45, RS232, RS485 ports, mcbs protected				
	outputs to supply water meter, borehole water level measurement, rising main pressure measurement, PLC, Radio/Data Trans-Receiver Equipment.	SET	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		
				<del>                                     </del>	
	TOTAL PAGE 6				



## 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 <sup>3</sup> /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 <sup>2</sup> /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		
5.11.1.1.11	0.75mm <sup>2</sup> 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 <sup>2</sup> /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 <sup>2</sup> /4c armoured copper cable	LM	15		
5.11.1.1.14	Copper cable gland c/w lock-nut and shroud for 6 mm <sup>2</sup> /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 <sup>2</sup> /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 10mm²/4c and 0.75 mm² 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				
	TOTAL FACE I				



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 10mm²/4c 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)	рс	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 <sup>2</sup> cable	Nr	4	
5.11.1.1.18h	Stainless steel ferrules for 0.75 mm <sup>2</sup> 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			
5.11.1.1.19c	contractor considers necessary to complete works  Painting, varnishing and any other works necessary for making good all the	LS	1	
	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 4-20<br="" and="" output="" signal="" vdc="">mA 2-wire system.</ucb<30>	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, $Q_{\text{max}}$ =80m³/hr, $Q_{\text{nom}}$ =40m³/hr, $Q_{\text{T}}$ =8m³/hr and $Q_{\text{min}}$ =1.2m³/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°C, range from 1-100 mH2Og, acuracy + 0.175% FS BSL NLHR>4mH2O, +0.25%<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/cm² and Bar), range 0 - 25 Kg/cm² (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/cm² and Bar).Range (0 - 30 Kg/cm²)/(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 hall value	Nr	1	
5.11.1.1.19k	Single orifice cast steel air valve c/w accessories for mounting on DN75 GS pipe.	Nr	1	
5.11.1.1.191	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	. 41		<del>                                     </del>



5.11.1	BOREHOLE NO. 9	1	1	ı
5.11.1.1.19n				
3.11.1.1.1311	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° C to +55°C,RS 232			
	interface,TCP/IP protocol stack for M2M	NI-		
5.11.1.1.190	Supply and installation of 1.5mm² armoured underground cable for the well	No	1	
3.11.1.1.190	probe	m	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° 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° 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	
5.11.1.1.201	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	
5.11.1.1.200	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.			
	ground level alter laying or 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		- 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,	NI=	4		
5.11.3.1.08	programmable electronic PF controller.relay. 154 μF/phase etc. 1xsingle phase, 240 vac kWh energy registering meter)	Nr 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 <sub>CU</sub> =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 <sub>CU</sub> =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	Nr	1		
5.11.3.1.13	mccb 1x100 amps,1phase, 240 vac class "A" mcbs (staff houses - future)	Nr Nr	1		+
5.11.3.1.14	240 ac/24 vdc, 6 amps continuosly rated output converter fully protected				
5.11.3.1.15	1xCooling fan rated 25 watts, 240 vac, 2800 rpm continuously rated installed	Nr	1		
5.11.5.1.15	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,	Nr	1		
5.11.3.1.19	1 No. Blanking plate.  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)		1		
5.11.3.1.22	25x3 mm thick copper strip bound along the switchgear panel length (earthing)	Nr 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				
5.11.3.2.03	accessories  1.5 mm <sup>2</sup> single copper cables (Red=50 m, Black=25 m, Green =25 m) laid in GS conduit and terminated at boh ends.	m m	28 90		
5.11.3.2.04	2.5 mm <sup>2</sup> 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, 1I 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		
				1	1

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5.11.1	BOREHOLE NO. 9			1	
5.11.3.2.10	3x2.5 mm <sup>2</sup> 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).	CET	,		
5.11.3.2.12	Improve lightning protection system	SET	1		
5.11.33	AC/DC POWER SUPPLY	LO			
.11.33.01	Floor stand supported, 240 ac, 2.5 amps/24 vdc, 20 amps continuosly rated				
	converter fully protected (overload/short-circuit/reverse voltage and polarity				
	etc c/w RJ45, RS232, RS485 ports, mcbs protected outputs to supply water meter, borehole water level measurement, rising main pressure				
	measurement, PLC, Radio/Data Trans-Receiver Equipment.				
		SET	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.	NI-	_		
	Charged.	Nr	2		
				ļ	
-					
				<del>                                     </del>	1
	<u> </u>				
				<del>                                     </del>	1
	TOTAL BAGE 5				
	TOTAL PAGE 5	I	l	1	1





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					

### **NOTES**

The monitoring system shall;

- 1. Cover 40 No. boreholes and 1 No. reservoir clustered within a radius of 50 Kms.
- 2. Interrogate the sites, issue instructions, obtain the information required through wireless communicaion.

### 3. DATA TO BE CAPTURED AT EACH BOREHOLE/RESERVOIR SITE:

At each site, the following information will be automatically collected and stored in memmory.

Continuous monitoring, recording and Storing data on:

- 3a). Water level in the borehole or reservoir.
- 3b). Pressure on the rising main from borehole/reservoir.
- 3c). System power consumption (KWh, Kw, KVA demand, Line Current, Line voltage, power factor, supply frequency etc).
- 3d). Water flow rate (m³/hr or Litres/minute) and Cummulative quantity (M³ or litres) from water meter of each borehole or reservoir.
- 3e). Status of the Pump set (Run, Stopped, Fault).

/-	Ctatae of the famp out (fram, Ctoppea, family)		
	TOTAL CARRIED TO BILLL 5 SUMMARY SHEET		-



ISEP Page 78 of 10



	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	рс	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	рс	1		
5.13.22	GI Pipes Class B, DN75 , 6m long with crane sockets	pcs	8		
	BOREHOLE 7				
5.13.26	PSk2-40 Controller-controller with DataModule, Sunswitch	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 10mm2 Copper Earth Cable	pc m	10		
5.13.43	60A Manual Change over switch	m Pc	10 1		
5.13.44	Lightning Arrestor	Set Set	1		
5.13.46	Non Return Valve (Flap Type) DN75mm		1		
5.13.47	GI Pipes Class B, DN75 , 6m long with crane sockets	pc pcs	8		



