CONTRACT NO: RLM/RWST/OMM/0103/2024/25

RE-ADVERT: APPOINTMENT OF A CONTRACTOR FOR THE UPGRADING AND EXTENSION OF BOSPOORT WATER TREATMENT WORKS – MECHANICAL AND ELECTRICAL WORKS

VOLUME 1B: PRICING DATA

JULY 2025

NAME OF BIDDER: ……..

BID PRICE: ……..……. (VAT Incl.)

Prepared by:

RUSTENBURG WATER SERVICES TRUST
1A KOCK STREET
RUSTENBURG
0300

BID CLOSING: 01 August 2025 at 10:00

RUSTENBURG WATER SERVICES TRUST

BID No RLM/RWST/OMM/0103/2024/25

RE-ADVERT: UPGRADE AND EXTENSION OF BOSPOORT WATER TREATMENT WORKS – MECHANICAL AND ELECTRICAL WORKS

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RUSTENBURG WATER SERVICES TRUST

BID No RLM/RWST/OMM/0103/2024/25

RE-ADVERT: UPGRADE AND EXTENSION OF BOSPOORT WATER TREATMENT WORKS – MECHANICAL AND ELECTRICAL WORKS

C2.1 PRICING INSTRUCTIONS

C2.1 PRICING INSTRUCTIONS

1. General

1.1 This section provides the tenderer with guidelines and requirements with regard to the completion of the Bill of Quantities. The Schedule has to be completed in black ink and the tenderer is referred to the Tender Specifications in regard to the correction of errors.

1.2 The Bill of Quantities shall be read with all the documents which form part of this Contract.

1.3 The following words shall have the meanings hereby assigned to them:

Unit:	The unit of measurement for each item of work in terms of the Specifications and the Project Specifications.
Quantity:	The number of units of work for each item.
Rate:	The payment per unit of work at which the tenderer tenders to do the work.
Amount:	The product of the quantity and the rate tendered for an item.
Lump sum:	An amount tendered for an item, the extent of which is described in the Bill of Quantities, the Specifications and the Project Specifications, but the quantity of work of which is not measured in any units.

1.4 Reference shall be made to the General and Special Conditions of Contract regarding Provisional and Prime Costs Sums.

1.5 The contractor shall determine the contract skills participation goals, expressed in Rand, which shall not be less than the sub-total multiplied by a percentage factor given in Table 2 in the Standard for the applicable class of construction works. This is indicated by the percentage factor in the Final Tender Summary section. Minimum Contract Skills Development Goal (CSDG) sum = Electrical Engineering(Infrastructure) EP and Mechancial Engineering (Infrastructure) ME of (0.25%) x Subtotal of the tender amount.

2. PRICING OF MECHANICAL AND ELECTRICAL WORKS

The prices quoted for the supply of plant and equipment shall include for all handling, loading, transporting and off-loading required for the delivery of the plant and equipment to the site, including in the case of off-site storage for double handling at the store.

The prices quoted for erection and/or installation shall include for all handling, loading, transporting and off-loading to take plant and equipment to place on site where required, erection, installation, painting, guaranteeing for a period of twelve (12) months and upholding for a period of twelve (12) months, all as specified.

The prices quoted for the commissioning of plant shall include for operating, mechanical and electrical testing, adjusting and handing over in a proper working order and for the provision of operating and maintenance manuals, all as specified.

Any additional charges in connection with off-site storage which there may be over and above the prices quoted in the various sections of this Bill of prices, shall be set-out in detail by the Tenderer.

Amounts allowed for provisional sums and contingencies will be spent in part or as a whole at the sole discretion of the Engineer.

2. PAY ITEMS

For preliminary and general charges, the method of measurement and payment shall be as specified in Particular Specification PPG of the contract documents. Measurement and payment of mechanical and electrical equipment shall be as described in the Particular Specification, as amended, or as described in the Bill of Quantities.

Descriptions in the Bill of Quantities are abbreviated and comply generally with those in the Standard Specifications. The measurement and payment clause of each Standard Specification, read together with the relevant variations and amendments to the Standard Specification, set out what ancillary or associated activities must be included in the rates for the operations specified. Should any requirements of the measurement and payment clause of the applicable Standard Specification, or the variation thereof, conflict with the terms of the Bill of Quantities, the requirements of the Standard Specification or variation thereof, as applicable, shall prevail.

The units of measurement described in the Bill of Quantities are metric units. Abbreviations used in the Bill of Quantities are as follows:

mm	=	millimetre	h	=	hour
m	=	metre	kg	=	kilogram
km	=	kilometre	t	=	ton (1000kg)
m^2	=	square metre	no.	=	number
m^2.pass	=	square metre pass	sum	=	lump sum
ha	=	hectare	MN	=	meganewton
m^3	=	cubic metre	MN.m	=	meganewton-metre
m^3.km	=	cubic metre-kilometre	PC sum	=	Prime Cost sum
l	=	litre	Prov sum	=	Provisional sum
kl	=	kilolitre	%	=	Percent
MPa	=	megaspascal	kW	=	kilowatt

4. RATES

4.1 The prices and rates to be inserted in the Bill of Quantities are to be full inclusive prices for the work described under the several items. Such prices and rates shall cover all costs and expenses that may be required in and for the execution of the work described, and shall cover the cost of all general risks, liabilities, and obligations set forth or implied in the documents on which the tender is based, as well as overhead charges and profit. Reasonable prices shall be inserted as these will be used as a basis for assessment of payment for additional work that may have to be carried out.

4.2 A price or rate is to be entered against each item in the Bill of Quantities, whether the quantities are stated or not. An item against which no price is entered or where a word or phrase such as “included” or

"provided elsewhere" will be accepted as a rate of nil (R0,00) having been entered against such items and covered by the other prices or rates in the schedule.

Any work executed to which such a pay item applies, shall be measured under the appropriate items in the Bill of Quantities and valued at a rate of nil (R0,00). The rate of nil shall be valid irrespective of any change in the quantities during the execution of the Contract.