Bill of Quantity

	BOREHOLE 4				
5.13.50	PSk2-40 Controller-controller with Data Module, Sunswitch	Рс	1		
5.13.51	Solar Panels 270W poly crystalline	Pc	84		
5.13.51	DC Disconnect 1000-40-5	Pc			
5.13.52	Well Probe Sensor	Set	2		
		t	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		
- 40.00	1.5mm2 Armoured Underground cable for the				
5.13.60	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	<u> </u>	+
5.13.66	Earth rod c/w clamp	m pc	2		
5.13.67	10mm2 Copper Earth Cable				
-		m Do	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	рс	1		
5.13.71	GI Pipes Class B, DN75 , 6m long with crane sockets	pcs	8		
	DODELIOLE A				
	BOREHOLE A				
E 40.70		Da	1		
5.13.73	RSI 3 x 380V IP66 22kW 46A	Pc	1		
5.13.74	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline	Рс	96		
5.13.74 5.13.75	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5	Pc Pc	96 2		
5.13.74 5.13.75 5.13.76	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A	Pc Pc Pc	96 2 1		
5.13.74 5.13.75 5.13.76 5.13.77	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor	Pc Pc Pc Set	96 2 1 1		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125	Pc Pc Pc Set Pc	96 2 1 1		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect	Pc Pc Pc Set Pc Pc	96 2 1 1 1 2		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125	Pc Pc Pc Set Pc	96 2 1 1		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable	Pc Pc Pc Set Pc Pc	96 2 1 1 1 2		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable	Pc Pc Pc Set Pc Pc Pc Pc	96 2 1 1 1 2		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable	Pc Pc Pc Set Pc Pc Pc Pc Pc Pc Pc Pc	96 2 1 1 1 2 1 50		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the	Pc Pc Set Pc Pc Pc Pc M M M	96 2 1 1 1 2 1 50		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring	Pc Pc Set Pc Pc Pc m m m	96 2 1 1 1 2 1 50 150 30		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.83	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable	Pc Pc Set Pc Pc Pc m m m	96 2 1 1 1 2 1 50 150 30 80		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.84 5.13.84	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry	Pc Pc Pc Set Pc Pc Pc m m m unit	96 2 1 1 1 2 1 50 150 30 80 20 1		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.83	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry 5m High Ground mount mild steel support structure	Pc Pc Set Pc Pc Pc m m m	96 2 1 1 1 2 1 50 150 30 80		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.84 5.13.84	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry 5m High Ground mount mild steel support structure 25mm UPVC Airline	Pc Pc Pc Set Pc Pc Pc m m m unit	96 2 1 1 1 2 1 50 150 30 80 20 1		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.84 5.13.85 5.13.86 5.13.87	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry 5m High Ground mount mild steel support structure 25mm UPVC Airline Earth rod c/w clamp	Pc Pc Set Pc Pc Pc m m m unit Lump sum	96 2 1 1 1 2 1 50 150 30 80 20 1		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.84 5.13.85 5.13.86 5.13.87	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry 5m High Ground mount mild steel support structure 25mm UPVC Airline Earth rod c/w clamp 10mm2 Copper Earth Cable	Pc Pc Set Pc Pc Pc m m m unit Lump sum	96 2 1 1 1 2 1 50 150 30 80 20 1 1		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.84 5.13.85 5.13.86 5.13.87 5.13.88 5.13.89	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry 5m High Ground mount mild steel support structure 25mm UPVC Airline Earth rod c/w clamp	Pc Pc Set Pc Pc Pc m m m unit Lump sum pc	96 2 1 1 1 2 1 50 150 30 80 20 1 1 42 2		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.84 5.13.85 5.13.86 5.13.87 5.13.88 5.13.89 5.13.90	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry 5m High Ground mount mild steel support structure 25mm UPVC Airline Earth rod c/w clamp 10mm2 Copper Earth Cable	Pc Pc Set Pc Pc Pc m m m unit Lump sum pc m pc m	96 2 1 1 1 2 1 50 150 30 80 20 1 1 42 2 10		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.84 5.13.85 5.13.86 5.13.87 5.13.88 5.13.89 5.13.90 5.13.91	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4  10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry 5m High Ground mount mild steel support structure 25mm UPVC Airline Earth rod c/w clamp 10mm2 Copper Earth Cable Lightning Arrestor	Pc Pc Set Pc Pc Pc m m m unit Lump sum m pc m Set	96 2 1 1 1 2 1 50 150 30 80 20 1 1 42 2 10 1		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.84 5.13.85 5.13.86 5.13.87 5.13.88 5.13.89 5.13.90 5.13.92	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry 5m High Ground mount mild steel support structure 25mm UPVC Airline Earth rod c/w clamp 10mm2 Copper Earth Cable Lightning Arrestor Non Return Valve (Flap Type)DN75	Pc Pc Pc Set Pc Pc Pc M M M M Unit Lump sum M Set Pc M Set	96 2 1 1 2 1 50 150 30 80 20 1 1 42 2 10 1		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.80 5.13.81 5.13.82 5.13.83 5.13.84 5.13.85 5.13.86 5.13.87 5.13.89 5.13.90 5.13.91 5.13.92	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4  10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry 5m High Ground mount mild steel support structure 25mm UPVC Airline Earth rod c/w clamp 10mm2 Copper Earth Cable Lightning Arrestor Non Return Valve (Flap Type)DN75 GI Pipes Class B, DN75 , 6m long with crane sockets	Pc Pc Pc Set Pc Pc Pc M M M M Unit Lump sum M Set Pc M Set	96 2 1 1 2 1 50 150 30 80 20 1 1 42 2 10 1		
5.13.74 5.13.75 5.13.76 5.13.77 5.13.78 5.13.79 5.13.80 5.13.81 5.13.82 5.13.83 5.13.84 5.13.85 5.13.86 5.13.87 5.13.88 5.13.89 5.13.90 5.13.92	RSI 3 x 380V IP66 22kW 46A Solar Panels 270W poly crystalline DC Disconnect 1000-40-5 Manual Changeover switch 160A Well Probe Sensor PV Protect 1000-125 Surge Protect PV Combiner 1000-125-4 10 mm2 4 core armoured underground cable 0.75mm2 Well Probe Cable 1.5mm2 Armoured Underground cable for the Well probe 10mm2 Twin Flat with Earth for panel interwiring 10mm2 Earth Cable Installation Sundry 5m High Ground mount mild steel support structure 25mm UPVC Airline Earth rod c/w clamp 10mm2 Copper Earth Cable Lightning Arrestor Non Return Valve (Flap Type)DN75	Pc Pc Pc Set Pc Pc Pc M M M M Unit Lump sum M Set Pc M Set	96 2 1 1 2 1 50 150 30 80 20 1 1 42 2 10 1		



	REHABILITATION AND DRILLING OF BORE			1	T	
BILL No.	DESCRIPTION	UNIT	QTY	Rate (KES)	Amount (KES)CONFIRMED BILLS	Amount (KES)PROVISIONA BILLS
	BILL 5 SUMMARY SHEET					
	DIEC O GOMMANT GIEET					
	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, 8.2,8.3					
5.10	BURE HULE 6.1, 6.2,6.3					
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					





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	0.65		
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			1	
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		
	PIDE EITTINGS GUDDI WOMAN				
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		
600	HINGTIONS AND DRANGUES ALL ELANGES MIN DIAG				
<b>6.2.3</b> 6.2.3.1	JUNCTIONS AND BRANCHES, ALL FLANGED, MIN PN12	No	2		
6.2.3.1	Tees branch down 6 diameter, 150/150 mm diameter  Tees branch down 7 diameter, 150/150 mm diameter	No No	2		
3.2.0.2	1000 Station down 7 diameter, 100/100 min diameter	140		1	
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	1			





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 Gl/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 Gl/uPVC, 80 mm dia	No	4		
6.2.6	FITTINGS IN UPVC TO SUIT UPVC PIPES			ı	
6.2.6.1	Bends 45°, 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	No	5		
6.2.7.6	isolating integral valve PN12 Flanged Float Valves Min PN12 - 150 mm diameter	No	2		
6.2.7.7	Zonal Bulk Meters, Flanged Woltman Type Min PN12 - DN 150	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				
6001	HDPE pipes and fittings		074		
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	L	
6.2.8.4	Installation of HDPEwashout pipes Pipe n.b. exc 100 mm but n.e. 200 mm trenches 1.5-2m	m	36	1	





ITEM	DESCRIPTION	UNIT	QTY	RATE (KES)	AMOUNT(KES
	PRESSURE TESTING HDPE PIPES AND FITTINGS: Ref Specs. 9.2.6.1				
	Test pressure exc 12 bars but not exc 16 bars pipe n.b. exc.				
6.2.8.5	100mm but n.e. 400mm	m	1663		
	STERILIZATION AND FLUSHING				
6.2.8.6	Pipe n.b100mm-400mm	m	1663		
0.2.0.0	METHOD OF MEASUREMENT TYPE B BY NUMBER		1000		
	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		
	<u>Tapers</u>				
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	<del>.</del> 1		
6.2.8.19	Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5 m	No	1		
	Side real min but no 200 min in translates, depart 1 mo m	1.10	•		
	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 Gl/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				





ITEM	DESCRIPTION	UNIT	QTY	RATE (KES)	AMOUNT(KE
6.3	PIPEWORK				
6.3.1	MANHOLE AND OTHER CHAMBERS IN ACCORDANCE WITH	H STAN	IDARD DE	RAWINGS	
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 Fence crossing pipe nom. Bore ne 200-400 mm	No	15		
6.3.3.1	Sewer, ditch or drain crossing pipe nom. Bore ne 200-400	INO			
6.3.3.2	mm(Provisional)	No	3		
6.3.4	REINSTATEMENT				
	Breaking up, temporary and permanent reinstatement of				
6.3.4.1	tarmac roads, pipe nom.bore100-400 mm  Breaking up, temporary and permanent reinstatement of dirt	m	24		
6.3.4.2	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	1			
6.4.1.1	In pipe trenches excavation or rock class I material (Provisional)  In pipe trenches excavation or rock class II material	m3	223		
6.4.1.2	(Provisional)	m3	230		
6.4.1.3	In pipe trenches backfilling with class S2 material (Provisional) In manhole and chambers excavation of rock class II material	m3	2370		
6.4.1.4	(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 Selected granular material incl upper bedding, side filling and				
6.4.3.1	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 C	LASS 2	20		
					· · · · · · · · · · · · · · · · · · ·
0.4.4.	To Horizontal bends	<b> </b>			
6.4.4.1	Volume 0.5-1 m3, nom bore 200-400 mm	No	12		





ITEM	DESCRIPTION	UNIT	QTY	RATE (KES)	AMOUNT(KES
				,	
	To Vertical bends at Crest				
6.4.4.2 6.4.4.3	Volume 0.1-0.2 m3 nom bore 100-200 mm(Provisional)	No	1		
0.4.4.3	Volume 0.5-1 m3 nom bore 100-200 mm(Provisional)  To Junctions	No	ı		
6.4.4.4	Volume 0.5-1m3, bore 200-400 mm	No	2		
	To Tapers	- 1.0			
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		
				1	
				1	
				1	
				+	
				+	
				1	
				1	
	TOTAL PAGE 5				



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

CHAMBER	(as per Tech Spec chapter 16 and drawing N° 1220						
ITEM	DESCRIPTION	UNIT	QTY	RATE (KES)	AMOUNT(KES)		
6A.1	Demolition and Site Clearance				-		
6A.1.1	Demolition of existing masonry weir/scour chamber (approx. dimensions 1200x1200mm)	Item	1				
6A.1.2	Disconnection of connected pipework (2x DN160 uPVC discharge pipes, DN50 steel scour pipe and gate valve)	Item	1				
6A.1.3	Removal of demolition material, cleaning and preparation of ground for new structure	Item	1				
6A.1.4	Demolition of the existing RC side wall of the existing chlorine dosing chamber (approximate length= 2000mm)	Item	1				
6A.3	Concrete construction & masonry work						
6A.3.1	Volume n.e. 50-100 m3	Item	1				
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	Item	1				
6A.3.3	New cover to fit to expanded RC chlorine dosing chamber and to allow manual adjustment of both gate valves comfortably	Item	1				
6A.3.4	Reconstruction of the entire weir/sour chamber (1200 x 1200 mm, masonry)	Item	1				
6A.4	PIPE- FITTINGS- SUPPLY-(PN10)						
6A.4.1	Extension of existing 2x DN 160 uPVC drainage pipes to reconstructed and replaced weir/scour chamber. Supply, connect to existing pipes	Item	1				
6A.4.2	DN50 steel scour pipe and gate valve - supply and installation between new chlorine dosing chamber and new weir/scour chamber	Item	1				
	Volves Denetocks Hydrento Meters						
6A.4.3	Valves, Penstocks, Hydrants, Meters 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						







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	<u>Forest</u>				
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	m3	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				





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	No	3		
7.2.8.6	flange - 80 mm dia. Length = 1000 mm  Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle	No	3		
	flange - 100 mm dia. Length = 1000 mm  Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle				
7.2.8.7	flange - 150 mm dia. Length = 1000 mm Single flanged pipe pieces ,length n.e. 1.0 m, c/w centre puddle	No	14		
7.2.8.8	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 Gl/uPVC - 50 mm dia	No	3		
7.2.9.10	Flanged adaptor, flexible to suit Gl/uPVC - 80 mm dia	No	3		
	Flanged adaptor, flexible to suit Gl/uPVC - 100 mm dia	No	2		
7.2.9.11	rianged adapter, nexible to eat eval ve ree min dia				
7.2.9.11 7.2.9.12	Flanged adaptor, flexible to suit Gl/uPVC - 150 mm dia	No	12		





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 - 45° DN 160 mm	No	10		
7.2.11	VALVES, PENSTOCKS, HYDRANTS, METERS				
	Gate valve to SSRN 226 c/w T-Keys, Resilient seal series 14 Min				
7.2.11.1	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 -	No	6		
7.2.11.8	DN 200 mm Flap Valves(Washout) Min PN25 - 150 mm diameter	No	11		
11.0	Air valves, Non-slam air valve or equivalent with Isolating valve -	140			
7.2.11.9	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		
	Master Strainer, double flanged, Min PN25 - 200 mm dia	No	1		
7.3	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-	m	53		
7.3.1.2	1.5m HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth 1-	m	340		
7.3.1.3	1.5m HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth	m	1200		
7.3.1.4	1.5-2m HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth 2-		3822		
7.3.1.5	3m HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth 3-		628		
7.3.1.6	4m HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm trenches depth 4-		200		
	6m HDPE pipes - Pipe n.b exc 200mm but n.e. 400mm on concrete	m			
7.3.1.7	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 Valvo at Kaya Rombo Junation				
	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		