4.3 The Tenderer shall fill in a rate against all items where the words "rate only" appears in the amount column. The intention is that, although no work is foreseen under such item and no quantities are consequently given in the quantity column, the tendered rate shall apply should work under this item be actually required.

4.4 Except where rates only are required, the Tenderer shall insert all amounts to be included in his total tendered price in the "Amount" column and show the corresponding total tendered price.

4.5 All rates and sums of money quoted in the Bill of Quantities shall be in rands and whole cents. Fractions of a cent shall be discarded.

4.6 All prices and rates entered in the Bill of Quantities must be **excluding** Value Added Tax (VAT). VAT will be added last on the summary page of the Bill of Quantities.

4.7 Should excessively high unit prices be tendered, such prices may be of sufficient importance to warrant rejection of a tender by the Employer.

4.8 Where the Contractor is required to furnish detailed drawings and designs or other information in terms of the Contract Documents, all costs thereof shall be deemed to have been provided for and included in the unit rates and sum amounts tendered for the items scheduled in the Bill of Quantities, and separate additional payments will not be made.

4.9 For items in the bill of quantities where rates include the disposal of recyclable materials, the rebate for the value of the recyclable materials are to be included in the rate provided.

CORRECTION OF ENTRIES MADE BY TENDERER

Any entry made by the Tenderer in the Bill of Quantities, forms, etc, which the tenderer desires to change, shall not be erased or painted out. A line shall be drawn through the incorrect entry and the correct entry shall be written above in black ink and the full signature of the Tenderer shall be placed next to the correction.