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		
70040	All flanged Tees - Nb exc 200 mm but n.e 400 mm in trenches depth				
7.3.2.10	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		
	Main Plan ended, Branch flanged in trenche - Nb exc 200 mm but		_		
7.3.2.12	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	No	11		
	trenches depth 1-1.5 m  Main socketed, Branch flanged - Nb exc 200 mm but n.e 400 mm in				
7.3.2.14	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	No	11		
	400 mm in trenches depth 1-1.5 m  Main Socketed, Branch flanged, invert level - Nb exc 200 mm but n.e				
7.3.2.16	400 mm in trenches depth 1.5-2 m	No	10		
	Tonoro				
7.3.2.17	Tapers     Nb exc 100 mm but n.e. 200 mm in trenches depth n.e. 1m	No	11		
7.3.2.17	Nb exc 100 mm but n.e. 200 mm in trenches depth 1-1.5m	No	10		
7.5.2.10	No exc 100 min but n.e. 200 min in denotes depth 1-1.5m	140	10		
	Pipe pieces and bellmouths				
7.3.2.19	Plain ended pieces, Nb.exc 200 mm but ne 400 mm in trenches 1-	No	1		
7.0.2.10	1.5m   Plain ended pieces, Nb.exc 200 mm but ne 400 mm in trenches 1.5-	110	•		
7.3.2.20	2m	No	1		
7.3.2.21	Plain ended pieces, length n.e. 1m c/w centre puddle flange - Nb.exc	No	1		
7.0.2.21	200 mm but ne 400 mm in trenches 1-1.5m Single flanged pipe pieces, length n.e. 1.0 m - NB. Exc 100mm but	110	•		
7.3.2.22	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	No	2		
7.5.2.25	n.e. 200 mm in trenches depth 1-1.5m	INO			
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	No	11		
7.3.2.23	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	No	1		
1.3.2.21	trenches 1-1.5m	INU	- 1		
7.3.2.28	Double flanged pipe pieces - Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m	No	2	İ	





	UNIT	QTY	RATE(KES)	AMOUNT(KES)
Adaptors, detachable Collars Couplings &saddles				
Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m	No	6		
Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m	No	5		
Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1m	No	7		
Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5m	No	7		
Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n.e 1m	No	6		
Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n 1-1.5m	No	4		
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		
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		
Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m	No	5		
Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m	No	3		
Flanged adaptor, flexible to suit Gl/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1m	No	6		
Flanged adaptor, flexible to suit Gl/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1-1.5m	No	5		
Flanged adaptor, flexible to suit Gl/uPVC pipes PN16 - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5 m	No	6		
	Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m  Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m  Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1m  Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n.e 1m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 200 mm but ne 200 mm in trenches, depth 1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb-exc 200 mm but ne 400 mm in trenches 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb-exc 200 mm but ne 400 mm in trenches 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb-exc 200 mm but ne 400 mm in trenches 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb-exc 200 mm but ne 400 mm in trenches 1-1.5m  Flanged adaptor, flexible to suit Gl/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1m	Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m  Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m  Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm but ne trenches 1.5-2m  Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1m  Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n.e 1m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 200 mm but ne 400 mm in trenches 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc 200 mm but ne 400 mm in trenches 1.5-2m  Flanged adaptor, flexible to suit Gl/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1m  Flanged adaptor, flexible to suit Gl/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1-1.5m  Flanged adaptor, flexible to suit Gl/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1-1.5m	Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m  Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m  Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1m  Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n.e.1m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n.1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth 1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 200 mm but ne 200 mm in trenches 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb.exc 200 mm but ne 400 mm in trenches 1.5-2m  Flanged adaptor, flexible to suit Gl/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1m  Flanged adaptor, flexible to suit Gl/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1-1.5m  Flanged adaptor, flexible to suit Gl/uPVC pipes PN16 - Nb. Ne 100 mm in trenches, depth ne 1-1.5m	Flexible, strainght coupling to suit ferrous pipe - Nb.exc 200 mm but ne 400 mm in trenches 1-1.5m  Flexible, wide range/stepped coupling - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n 1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm but ne 200 mm in trenches, depth n-1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb. ne 100 mm in trenches, depth n-1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth n-1-1.5m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth ne 1 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth n-1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 100 mm but ne 200 mm in trenches, depth n-1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 200 mm but ne 200 mm in trenches, depth n-1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 200 mm but ne 400 mm in trenches 1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 200 mm but ne 400 mm in trenches 1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 200 mm but ne 400 mm in trenches 1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 200 mm but ne 400 mm in trenches 1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 200 mm but ne 400 mm in trenches 1-1.5 m  Flexible, Flanged adaptor, PN 16 to suit steel pipes - Nb- exc. 200 mm but ne 400 mm in trenches 1-1.5 m





ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES
7.4	<u>PIPEWORK</u>				•
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	No	11		
	ne 200 depth 1.5-2m Precast Concrete air valve chamber pipe nb exc . 200 mm but ne				
7.4.1.2	400 mm depth ne 1.5 m	No	12		
	Masonry or dense blockwork Bulk Meter chamber pipe nb not exc		_		
7.4.1.3	100 mm depth exc1.5m	No	2		
7.4.1.4	Masonry or dense blockwork Master Meter chamber pipe nb not exc	No	2		
7.1.1.1	100 mm depth exc1.5m	110	_		
7.4.1.5	Masonry or dense blockwork strainer chamber pipe - nb not exc 100	No	3		
	mm depth exc1.5m				
7.4.2	MANHOLE COVERS	I	l	l .	
		T	40		
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				
	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				
7.4.3.1	1000mm + DN (150 mm stone packing in mortar, 50 mm Mortar	No	1		
	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				
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	No	5		
	(Provisional)				
7.4.4	REINSTATEMENT				
	Breaking up, temporary and permanent reinstatement of tarmac				
7.4.4.1	roads, pipe nom.bore200-400 mm (Provisional)	m	3		
	Breaking up, temporary and permanent reinstatement of dirt roads,				
7.4.4.2	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				
	HDPE valve surface boxes, medium duty with locable cover and	]			
7.5.1	frame in (500 x 500 x 200) mm class 20 concrete surround as per	No	10		
	standard drawing: area 0.1-0.5 m2				
7.5.2	Concrete chamber covers with locable Composite covers and frame	No	46		
1.5.2	600 mm dia. Medium duty, with key. Area 1-5 m2	INU	40		
7.5.3	Fixed length Extension Spindles c/w protection sleeve to suit gate	No	24		
1.0.0	valves, Length = 800 mm	110	44		
	TOTAL PAGE 6	1		1	





ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES
7.6	PIPEWORK SUPPORTS & PROTECTION ANCILLARIES TO LAYIN	IG & EX	CAVATION	<u>\</u>	•
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		<u> </u>		
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				
7.0.4	CLASS 20				
	To Horizontal bends				
7.6.4.1	Volume 0.5-1 m3, nom bore 200-400 mm	No	20		
7.0.1.1	To Vertical bends at Crest	110	20		
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	110			
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		
1.0.1.0	To Junctions	110			
7.6.4.6	Volume 0.5-1m3, bore 200-400 mm	No	30		
	To Tapers	110	- 00		
7.6.4.7	Volume 0.1-0.2 m3, nom bore 200-400 mm	No	43		
7.0.1.7	To Valves	110	70		
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				
	Provide T-keys for the operatiob of Sluice Valves. Length=800 mm				
7.7.1.1	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 -		l		





ITEM	Dosing Unit at Kaya Bombo and Magodzoni (qual 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	m²	5		
8.1.2.13	haul distance of 5.0 km  Ditto but rock	m3	1		
	Filling to structures: selected excavated materials other than	m³			
8.1.2.14	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		
0.22	0.000 20/20		20		
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		
0.0	Famousel				
8.3	Formwork (f) 1 1 2 2 2 4 2		05.00		
8.3.1	Rough formwork to edges of floor slab 0.2 - 0.40 m	m²	25.00		
8.3.2	Fair Faced Fomwork  Plane, bertical; 0.2 - 0.4 m wide	m²	50.4		
0.3.2	ir iane, petitical, 0.2 - 0.4 iii wide	1117	50.4		
8.4	Reinforcement			<u> </u>	
	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				





ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES
8.5	Walling, Dense concrete block, solid block to BS 2028		***	(-1)	2211(1.20
8.5	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	<u>Miscellaneous</u>				
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 8.6.12	Downpipes 100 mm Fittings to downpipes; 90 degrees bends	m No	7.40 4.00		
J.U. 12	i mange to dominipped, or degrees bends	140	7.00		
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		
					. —



PART 8 -					
Chlorine ITEM	Dosing Unit at Kaya Bombo and Magodzoni (qual DESCRIPTION	ntities	are for	2 units) RATE(KES)	AMOUNT(KES)
IIEW	Gravity solution feeder, constant level tank with inlet	UNII	Q I Y	KAIE(NES)	AWOUNT(KES)
	connector, repentor, outer funnel and 50 mm tubing for outlet.				
8.7.4	Includes valves and chemical resistant tubing. Flow upto 15-	No	2		
	20 ml/s				
8.8	Walkway  Provide all materials and construct walkway to connect the				
	dosing structure to the tank as shown on drawings. Length of				
8.8.1	walkway is 2.0 m. Include for installation of handrails along	LS	1		
	the walkway.				
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		
0.0.1.2	Tronina 5575. Zonini, nomina longin 6000 mm	140	14		
8.9.2	UPVC pipe fittings to SSRN 302, Junctions and branches,				
0.9.2	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		
0.3.3.1	i ianged, non-namy apindle with handwheel hb, ou film	140	7		
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 BASES				
	TOTAL PAGE 3				ļ
	TOTAL CARRIED TO GRAND SUMMARY -				



ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
9.1	Rehabilitation of 1140 m³ Kaya Bombo reservoir				
	Ref. Drawing No1210/008A-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	<u>OTHER</u>				
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				
9.2.1	accordance with drawing No.1230/K/017A  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				



ITEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES
	Provide and build dressed masonry walls with quarry stone				
0 2 7	using 1:3 cement sand mortarfor the laterines walls and pit		220.00		
9.2.7	to the required dimensions and shapes as specified on the	m2	320.00		
	drawings.				
	Provide all materials and install doors to the required				
	dimensions as detailed on the drawings, inclde for door				
9.2.8	frame, hinges, locks and keys, materials and workmanship	No	10		
	to make it complete.				
	Provide all materials and install windows as specified.				
000		NI-	40.00		
9.2.9	Include for frames, hinges, screws,and workmanship to	No	10.00		
	make it complete.				
9.2.10	Provide all materials and construct roof to the VIP latrine as	No	10.00		
0.2.10	specified on drawings	110	10.00		
	Provide all materials and apply one undercoat and 3				
9.2.11	finishing coats to the walls, doors and windows both	m2	600.00		
	externally and internally of the VIP latrines				
0.0.40	Provide all all materials and lay non-slip floor tiles as		40		
9.2.12	specified.	m2	40		
0.0	FENCING AND CATE 40 No Cite-	<del>                                     </del>			
9.3	FENCING AND GATE- 10 Nos Sites				
	Excavate for post holes, provide all materials and construct				
001	chain link fence on concrete posts at 3m centres all as per	_	0000		
9.3.1	details on Drg. No. 1230/k/015A-016A, including straining	m	3200		
	posts at every 10th post and additional posts at corners				
		1			
	Provide all materials and construct metal gate 3600mm				
9.3.2	widex 2000mm high with 1 Nr. 915mm wide pedestrian gate	No	10		
	including 3 Nr. Pillars all as detailed on Drg. No.				
	1230/K/015A-016A				
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	TOTAL PAGE 2				
	TOTAL CARRIED TO GRAND SUMMARY -	1		<del>                                     </del>	
	LICIAL CARRIED TO GRAND SUMMARY -	1		1	