RUSTENBURG WATER SERVICES TRUST

BID No RLM/RWST/OMM/0103/2024/25

RE-ADVERT: UPGRADE AND EXTENSION OF BOSPOORT WATER TREATMENT WORKS – MECHANICAL AND ELECTRICAL WORKS

C2.2 PRICING SCHEDULE

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
	PPG	**SCHEDULE NO. 1** **PRELIMINARY AND GENERAL**					
1.1		**SCHEDULE NO: 1.1 - FIXED-CHARGE ITEMS**					
1.1.1	PPG8.1.1	Contractual Requirements	G	sum	1		
		Establishment of Facilities on Site					
1.1.2	PSPPG3	Facilities for the Engineer	G	sum	1		
1.1.3	PPG 8.1.2	Facilities for the Contractor	G	sum	1		
1.1.4	PPG 8.1.4	Other fixed-charge obligations					
1.1.4.1		…… (contractor to specify)	G	sum	1		
1.1.5	PPG 8.1.5	Removal of Contractor's site establishment on completion	G	sum	1		
1.1.6	PPG 8.1.6	Compliance with Health and Safety Requirements	G	sum	1		
1.1.7	PSPPG8.1.7	Provision of LEP Plan, auditing and monthly reports	G	sum	1		
1.1.8	PPG 8.1.8	Compliance with record of decision and EMP	G	sum	1		
1.2		**SCHEDULE NO: 1.2 - TIME-RELATED ITEMS**					
1.2.1	PPG 8.2.1	Contractual Requirements	G	sum	1		
		Operation and maintenance of facilities on the Site for the duration of construction					
1.1.2	PSPPG3	Facilities for the Engineer	G	sum	1		
1.1.3	PPG 8.2.2	Facilities for the Contractor	G	sum	1		
1.2.4	PPG 8.2.3	Supervision for duration of installation	G	sum	1		
1.2.5	PPG 8.2.4	Company and head office overhead costs for the duration of the contract	G	sum	1		
1.2.6	PPG 8.2.5	Other time-related obligations	G	sum	1		
1.2.7	PPG 8.2.6	Compliance with Health and Safety Requirements	G	sum	1		
1.2.8	PPG 8.1.8	Compliance with record of decision and EMP	G	sum	1		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
1.3		**SCHEDULE NO: 1.3 - OTHER GENERAL CHARGES**					
1.3.1	PPG 8.3.1	Temporary Storage of Equipment	G	m^3/mth	8		
1.3.2	PPG 8.3.2	Provision of as-built drawings and details	G	Sum	1		
1.3.3	PPG 8.3.3	Provide Operation and Maintenance Manuals	G	Sum	1		
1.4		**SCHEDULE NO: 1.4 - TRIAL OPERATION PERIOD**					
1.4.1	PPG8.5.3 PSPPG6.3	Maintenance and Servicing of Mechanical and Electrical Equipment	G	Sum	1		
1.4.2	PPG8.5.4 PSPPG6.4	Supply of Chemicals	G	Sum	1		
1.4.3	PPG8.6	Trial Operation Period	G	Sum	1		
		SCHEDULE NO. 1 PRELIMINARY AND GENERAL CARRIED FORWARD TO SUMMARY					
						TOTAL	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
	PPG	**SCHEDULE NO. 2 PROVISIONAL SUMS, ADDITIONAL SERVICES AND DAY WORKS**					
2.1		**SCHEDULE NO: 2.1 - SUMS STATED PROVISIONALLY BY THE ENGINEER**					
2.1.1	PPG8.4.1	Maintenance Spares	N	P Sum	1	550,000.00	550,000.00
2.1.2	PPG8.4.2	Specialist External Inspectorate	N	P Sum	1	200,000.00	200,000.00
2.1.3	PPG8.4.4	Water Quality Sampling and Testing	N	P Sum	1	100,000.00	100,000.00
2.1.4	PPG8.4.5	Water Quality Instruments	N	P Sum	1	250,000.00	250,000.00
2.1.5	PSPPG8.4.6	CLO/LDO Salaries	N	P Sum	1	400,000.00	400,000.00
2.1.6	PSPPG8.4.7	Socio Economic Development	N	P Sum	1	250,000.00	250,000.00
2.1.7	PSPPG8.4.8	Engineer's Cellular Phone Costs	N	P Sum	1	25,000.00	25,000.00
2.1.8	PSPPG8.4.9	Engineers Site Office Consumables	N	P Sum	1	25,000.00	25,000.00
2.1.9	PSPPG 8.4.10	Electronic Equipment	N	P Sum	1	25,000.00	25,000.00
2.1.10	PSPPG 8.4.11	Acceptance and Control Testing	N	P Sum	1	25,000.00	25,000.00
2.1.11	PSPPG 8.4.12	Specialist Services	N	P Sum	1	200,000.00	200,000.00
2.1.12	PSPPG 8.4.13	Social facilitation	N	P Sum	1	2,500,000.00	2,500,000.00
2.1.13	PPG 8.3.4	Training	N	P Sum	1	200,000.00	200,000.00
2.1.14	PSPPG 8.4.14	Specialised security services, PSiRA registered	N	P Sum	1	1,450,000.00	1,450,000.00
2.1.15	PSPPG 8.4.15	Allowance for the management of local sub-contractors (SMME's) to cover any additional costs incurred (including rate variance)	N	P Sum	1	1,000,000.00	1,000,000.00
2.2		**SCHEDULE NO: 2.2 - ADDITIONAL SERVICES**					
2.2.1		Additional pH correction at inlet works	N	P Sum	1	300,000.00	300,000.00
2.2.2		Allowance for removal of pipe items and fittings in the existing chlorination room	N	P Sum	1	40,000.00	40,000.00
2.2.3		Allowance for sampling points and stubs for gauges	N	P Sum	1	40,000.00	40,000.00
2.2.4		Allowance for additional pipework, requirement not included elsewhere	N	P Sum	1	900,000.00	900,000.00
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
2.2.5		Allowance for isolation of "old" RGS filters bypass to new clearwater tank	N	P Sum	1	150,000.00	150,000.00
2.2.6		Allowance for installation of new knifegate valve at control valve chamber incl. suitable actuator	N	P Sum	1	150,000.00	150,000.00
2.2.7		Allowance for construction of new flow meter chamber and Box CH6, installation of 600 mm diameter ultrasonic flow meter including all pipe fittings, cutting and removal of existing pipes	N	P Sum	1	700,000.00	700,000.00