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 INCLIDE 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 Uraskited laboure  10.1.2 Electrician  10.1.3 Stone masson  10.1.4 400  10.1.5 Concreted laboure  10.1.6 Concreted wideor  10.1.7 Pipelayer  10.1.7 Pipelayer  10.1.8 Painter  10.1.9 Painter  10.1.10 Foreman  10.1.11 Outscheding surveyor  10.1.10 Foreman  10.1.11 Qualified bridge yardshing).  10.1.11 Qualified largement gappendisor  10.1.11 Qualified largement gappendisor  10.1.12 Qualified wider supply technician (min. 15 years experience)  10.1.1 Qualified wider supply technician (min. 15 years experience)  10.2.2 Damper 0.38 m³  The rates inserted herein shall include for all operational and maintenance costs, fuel, oil, grease, operators, turnboys, supervision, voverhead and profits. Only the time actually employed on works shall be paid for and the rates shall include for fell time.  10.2.1 Compressor complete (3) may minimute)  10.2.2 Compressor complete (3) may minimute)  10.2.3 Concrete hirator (Fath) of mones  10.2.4 Compressor complete (3) may minimute)  10.2.5 Concrete mixer 14/10 (including batch weighing gear and drag feed showly of the time actually employed on works shall be paid for and the rates shall include for fells time.  10.2.1 Compressor complete (3) may minimute)  10.2.2 Compressor complete (3) may minimute)  10.2.3 Concrete mixer 14/10 (including batch weighing gear and drag feed showly have the paid of the fell of the shown of the shown of the fell of the shown of the fell of the shown of the fell of the shown of the fell of the shown of the fell of the shown of the fell of th	ITEM	BRIEF DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
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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 pline, overfline, 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 Christified labourer 10.1.2 Electrician 11.3 Stone mason 11.4 Mo0 10.1.3 Stone mason 11.5 Corretor 11.6 Carpenter 11.7 How work of the wore work of the work of the work of the work of the work of the wor						
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  10.1.2 Electrician  10.1.3 Stone mason  10.1.4 Hr 400  10.1.5 Concretor  10.1.6 Certified welder  10.1.7 Ppelayer  10.1.8 Painter  10.1.9 Engineering surveyor  10.1.1 Penglegering surveyor  10.1.1 Penglegering surveyor  10.1.1 Penglegering surveyor  10.1.10 Foreman  10.1.10 Custified engineering supervisor  10.1.10 Qualified engineering supervisor  10.1.11 Qualified engineering supervisor  10.1.12 Qualified engineering supervisor  10.1.13 Cualified water supply technician (min. 15 years experience)  10.1.10 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 m Prininute)  10.2.2 Mobile generator 15K/VA  10.2.3 Concrete wibrator (petrol or diesel)  10.2.4 Concrete mixer 14/10 (including batch weighing gear and drag feed shovel)  10.2.5 Dumper 0.38 m³  10.2.6 Compressor complete (3.0 m Prininute)  10.2.7 Lorry (tipper) 5 tonne  10.2.8 Lorry (tipper) 7 tonne  10.2.9 Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.)  10.2.1 Concrete wibrator (petrol or diesel)  10.2.2 Mobile generator 15K/VA  10.3 Hr 600  10.4 Concrete wibrator (petrol or diesel)  10.4 Concrete wibrator (petrol or diesel)  10.5 Dumper 0.38 m³  10.6 Compactor / roller, dead weight 9 tonnes  10.7 Hr 600  10.8 Compressor complete (3.0 m Prininute)  10.9 Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.)  10.2.1 Concrete wibrator (petrol or diesel)  10.2.2 Mobile generator 15K/VA  10.3 Materials  All materials shall including diesel engine for pump)  10.4 Hr 400  10.5 Description of the dead weight 9 tonnes		INCLUDE TRAVEL AND INSTALLATION TIMES FOR EQUIPMENT				
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.  Unskilled labourer  Unskilled labourer  Unskilled labourer  Unskilled labourer  Hr 400  10.1.2 Electrician  Hr 400  10.1.3 Stone mason  Hr 400  10.1.1.5 Concretor  Hr 400  10.1.6 Certified welder  Hr 400  10.1.7 Pepleayer  Hr 400  10.1.8 Painter  10.1.9 Painter  Hr 400  10.1.10 Foreman  Watchman (including use of firewood, lights, day, night, Sunday and Public Holiday watching)  10.1.10 Custified engineering supervisor  10.1.11 Qualified engineering supervisor  10.1.12 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 m²/minute)  Hr 600  10.2.2 Mobile generator 15kVA  Compressor complete (3.0 m²/minute)  Hr 600  10.2.3 Lorry (tipper) 5 tonne  Hr 400  10.2.4 Concrete wistrator (petrol or diesel)  10.2.5 Dumper 0.38 m²  Hr 600  10.2.6 Compressor complete (3.0 m²/minute)  Hr 600  10.2.7 Lorry (tipper) 7 tonne  Hr 400  10.2.8 Lorry (tipper) 7 tonne  Hr 400  10.2.9 Hr 600  10.2.1 Compressor complete (3.0 m²/minute)  Hr 600  10.2.1 Compressor complete (3.0 m²/minute)  Hr 600  10.2.2 Mobile generator 15kVO.  Hr 600  10.2.3 Lorry (tipper) 7 tonne  Hr 400  10.2.4 Concrete wistrator (petrol or diesel)  Hr 600  10.2.5 Dumper 0.38 m²  Hr 600  10.2.6 Compressor complete (3.0 m²/minute)  Hr 400  10.2.7 Lorry (tipper) 7 tonne  Hr 400  10.2.8 Lorry (tipper) 7 tonne  Hr 400  10.2.9 All materials shall moduling diesel engine for pump)  Hr 400  10.2.1 All materials shall comply with the Specifications. The rates inserted herein shall including diesel engine	10.1	Labour				
10.1.1   Unskilled labourer   Hr   1,200		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				
10.1.13   Stone mason	10.1.1		Hr	1,200		
10.1.4   Carpenter		Electrician				
10.1.5   Cencretor						
10.1.6   Certified welder		'				
10.1.7   Pipelayer						
10.1.8   Painter						
10.1.10 Foreman (including use of firewood, lights, day, night, Sunday and Purity (including use of firewood, lights, day, night, Sunday and Purity (including use of firewood, lights, day, night, Sunday and Purity (including use of firewood, lights, day, night, Sunday and Purity (including use of firewood, lights, day, night, Sunday and Purity (including use of firewood, lights, day, night, Sunday and Purity (including use of firewood, lights, day, night, Sunday and Purity (including use of firewood, lights, day, night, Sunday and Purity (including use of sunday and profits, City) (including use of rail 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 16kVA 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) 5 tonne Hr 400 10.2.9 Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.) 10.2.10 Concrete including and welding set, including oxygen and acetylene used acetylene cutting and welding set, including oxygen and acetylene used acetylene set including electrodes Hr 300 10.2.11 Electric welding set including electrodes Hr 800 10.2.12 AvWD pickup 1 tonne Hr 1,600 10.2.13 Jack hammer 25 kg Hr 800 10.2.14 Mobile crane 5 tonnes Hr 400 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			Hr	400		
Watchman (including use of firewood, lights, day, night, Sunday and Public Holiday watching)   Public Holiday watching)   Hr   1,600	10.1.9	Engineering surveyor		400		
Public Holiday watching)	10.1.10		Hr	400		