2.2.8		Allowance for core drilling 6 openings through 300 mm thick reinforced concrete wall to suit 150 mm nominal diameter steel pipe and puddlle flange at existing GAC filters and repair opening with standard non-shrink grout to form watertight joint. Rate to include for removal of all debris to a spoil site established by the contractor	N	P Sum	1	30,000.00	30,000.00
2.2.9		Allowance for construction of Box CH5 including all cutting and removal of existing pipes	N	P Sum	1	150,000.00	150,000.00
2.2.10		Allowance for relocating of existing MCC including all sleeves, cable joints, cable terminations and excavations that may be required	N	P Sum	1	750,000.00	750,000.00
2.2.11	PSA7.9	.1 Locating Existing Services	N	P Sum	1	17,000.00	17,000.00
	PSA7.10	.2 Relocating of Existing Services	N	P Sum	1	34,000.00	34,000.00
		.3 Carrying out pipe coating & lining repairs on existing pipes stored at Boitekong WWTW	N	P Sum	1	340,000.00	340,000.00
2.2.12	PSPPG 6.1	Site visits and reporting	N	P Sum	1	100,000.00	100,000.00
2.2.13	PSA11.1	Allowance for Contractor's mark-up on Provisional sums		%			
2.3		**SCHEDULE 2.3 - DAYWORKS**					
		Note: **Dayworks executed on instruction of the Engineer /Employer only**					
		LABOUR					
2.3.1	8.7.1	(a) Skilled		hr	20		
		(b) Semi-skilled		hr	50		
		(c) Un-skilled		hr	100		
		PLANTHIRE (WORK RATES ON SITE)					
2.3.2		**TRUCKS**					
	8.7.2	Tipper trucks (specify capacity)					
		(a) Capacity_____m³ (small)		hr	0		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
		(b) Capacity_____m³ (medium)		hr	25		
		(c) Capacity_____m³ (large)		hr	25		
	8.7.2	Flatbed trucks (specify capacity)					
		(a) Capacity_____m³ (small)		hr	25		
		(b) Capacity_____m³ (medium)		hr	25		
		(c) Capacity_____m³ (large)		hr	0		
		LDV'S					
2.3.3	8.7.2	LDV (specify size)					
		(a) LDV_____ton		km	250		
		WATER TANKERS					
2.3.4	8.7.2	Water tankers (specify capacity)					
		(a) Capacity_____litre (small, towable)		hr	0		
		(b) Capacity_____litre (medium)		hr	25		
		(c) Capacity_____litre (large)		hr	25		
		LOADERS					
2.3.5	8.7.2	Wheel loaders (specify capacity)					
		(a) Capacity_____m³ (small)		hr	0		
		(b) Capacity_____m³ (medium)		hr	25		
		(c) Capacity_____m³ (large)		hr	0		
		GRADERS					
2.3.6	8.7.2	Motor graders (specify model/kw)					
		(a) Model _____/_____kw		hr	25		
		EXCAVATORS					
2.3.7	8.7.2	Crawler excavators (specify model/mass/kw)					
		(a) Model____/_____/kg____kw (small)		hr	0		
		(b) Model____/_____/kg____kw (medium)		hr	25		
		(c) Model____/_____/kg____kw (large)		hr	0		
		TLB'S					
2.3.8	8.7.2	Tractor loader backhoe (TLB)(specify model)					
		(a) Model_____		hr	50		
2.3.9		**ROLLERS**					
	8.7.2	Self propelled vibrating rollers (smooth drum) (specify mass)					
		(a) Mass_____kg (medium)		hr	20		
		(b) Mass_____kg (large)		hr	0		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
	8.7.2	Self propelled vibrating rollers (padfoot) (specify mass)					
		(a) Mass_____kg (medium)		hr	0		
		(b) Mass_____kg (large)		hr	0		
	8.7.2	Walk behind vibrating rollers (specify model)					
		(a) Model_____(BW 61) (small)		hr	0		
		(b) Model_____(BW 76) (medium)		hr	25		
		(c) Model_____(BW 90) (large)		hr	25		
2.3.10		**COMPACTORS**					
	8.7.2	Plate compactors (specify model)					
		(a) Model_____		hr	40		
	8.7.2	Wackers (specify model)					
		(a) Model_____		hr	40		
		CONCRETE MIXERS					
2.3.11	8.7.2	Concrete mixers (specify mixing volume)					
		(a) Volume_____litre (small, towable)		hr	0		
		(b) Volume_____litre (medium)		hr	25		
		(c) Volume_____litre (large)		hr	0		
		COMPRESSORS					
2.3.12	8.7.2	Portable diesel compressors (specify capacity)					
		(a) Capacity_____cfm (small)		hr	0		
		(b) Capacity_____cfm (medium)		hr	20		
		(c) Capacity_____cfm (large)		hr	0		
		WATERPUMPS					
2.3.13	8.7.2	Waterpump (specify capacity)					
		(a) Capacity_____ liter/sec (small)		hr	20		
		(b) Capacity_____ liter/sec (medium)		hr	20		
		(c) Capacity_____ liter/sec (large)		hr	0		
		WELDERS					
2.3.14	8.7.2	Welding unit (specify ampere)					
		(a) _____Amp (small)		hr	0		
		(b) _____Amp (medium])		hr	20		
		(c) _____Amp (large)		hr	0		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
		GENERATORS					
2.3.15	8.7.2	Mobile generator set (specify KVA)					
		(a) _____KVA (small)		hr	0		
		(b) _____KVA (medium])		hr	25		
		(c) _____KVA (large)		hr	0		
2.4		**TRANSPORT (TRANSPORT COST TO AND FROM SITE)**					
		Note: **Distance shall be measured one way only (Tender rates shall include for transport in both directions to and from site)**					
2.4.1	8.7.3	Low bed					
		(a) Low-bed (suitable for the largest piece of equipment above)		km	200		
2.4.2	8.7.3	Tipper truck					
		(a) Small		km	0		
		(b) Medium		km	50		
		(c) Large		km	50		
2.4.3	8.7.3	Flatbed truck					
		(a) Small		km	50		
		(b) Medium		km	50		
		(c) Large		km	0		
2.4.4	8.7.3	Water tanker					
		(a) Small		km	0		
		(b) Medium		km	50		
		(c) Large		km	50		
2.5	**8.6**	**PRIME COST ITEMS**					
2.5.1	PSA8.1	Materials used in the execution of dayworks		PC item	1	25,000.00	25,000.00
		DAY WORKS **CARRIED FORWARD TO SUMMARY**					
						TOTAL	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
3	PLK PLKA PLN	**SCHEDULE NO. 3** **STEEL, PIPE FITTINGS AND VALVES**					
3.1	PLQ	The rate for all items shall include for supply, delivery factory applied corrosion protection and off-loading on site					
3.1.1		**SCHEDULE NO: 3.1.1 - NEW DAF UNIT STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.EA.13.M001					
3.1.1.1		DAF 1.2	P	No	2		
3.1.1.2		DAF 1.3	S	No	1		
3.1.1.3		DAF 1.4	S	No	2		
3.1.1.4		DAF 1.5	P	No	4		
3.1.1.5		DAF 1.6	S	No	4		
3.1.1.6		DAF 2.1	P	No	1		
3.1.1.7		DAF 2.2	P	No	1		
3.1.1.8		DAF 2.3	S	No	1		
3.1.1.9		DAF 2.4	S	No	2		
3.1.1.10		DAF 2.5	S	No	2		
3.1.1.11		DAF 2.6	S	No	1		
3.1.1.12		DAF 2.7	P	No	1		
3.1.1.13		DAF 2.8	P	No	1		
3.1.1.14		DAF 3.1	P	No	4		
3.1.1.15		DAF 3.2	S	No	1		
3.1.1.16		DAF 7.1	S	No	2		
3.1.1.17		DAF 9.1	M	No	4		
3.1.1.18		DAF 9.2	M	No	1		
3.1.1.19		DAF 9.3	M	No	1		
3.1.1.20		DAF 12.1a	M	No	1		
3.1.1.21		DAF 12.1b	E	No	1		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.1.1.22		DAF 14.1	S	No	150		
3.1.2		**SCHEDULE NO: 3.1.2 - RGS FILTRATION SYSTEM STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.FA.14.D002 to D005 and X001 to X004					
3.1.2.1		FA1.4	P	No	3		
3.1.2.2		FA1.5	P	No	2		
3.1.2.3		FA1.6	S	No	8		
3.1.2.4		FA1.7	S	No	8		
3.1.2.5		FA1.8	S	No	8		
3.1.2.6		FA1.9	S	No	4		
3.1.2.7		FA1.10	S	No	4		
3.1.2.8		FA1.11	S	No	2		
3.1.2.9		FA2.1	P	No	1		
3.1.2.10		FA2.2	P	No	1		
3.1.2.11		FA2.3	P	No	3		
3.1.2.12		FA2.4	P	No	8		
3.1.2.13		FA2.5	P	No	8		
3.1.2.14		FA2.6	P	No	1		
3.1.2.15		FA3.1	P	No	2		
3.1.2.16		FA3.2	P	No	1		
3.1.2.17		FA3.3	P	No	1		
3.1.2.18		FA3.4	P	No	8		
3.1.2.19		F4.1	P	No	8		
3.1.2.20		F4.2	P	No	8		
3.1.2.21		FA9.1	M	No	2		
3.1.2.22		F9.2a	M	No	8		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.1.2.23		F9.2b	E	No	8		
3.1.2.24		F9.3	M	No	8		
3.1.2.25		F9.4	M	No	8		
3.1.2.26		F9.5a	M	No	8		
3.1.2.27		F9.5b	E	No	8		
3.1.2.26		F9.6a	M	No	4		
3.1.2.27		F9.6b	E	No	4		
3.1.2.28		FA12.1a	M	No	4		
3.1.2.29		FA12.1b	E	No	4		
3.1.2.30		FAX	P/S	No	1		
3.1.3		**SCHEDULE NO: 3.1.3 - GAC FILTRATION SYSTEM STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.FB.14.D005 to D006 and X002 to X004 and A002					
3.1.3.1		FB1.1	P	No	3		
3.1.3.2		FB1.2	P	No	2		
3.1.3.3		FB1.3	P	No	6		
3.1.3.4		FB1.4	S	No	6		
3.1.3.5		FB1.5	S	No	6		
3.1.3.6		FB1.6	S	No	6		
3.1.3.7		FB1.7	P	No	1		
3.1.3.8		FB1.8	P	No	6		
3.1.3.9		FB1.9	P	No	5		
3.1.3.10		FB1.10	P	No	6		
3.1.3.11		FB2.1	S	No	6		
3.1.3.12		FB2.2	P	No	6		
3.1.3.13		FB2.3	P	No	1		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.1.3.14		FB2.4	P	No	1		
3.1.3.15		FB2.5	P	No	1		
3.1.3.16		FB2.6	P	No	1		
3.1.3.17		FB2.7	P	No	1		
3.1.3.18		FB2.8	P	No	1		
3.1.3.19		FB3.1	P	No	6		
3.1.3.20		FB3.2	P	No	6		
3.1.3.21		FB3.3	P	No	6		
3.1.3.22		FB3.4	P	No	5		
3.1.3.23		FB4.1	P	No	6		
3.1.3.24		FB4.2	P	No	6		
3.1.3.25		FB7.1	P	No	6		
3.1.3.26		FB9.1a	M	No	6		
3.1.3.27		FB9.1b	E	No	6		
3.1.3.28		FB9.2	M	No	6		
3.1.3.29		FB9.3a	M	No	6		
3.1.3.30		F9.3b	E	No	6		
3.1.3.31		FB9.4a	M	No	6		
3.1.3.32		F9.4b	E	No	6		
3.1.3.33		F9.5a	M	No	6		
3.1.3.34		F9.5b	E	No	6		
3.1.3.35		FB9.6	M	No	12		
3.1.3.36		FA12.1a	M	No	4		
3.1.3.37		FA12.1b	E	No	4		
3.1.3.38		FBX	P	No	1		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.1.4		**SCHEDULE NO: 3.1.4 - FILTRATE SUMP STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.QB.14.D001					
3.1.4.1		QB1.1	P	No	2		
3.1.4.2		QB1.2	P	No	2		
3.1.4.3		QB1.3	P	No	1		
3.1.4.4		QB2.1	P	No	2		
3.1.4.5		QB2.2	P	No	1		
3.1.4.6		QB2.3	P	No	1		
3.1.4.7		QB2.4	P	No	1		
3.1.4.8		QB3.1	P	No	1		
3.1.4.9		QB4.1	P	No	2		
3.1.4.10		QB6.1	P	No	1		
3.1.4.11		QB8.1	P	No	2		
3.1.4.12		QB9.1	P	No	2		
3.1.4.13		QB10.1	P	No	2		
3.1.4.14		QB13.1	M	No	1		
3.1.5		**SCHEDULE NO: 3.1.5 - FLOW METER CHAMBER STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.QG.14.D001					
3.1.5.1		QG4.1	P	No	1		
3.1.5.2		QG7.1	P	No	2		
3.1.5.3		QG8.1	P	No	1		
3.1.5.4		QG8.2	P	No	1		
3.1.5.5		QG13.1	M	No	1		
3.1.6		**SCHEDULE NO: 3.1.6 - OZONE CONTACT TANK STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.QA.14.D001 and X001					
3.1.6.1		OA7.2	P	No	3		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.1.6.2		OA1.10	P	No	3		
3.1.7		**SCHEDULE NO: 3.1.7 - PRE-OZONE SYSTEM PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.SUF.12.D001 and 13.D001					
3.1.7.1		PZ1.1	P	No	1		
3.1.7.2		PZ1.2	P	No	1		
3.1.7.3		PZ2.1	P	No	2		
3.1.7.4		PZ3.1	P	No	1		
3.1.7.5		PZ4.2	P	No	1		
3.1.7.6		PZ5.1	P	No	1		