10.1.12 Qualified engineering supervisor 10.1.13 Qualified water supply technician (min. 15 years experience)  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) 10.2.2 Mobile generator 15kVA  10.2.3 Concrete vibrator (petrol or diesel) 10.2.4 Source of the concrete vibrator (petrol or diesel) 10.2.5 Dumper 0.38 m³  Hr 600 10.2.6 Compactor / roller, dead weight 9 tonnes 10.2.7 Lorry (tipper) 5 tonne 10.2.8 Lorry (tipper) 5 tonne 10.2.9 etc.) 10.2.9 Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.) 10.2.10 Oxy-acetylene cutting and welding set, including oxygen and acetylene 10.2.11 Electric welding set including electrodes 10.2.12 AuW pickup 1 tonne 10.2.13 Jack hammer 25 kg 10.2.14 Mobile crane 5 tonnes 10.2.15 Air compressor (5,000 l/min) 10.2.16 Pressure testing equipment (including diesel engine for pump) 10.2.17 Acoustic ground microphones for leak detection 10.3 Materials 10.3.1 Quick drying hydraulic mortar for leak repairs 10.3.2 Ordinary portland cement 10.3.2 Ordinary portland cement 10.3.3 Quick drying hydraulic mortar for leak repairs 10.3.2 Ordinary portland cement 10.3.3 Ordinary portland cement	10.1.11		Hr	2,000		
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 etc.)  10.2.10 Coxy-acetylene cutting and welding set, including oxygen and acetylene 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 //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  10.3.1 Quick drying hydraulic mortar for leak repairs Kg 300  10.3.2 Ordinary portland cement	10.1.12		Hr	1,600		
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)  10.2.2 Mobile generator 15kVA  10.2.3 Concrete vibrator (petrol or diesel)  10.2.4 Concrete mixer 14/10 (including batch weighing gear and drag feed shovel)  10.2.5 Dumper 0.38 m³  10.2.6 Compactor / roller, dead weight 9 tonnes  10.2.7 Lorry (tipper) 5 tonne  10.2.8 Lorry (tipper) 5 tonne  10.2.9 Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.)  10.2.10 Coxy-acetylene cutting and welding set, including oxygen and acetylene  10.2.11 Electric welding set including electrodes  10.2.12 4-WD pickup 1 tonne  10.2.13 Jack hammer 25 kg  10.2.14 Mobile crane 5 tonnes  Hr 400  10.2.15 Air compressor (5,000 l/min)  10.2.16 Pressure testing equipment (including diesel engine for pump)  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  Ordinary portland cement  Kg  Ordinary portland cement	10.1.13	Qualified water supply technician (min. 15 years experience)	Hr	1,200		
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)	10.2	Plant and Equipment				
10.2.2   Mobile generator 15kVA		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.				
10.2.3 Concrete vibrator (petrol or diesel)  10.2.4 Concrete mixer 14/10 (including batch weighing gear and drag feed shovel)  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 200  10.2.8 Lorry (tipper) 7 tonne Hr 200  10.2.9 Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.)  10.2.10 Oxy-acetylene cutting and welding set, including oxygen and acetylene  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)  10.2.16 Pressure testing equipment (including diesel engine for pump) Hr 400  10.2.17 Acoustic ground microphones for leak detection Hr 480  10.3.1 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						
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10.2.6 Compactor / roller, dead weight 9 tonnes  10.2.7 Lorry (tipper) 5 tonne  10.2.8 Lorry (tipper) 7 tonne  10.2.9 Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.)  10.2.10 Oxy-acetylene cutting and welding set, including oxygen and acetylene  10.2.11 Electric welding set including electrodes  10.2.12 4-WD pickup 1 tonne  10.2.13 Jack hammer 25 kg  10.2.14 Mobile crane 5 tonnes  10.2.15 Air compressor (5,000 l/min)  10.2.16 Pressure testing equipment (including diesel engine for pump)  10.2.17 Acoustic ground microphones for leak detection  10.3.1 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	10.2.4		Hr	600		
10.2.7 Lorry (tipper) 5 tonne 10.2.8 Lorry (tipper) 7 tonne 10.2.9 Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.) 10.2.10 Oxy-acetylene cutting and welding set, including oxygen and acetylene 10.2.11 Electric welding set including electrodes 10.2.12 4-WD pickup 1 tonne 10.2.13 Jack hammer 25 kg 10.2.14 Mobile crane 5 tonnes 10.2.15 Air compressor (5,000 l/min) 10.2.16 Pressure testing equipment (including diesel engine for pump) 10.2.17 Acoustic ground microphones for leak detection 10.3.1 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		,				
10.2.8 Lorry (tipper) 7 tonne  10.2.9 Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.)  10.2.10 Oxy-acetylene cutting and welding set, including oxygen and acetylene  10.2.11 Electric welding set including electrodes  10.2.12 4-WD pickup 1 tonne  10.2.13 Jack hammer 25 kg  10.2.14 Mobile crane 5 tonnes  10.2.15 Air compressor (5,000 l/min)  10.2.16 Pressure testing equipment (including diesel engine for pump)  10.2.17 Acoustic ground microphones for leak detection  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						
10.2.9 Portable water pump 50 mm diameter (inclusive of hoses, couplings, etc.)  Oxy-acetylene cutting and welding set, including oxygen and acetylene  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)  10.2.16 Pressure testing equipment (including diesel engine for pump)  Hr 400  10.2.17 Acoustic ground microphones for leak detection  Hr 480  10.3.1 Quick drying hydraulic mortar for leak repairs  Kg 300  10.3.2 Ordinary portland cement  Kg 600		1 (1)				
etc.) Oxy-acetylene cutting and welding set, including oxygen and acetylene  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  10.3.1 Quick drying hydraulic mortar for leak repairs Kg 300  10.3.2 Ordinary portland cement Kg 600						
acetylene 10.2.11 Electric welding set including electrodes 110.2.12 4-WD pickup 1 tonne 110.2.13 Jack hammer 25 kg 110.2.14 Mobile crane 5 tonnes 110.2.15 Air compressor (5,000 l/min) 110.2.16 Pressure testing equipment (including diesel engine for pump) 110.2.17 Acoustic ground microphones for leak detection 110.3.1 Materials 110.3 Materials 110.3.1 Quick drying hydraulic mortar for leak repairs 110.3.2 Ordinary portland cement 110.3.3 Value (10.2.15 kg) 110.3.4 Value (10.2.16 kg) 110.3.5 Value (10.2.17 kg) 110.3.6 Value (10.2.17 kg) 110.3.7 Value (10.2.17 kg) 110.3.8 Value (10.2.17 kg) 110.3.9 Value (10.2.17 kg) 110.3.1 Quick drying hydraulic mortar for leak repairs 110.3.1 Quick drying hydraulic mortar for leak repairs 110.3.1 Value (10.2.17 kg) 110.3.1 Value (10						
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10.3.2 Ordinary portland cement Kg 600		herein shall include for delivery to site, storage, handling, overheads				
10.3.2 Ordinary portland cement Kg 600	10.3.1	Quick drying hydraulic mortar for leak repairs	Kg	300		
10.3.3. Mild stool (any size from 9mm to 35mm dig.)		Ordinary portland cement	Kg	600		
10.5.5 Wild steel (any size from offin to 25min dia.)	10.3.3	Mild steel (any size from 8mm to 25mm dia.)	Kg	200		