3.1.7.7		PZ13.1	M	No	1		
3.2	Pipe Item Schedule	*The rate for all items to include for the handling, installation , testing, site corrosion protection, painting and building into walls*					
3.2.1		**SCHEDULE NO: 3.2.1 - NEW DAF UNIT STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.EA.13.M001					
3.2.1.1		DAF 1.2	I	No	2		
3.2.1.2		DAF 1.3	I	No	1		
3.2.1.3		DAF 1.4	I	No	2		
3.2.1.4		DAF 1.5	I	No	4		
3.2.1.5		DAF 1.6	I	No	4		
3.2.1.6		DAF 2.1	I	No	1		
3.2.1.7		DAF 2.2	I	No	1		
3.2.1.8		DAF 2.3	I	No	1		
3.2.1.9		DAF 2.4	I	No	2		
3.2.1.10		DAF 2.5	I	No	2		
3.2.1.11		DAF 2.6	I	No	1		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.2.1.12		DAF 2.7	I	No	1		
3.2.1.13		DAF 2.8	I	No	1		
3.2.1.14		DAF 3.1	I	No	4		
3.2.1.15		DAF 3.2	I	No	1		
3.2.1.16		DAF 7.1	I	No	2		
3.2.1.17		DAF 9.1	I	No	4		
3.2.1.18		DAF 9.2	I	No	1		
3.2.1.19		DAF 9.3	I	No	1		
3.2.1.20		DAF 12.1a	I	No	1		
3.2.1.21		DAF 12.1b	I	No	1		
3.2.1.22		DAF 14.1	I	No	150		
3.2.2		**SCHEDULE NO: 3.2.2 - RGS FILTRATION SYSTEM STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.FA.14.D002 to D005 and X001 to X004					
3.2.2.1		FA1.4	I	No	3		
3.2.2.2		FA1.5	I	No	2		
3.2.2.3		FA1.6	I	No	8		
3.2.2.4		FA1.7	I	No	8		
3.2.2.5		FA1.8	I	No	8		
3.2.2.6		FA1.9	I	No	4		
3.2.2.7		FA1.10	I	No	4		
3.2.2.8		FA1.11	I	No	2		
3.2.2.9		FA2.1	I	No	1		
3.2.2.10		FA2.2	I	No	1		
3.2.2.11		FA2.3	I	No	3		
3.2.2.12		FA2.4	I	No	8		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.2.2.13		FA2.5	I	No	8		
3.2.2.14		FA2.6	I	No	1		
3.2.2.15		FA3.1	I	No	2		
3.2.2.16		FA3.2	I	No	1		
3.2.2.17		FA3.3	I	No	1		
3.2.2.18		FA3.4	I	No	8		
3.2.2.19		F4.1	I	No	8		
3.2.2.20		F4.2	I	No	8		
3.2.2.21		FA9.1	I	No	2		
3.2.2.22		F9.2a	I	No	8		
3.2.2.23		F9.2b	I	No	8		
3.2.2.24		F9.3	I	No	8		
3.2.2.25		F9.4	I	No	8		
3.2.2.26		F9.5a	I	No	8		
3.2.2.27		F9.5b	I	No	8		
3.2.2.26		F9.6a	I	No	4		
3.2.2.27		F9.6b	I	No	4		
3.2.2.28		FA12.1a	I	No	4		
3.2.2.29		FA12.1b	I	No	4		
3.2.2.30		FAX	I	No	1		
3.2.3		**SCHEDULE NO: 3.2.3 - GAC FILTRATION SYSTEM STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.FB.14.D005 to D006 and X002 to X004 and A002					
3.2.3.1		FB1.1	I	No	3		
3.2.3.2		FB1.2	I	No	2		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.2.3.3		FB1.3	I	No	6		
3.2.3.4		FB1.4	I	No	6		
3.2.3.5		FB1.5	I	No	6		
3.2.3.6		FB1.6	I	No	6		
3.2.3.7		FB1.7	I	No	1		
3.2.3.8		FB1.8	P	No	6		
3.2.3.9		FB1.9	P	No	5		
3.2.3.10		FB1.10	P	No	6		
3.2.3.11		FB2.1	I	No	6		
3.2.3.12		FB2.2	I	No	6		
3.2.3.13		FB2.3	I	No	1		
3.2.3.14		FB2.4	I	No	1		
3.2.3.15		FB2.5	I	No	1		
3.2.3.16		FB2.6	I	No	1		
3.2.3.17		FB2.7	I	No	1		
3.2.3.18		FB2.8	I	No	1		
3.2.3.19		FB3.1	I	No	6		
3.2.3.20		FB3.2	I	No	6		
3.2.3.21		FB3.3	I	No	6		
3.2.3.22		FB3.4	I	No	5		
3.2.3.23		FB4.1	I	No	6		
3.2.3.24		FB4.2	I	No	6		
3.2.3.25		FB7.1	I	No	6		
3.2.3.26		FB9.1a	I	No	6		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.2.3.27		FB9.1b	I	No	6		
3.2.3.28		FB9.2	I	No	6		
3.2.3.29		FB9.3a	I	No	6		
3.2.3.30		F9.3b	I	No	6		
3.2.3.31		FB9.4a	I	No	6		
3.2.3.32		F9.4b	I	No	6		
3.2.3.33		F9.5a	I	No	6		
3.2.3.34		F9.5b	I	No	6		
3.2.3.35		FB9.6	I	No	12		
3.2.3.36		FA12.1a	I	No	4		
3.2.3.37		FA12.1B	I	No	4		
3.2.3.38		FBX	I	No	1		
3.2.4		**SCHEDULE NO: 3.2.4 - FILTRATE SUMP STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.QB.14.D001					
3.2.4.1		QB1.1	I	No	2		
3.2.4.2		QB1.2	I	No	2		
3.2.4.3		QB1.3	I	No	1		
3.2.4.4		QB2.1	I	No	2		
3.2.4.5		QB2.2	I	No	1		
3.2.4.6		QB2.3	I	No	1		
3.2.4.7		QB2.4	I	No	1		
3.2.4.8		QB3.1	I	No	1		
3.2.4.9		QB4.1	I	No	2		
3.2.4.10		QB6.1	I	No	1		
3.2.4.11		QB8.1	I	No	2		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.2.4.12		QB9.1	I	No	2		
3.2.4.13		QB10.1	I	No	2		
3.2.4.14		QB13.1	I	No	1		
3.2.5		**SCHEDULE NO: 3.2.5 - FLOW METER CHAMBER STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.QG.14.D001					
3.2.5.1		QG4.1	I	No	1		
3.2.5.2		QG7.1	I	No	2		
3.2.5.3		QG8.1	I	No	1		
3.2.5.4		QG8.2	I	No	1		
3.2.5.5		QG13.1	I	No	1		
3.2.6		**SCHEDULE NO: 3.2.6 - OZONE CONTACT TANK STEEL, PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.QA.14.D001 and X001					
3.2.6.1		OA7.2	I	No	3		
3.2.6.2		OA1.10	I	No	3		
3.2.7		**SCHEDULE NO: 3.2.7 - PRE-OZONE SYSTEM PIPE FITTINGS AND VALVES**					
		ref. dwg. 1890.08.SUF.12.D001 and 13.D001					
3.2.7.1		PZ1.1	I	No	1		
3.2.7.2		PZ1.2	I	No	1		
3.2.7.3		PZ2.1	I	No	2		
3.2.7.4		PZ3.1	I	No	1		
3.2.7.5		PZ4.2	I	No	1		
3.2.7.6		PZ5.1	I	No	1		
3.2.7.7		PZ13.1	I	No	1		
3.3		**SCHEDULE NO : 3.3 - STEEL PIPE SUPPORTS AND PIPE CLAMPS**					
3.3.1		Hot dip galvanized steel pipe supports bolted to concrete slab with mecanical anchors					
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
		DAF:					
		i) 150mm Ø pipe support	M	no	2		
		GAC Filters:					
		ii) 150mm Ø pipe clamp	M	no	10		
		Pre-Ozone Building:					
		iii) 250mm Ø pipe support	M	no	4		
3.4		**SCHEDULE NO : 3.4 - CONCRETE PIPE SUPPORTS AND PIPE CLAMPS**					
3.4.1		Mild steel pipe clamps bolted to concrete support with mecanical anchors Filtrate Pump Station (1890.08.QB.14.D001)					
		i) 150mm Ø Delivery pipe	M	no	3		
3.5		**PUMP STATION - STEEL PIPE FITTINGS AND VALVES** **DESIGN, DRAWINGS AND GENERAL** The rate for all items shall include for supply, delivery factory applied corrosion protection and off-loading on site					
3.5.1		Provide design drawings and information as specified	G	Sum	1		
3.5.2		Provide operating and maintenance manuals and "as built" drawings as specified	G	Sum	1		
		STEEL PIPE FITTINGS AND VALVES ref. dwg. 1890.11.00.WPA.13.D001 The rate for all items to include for the handling, installation , testing, site corrosion protection, painting and building into walls					
3.5.3		Pump suction reducers to be replaced to suit offerred pump inlet dia. and pump dimensions (as applicable)	I	No	2		
3.5.4		Connection pipes with reducers to be replaced to suit offerred pump inlet and oulet dia.'s and pump dimensions (as applicable)	I	No	2		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
3.5.5		Delivery reducers to be replaced to suit offered pump outlet dia. and pump dimensions (as applicable)	I	No	2		
		SCHEDULE NO. 3 **STEEL, PIPE FITTINGS AND VALVES** **CARRIED FORWARD TO SUMMARY**					
						TOTAL	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
4	SANS *1200 HA*	**SCHEDULE: 4** **STRUCTURAL STEELWORK (SMALL WORKS)** Rate to include for supply of material, erection, welding, bolts, nuts, protection, etc.					
4.1		**SCHEDULE NO: 4.1 - DISSOLVED AIR FLOTATION (DAF)**					
4.1.2		Stainless Steel (316L) adjustable weir plate bolted to concrete wall, complete as per drg 1890.08.EA.13.D003	S	No	2		
4.2		**SCHEDULE NO: 4.2 - GAC FILTRATION SYSTEM**					
4.2.1		Working platform, RS40 grating on PC140 bolted to concrete wall with side mounted hand rail complete as shown on drg. 1890.08.FB.14.D007	M	No	6		
		SCHEDULE: 4 **STRUCTURAL STEELWORK (SMALL WORKS)** **CARRIED FORWARD TO SUMMARY**					
						TOTAL	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
5	PTB PSPTB	**SCHEDULE: 5** **DISSOLVED AIR FLOTATION (DAF)**					
5.1		**SCHEDULE NO: 5.1 - DESIGN AND DRAWINGS**					
5.1.1		Detail design calculations, as well as submission of quality assurance documentation, detailed P&ID's, and manufacturing GA layouts, pipe work layouts as may be required for complete installation	G	Sum	1		
5.2		**SCHEDULE NO: 5.2 - SATURATOR AND AIR COMPRESSOR**					
5.2.1		The rate is to include the supply, delivery, transport, handling, installation and testing etc.					
5.2.1.1	PTB5a PSPTB1	Mild Steel rubber lined saturator complete with media, magnetic level indicator, pressure testing, air piping etc. complete as shown on drawing 1890.08.EA.13.D002	M	No	1		
5.2.1.2	PTB5b PSPTB4	Air compressor with air receiver to feed DAF saturator including piping inside high lift pump station	M	No	1		
5.3		**SCHEDULE NO: 5.3 - COMMISSIONING**					
5.3.1		Commissioning of one DAF unit	I	Sum	1		
		SCHEDULE: 5 **DISSOLVED AIR FLOTATION (DAF)** **CARRIED FORWARD TO SUMMARY**					
						TOTAL	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
6	*PTG* *PTTG* *PSPTTG*	**SCHEDULE: 6** **RGS FILTRATION SYSTEM**					
6.1		**SCHEDULE NO: 6.1 - DESIGN AND DRAWINGS**					
6.1.1		Detail design calculations, as well as submission of quality assurance documentation, detailed P&ID's, and manufacturing GA layouts, pipe work layouts as may be required for complete installation	G	Sum	1		
6.2		**SCHEDULE NO: 6.2 - SUPPLY AND DELIVERY TO SITE RGS FILTER EQUIPMENT**					
	PSPTT 1.2 & 1.3	**RAPID GRAVITY SAND FILTER FLOOR**					
6.2.1		Complete rapid gravity sand filter floor system including laterals, nozzles, fixing and sealing materials. Nozzles to be embedded in concrete. (refer to dwgs 1890.08.FA.14.D001 and D002, X001 - X003)	M	No	4		
		FILTER MEDIA					
6.2.2		Note: Volume will be measured of media in place after one complete backwash cycle.					
	PSPTT 1.4	i) Sand (700 mm)	M	m^3	155		
	PSPTT 1.4	ii) Grit (100 mm)	M	m^3	25		
	PSPTT 1.4	iii) Pebbles (150 mm)	M	m^3	35		
6.3		**SCHEDULE NO: 6.3 - INSTALLATION OF RGS FILTER EQUIPMENT**					
	PSPTT 1.2 & 1.3	**RAPID GRAVITY SAND FILTER FLOOR**					
6.3.1		Complete rapid gravity sand filter floor system including laterals, nozzles, fixing and sealing materials. Nozzles to be embedded in concrete. (refer to dwgs 1890.08.FA.14.D001 and D002, X001 - X003)	I	No	4		
		FILTER MEDIA					
6.3.2		Note: Volume will be measured of media in place after one complete backwash cycle.					
	PSPTT 1.4	i) Sand (700 mm)	I	m^3	155		
	PSPTT 1.4	ii) Grit (100 mm)	I	m^3	25		
	PSPTT 1.4	iii) Pebbles (150 mm)	I	m^3	35		
						Carried Forward	