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 <sup>2</sup>	100		
10.3.6	Building sand	m³	100		
10.3.7	Coarse aggregate for concrete	m³	200		
10.3.8	Use of shuttering timber	m <sup>2</sup>	100		
10.3.9	Imported murram fill	m³	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	m³	500		
10.3.13	Concrete ogee pipe, DN 300 mm	m	500		
10.3.14	Concrete Class 15/20	m³	200		
10.3.15	Concrete Class 20/20	m³	200		
10.3.16	Concrete Class 25/20	m³	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	<u>Transportation</u>				
	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	+			1



	GRAND SUMMARY			
Contract Name:	EMERGENCY WORKS FOR INCREASING WATER AVAILABILITY IN LIKONI			
NCB No.	Contract No. CWSB/AFD/W1/2019			
	DESCRIPTION	BAGE	AMOUNT	AMOUNT
	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 And 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:	Α		
	Add Provisional Sum for Contingency Allowance( =10% *A )	В		
	Sub-Total 1(A+B)	С		
	Allow for all Local Taxes and Duties including 16% VAT on sub-total (C)	D		
	SUB-TOTAL CONFIRMED BILLS(C+D)	E		
PROVISIONAL 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)	Н		
	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:				

Date:



PART 5.14 - Electro-Mechanical Works & Pipeworks Borehole (Site-Repairs) **UNIT PRICES** Delivery To ITEM ITEM DESCRIPTION UNIT Quantity Rate(KES) Amount(KES) Site(KES) Bareshaft Borehole Submersible pump c/w 4 Α core tail cable; Α1 Nr 1 Capacity 9 m<sup>3</sup>/hr, 130 metres head A2 Capacity 9 m<sup>3</sup>/hr, 150 metres head А3 Capacity 9 m<sup>3</sup>/hr, 165 metres head Nr 1 A4 Nr 1 Capacity 9 m<sup>3</sup>/hr, 180 metres head A5 Capacity 12 m<sup>3</sup>/hr, 125 metres head Nr A6 Capacity 12 m<sup>3</sup>/hr, 140 metres head Nr A7 Capacity 12 m<sup>3</sup>/hr, 165 metres head Nr 1 A8 Nr 1 Capacity 12 m<sup>3</sup>/hr, 180 metres head Α9 Nr Capacity 15 m<sup>3</sup>/hr, 135 metres head A10 Capacity 15 m<sup>3</sup>/hr, 150 metres head Nr A11 Capacity 15 m<sup>3</sup>/hr, 165 metres head Nr 1 A12 Nr 1 Capacity 15 m<sup>3</sup>/hr, 185 metres head A13 Capacity 22 m<sup>3</sup>/hr, 120 metres head Nr 1 A14 Capacity 22 m<sup>3</sup>/hr, 135 metres head Nr 1 A15 Capacity 22 m<sup>3</sup>/hr, 150 metres head Nr 1 A16 Capacity 22 m<sup>3</sup>/hr, 165 metres head Nr 1 A17 Nr Capacity 22 m<sup>3</sup>/hr, 175 metres head A18 Nr Capacity 22 m<sup>3</sup>/hr, 190 metres head 1 A19 Capacity 30 m<sup>3</sup>/hr, 130 metres head Nr 1 A20 Capacity 30 m<sup>3</sup>/hr, 140 metres head Nr 1 A21 Capacity 30 m<sup>3</sup>/hr, 155 metres head Nr 1 A22 Capacity 40 m<sup>3</sup>/hr, 125 metres head Nr 1 A23 Nr Capacity 40 m<sup>3</sup>/hr, 135 metres head 1 A24 Capacity 40 m<sup>3</sup>/hr, 150 metres head Nr A25 Capacity 40 m<sup>3</sup>/hr, 170 metres head Nr 1 A26 Capacity 46 m<sup>3</sup>/hr, 120 metres head Nr 1 A27 Capacity 46 m<sup>3</sup>/hr, 130 metres head Nr 1 Capacity 46 m<sup>3</sup>/hr, 150 metres head A28 Nr 1 A29 Capacity 46 m<sup>3</sup>/hr, 180 metres head Nr 1 A30 Capacity 50 m<sup>3</sup>/hr, 185 metres head Nr 1 A31 Capacity 50 m<sup>3</sup>/hr, 130 metres head Nr 1 A32 Nr Capacity 50 m<sup>3</sup>/hr, 140 metres head A33 Capacity 50 m<sup>3</sup>/hr, 150 metres head Nr 1 A34 Capacity 50 m<sup>3</sup>/hr, 165 metres head Nr 1 В Bareshaft 3 phase Borehole Submersible Motor c/w 4 core cu, tail cable; Rating 7.5 Kw В1 Nr 1 Rating 9.2 Kw Nr B2 1 Rating 11 Kw ВЗ Nr 1 Rating 15 Kw В4 Nr Rating 18.5 Kw В5 Nr 1 Rating 22 Kw Nr В6 1 В7 Rating 26 Kw Nr Rating 30 Kw В8 Nr 1 Rating 37.2 Kw В9 Nr 1 Rating 45 Kw B10 Nr 1



#### UNIT PRICES

ITEM	ITEM DESCRIPTION	UNIT	Quantity	Rate Excluding VAT(KES)	Delivery To Site(KES)	Amount(KES)
С	6 Metres Length Galvanised water Pipes					
C1	Heavy Class Threaded PIN12					
C1.1	DN50	Nr	1			
C1.2	DN65	Nr	1			
C1.3	DN100	Nr	1			
C1.4	DN150	Nr	1			
C1.5	DN200	Nr	1			
C2	Heavy Class Flanged-PIN12					
C2.1	DN50	Nr	1			
C2.2	DN65	Nr	1			
C2.3	DN100	Nr	1			
C2.4	DN150	Nr	1			
C2.5	DN200	Nr	1			
D	3 PHASE ELECTRIC MOTOR STARTER PANELS					
D1	SOFT START- STARTER PANELS					
D1.1	7.5 Kw	Nr	1			
D1.2	9.2 Kw	Nr	1			
D1.3	11 Kw	Nr	1			
D1.4	15 Kw	Nr	1			
D1.5	18.5 Kw	Nr	1			
D1.6	22 Kw	Nr	1			
D1.7	26 Kw	Nr	1			
D1.8	30 Kw	Nr	1			
D1.9	37.2 Kw	Nr	1			
D1.10	45 Kw					
D2	DIRECT-ON LINE STARTER PANELS					
D2.1	5.5 Kw	Nr	1			
D2.2	7.5 Kw	Nr	1			
D2.3	9.2 Kw	Nr	1			
E	CABLES					
E1	PVC SWA PVC COPPER CABLES					
E1.1	1.5 mm <sup>2</sup> /2 core	Rolls	1			
E1.2	2.5 mm <sup>2</sup> /2 core	Rolls	1			
E1.3	4 mm <sup>2</sup> /4 core	Rolls	1			
E1.4	6 mm <sup>2</sup> /4 core	Rolls	1			
E1.5	10 mm <sup>2</sup> /4 core	Rolls	1			
E1.6	16 mm²/4 core	Rolls	1			
E1.7	25 mm <sup>2</sup> /4 core	Rolls	1			
E1.8	35 mm²/4 core	Rolls	1			
E1.9	50 mm²/4 core	Rolls	1			
E2	DOUBLE INSULATED RUBBER WATER TIGHT					
F0.4	SUBMERSIBLE COPPER CABLES					
E2.1	0.75 mm² single core	Rolls	1			
E2.2	1.5 mm²/2 core	Rolls	1			
E2.3	4 mm <sup>2</sup> /4 core	Rolls	1			
E2.4	6 mm <sup>2</sup> /4 core	Rolls	1			
E2.5	10 mm²/4 core	Rolls	1			
E2.6	16 mm²/4 core	Rolls	1			
E2.7	25 mm²/4 core	Rolls	1			
E2.8	35 mm <sup>2</sup> /4 core	Rolls	1			



TEM	DESCRIPTION	UNIT	QTY	RATE(KES)	AMOUNT(KES)
	Quantities 2.1-2.7 for 1 No of wells			\ -7	
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		
	L. C. B. C. W. J.				
<b>2.2</b> 2.2.1	Installation Work Removal, cleaning and installation of well and shaft equipment	LS	1		
2.2.2	including proper storage.  Disassembly, cleaning and installation of the rising pipe, U-pump and fittings including disassembly and professional installation of electrotechnical connections.	LS	1		
2.2.3	Installation depth up to max. 120 m  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	Machanical and hydrodis are stories. Door Pro				
<b>2.4</b> 2.4.1	Mechanical and hydraulic pre-cleaning - Desanding  Mobilization and demobilization of the desanding facility and execution of desanding up to the technical absence of sand (0.1	LS	1		
	g/m³) Pre-cleaning of the well interior by brushes with variable				
2.4.2	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		
	1	i			



2.5	Hydraulic-chemical intensive cleaning			
2.3	Provision, transport and installation of a double surge block			
2.5.1	(swabbing tool), as per specifictaions (incl. Maintenance and	LS	1	
	frequent installations as required)			
	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			
2.5.2	diameter.	m	40	
	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.			
2.5.3	Straining of the regenerating solution with a packer until it can	No	2	
	be proven that no regeneration agent is present.  Performance of a gravel-filling wash (main wash) as described			
2.5.4	in item 2.5.2.	m	40	
2.5.5	Straining the regeneration solution with a packer until it can be	No	1	
	proven that no regeneration agent is present.  Performing the following measurements during pumping at 15-			
2.5.6	minute intervals:	LS	1	
	flow rate, water level, temperature, conductivity			
	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.			
	initiale intervals.	LS	4	
2.5.7	Subsequent discharge of the clear water phase, in compliance	LS	1	
	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.			
2.6	Disinfection and well development			
2.6.2	Performance of a well disinfection according to specifications	LS	1	
2.6.3	Performance of a pumping test as describe in the specifications.	No	1	
2.7	Documentation			
	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			
2.7.1	- quantities of water	No	1	
	- 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			
	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	