						Brought Forward	
6.4		**SCHEDULE NO: 6.4 - COMMISIONING OF RGS FILTER EQUIPMENT**					
	PSPTT 1.2 & 1.3	**RAPID GRAVITY SAND FILTER FLOOR**					
6.4.1		Commissioning of the RGS Filters complete	I	Sum	1		
		SCHEDULE: 6 **RGS FILTRATION SYSTEM** **CARRIED FORWARD TO SUMMARY**					
						TOTAL	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
7	PTO PSPTO	**SCHEDULE 7: OZONE EQUIPMENT**					
7.1		**SCHEDULE NO: 7.1 - DESIGN, DRAWINGS AND GENERAL**					
		Provide design drawings and design information as specified including as-built and O&M information	G	Sum	1		
		SUPPLY AND DELIVERY OF OZONE EQUIPMENT TO SITE					
7.2	PTO	**SCHEDULE NO: 7.2 - OZONE GENERATION EQUIPMENT**					
	PSPTO 5	Complete ozone generation system					
		Supplier 1:					
7.2.1		- Ozone generator (13,2 kg/hr at O_3 concentration of 10 (%wt) and 25°C cooling water temperature) complete with power supply	M	No	2		
7.2.2		- Ozone generation system instrumentation	M	Sum	1		
7.2.3		- Ventilation system in ozone generator room	M	No	1		
7.2.4		- Ozone production control system	M	No	1		
7.2.5		- Ozone generation pipework and valves	M	Sum	1		
7.2.6		- Ozone dosing control system	M	No	1		
		Supplier 2					
7.2.7		- Ozone generator (13,2 kg/hr at O_3 concentration of 10 (%wt) and 25°C cooling water temperature) complete with power supply	M	No	2		
7.2.8		- Ozone generation system instrumentation	M	Sum	1		
7.2.9		- Ventilation system in ozone generator room	M	No	1		
7.2.10		- Ozone production control system	M	No	1		
7.2.11		- Ozone generation pipework and valves	M	Sum	1		
7.2.12		- Ozone dosing control system	M	No	1		
		(NOTE: The rates from both suppliers shall be completed, only the highest rate shall be carried forward to the total)					
7.3	PSPTO 7	**SCHEDULE NO: 7.3 - NITROGEN BLEED EQUIPMENT**					
7.3.1		A complete dual air compressor system with air receiver, air filters, refrigerant and desicant driers, flow, pipework, valves, pressure control valves and dew point analyzer with a capacity of at least 10 Nm^3/hr.	M	No	1		
7.4	PSPTO 8	**SCHEDULE NO: 7.4 - COOLING WATER EQUIPMENT**					
7.4.1		Cooling water pumpsets suitable for operation with ozone generators	M	No	2		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
7.4.2		Cooling water pipework, valves and instrumentation to complete the cooling water system	M	Sum	1		
7.5		**SCHEDULE NO: 7.5 - OZONE DIFFUSION AND INJECTION EQUIPMENT**					
	PSPTO 9	**MAIN OZONE BUBBLE DIFFUSION EQUIPMENT**					
7.5.1		Pipework and valves from ozone generation to diffusers	M	Sum	1		
		Stage 1 diffusers					
7.5.2		Ceramic dome diffusers, manifold, gaskets, couplings supports, valves and feed pipes for dissolved ozone gas into water at a maximum rate of 6 mg/l.	M	No	1		
		Stage 2 and 3 diffusers					
7.5.3		Ceramic dome diffusers, manifold, gaskets, couplings supports, valves and feed pipes for dissolved ozone gas into water at a maximum rate of 3 mg/l.	M	No	2		
7.5.4		200NB pressure relief and vacuum breaker for ozone contact tank	M	No	4		
	PSPTO 10	**(PRE-OZONE) SIDESTREAM DIFFUSION AND DEGASSING EQUIPMENT**					
7.5.5		Pipework and valves from ozone generation to pre-ozone dosing point including pipe special on main pipeline	M	Sum	1		
7.5.6		Sidestream pumpsets with flow rate of at least 100 m³/h	M	No	2		
7.5.7		Ozone injection device each capable of 16 m³/hr	M	No	2		
7.5.8	PSPLT 1	Water flow meter with measuring range of 0 - 300 m³/hr	M	No	1		
7.5.9		Pre-ozone diffusion Instrumentation		Sum	1		
7.6	PSPTO 11	**SCHEDULE NO: 7.6 - OZONE DESTRUCTION EQUIPMENT**					
	PSPTO 11	**MAIN OZONE VENT OFF-GAS DESTRUCTION EQUIPMENT**					
7.6.1		Complete off-gas destruction system including extraction fan, thermo-catalytic converter, ozone off-gas analyser and demister	M	Sum	1		
7.6.2		Pipework and valves	M	Sum	1		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
7.6.3		Main ozone diffusion Instrumentation	M	Sum	1		
7.7	PSPTO 15	**SCHEDULE NO: 7.7 - ADDITIONAL OZONE INSTRUMENTATION**					
		(Not included above)					
7.7.1		Oxygen concentration analyser	M	No	2		
7.7.2		Ozone gas analyser (low concentration)	M	No	4		
7.7.3		Ozone off-gas analyser	M	No	2		
7.7.4		Ozone gas analyser (high concentration)	M	No	4		
7.7.5		UV254 analyser	M	No	4		
7.7.6		Dew point analyser	M	No	2		
7.7.7		Mass flow meter (ozone gas flow)	M	No	5		
7.8		**SCHEDULE NO: 7.8 - ADDITIONAL EQUIPMENT REQUIRED**					
7.8.1		a)……	M	Sum	1		
7.8.2		b)……	M	Sum			
7.8.3		c)……	M	Sum			
7.8.4		d)……	M	Sum			
7.8.5		e)……	M	Sum			
7.8.6		f)……	M	Sum			
7.8.7		g)……	M	Sum			
		INSTALLATION OF OZONE EQUIPMENT					
7.9	PTO	**SCHEDULE NO: 7.9 - OZONE GENERATION EQUIPMENT**					
	PSPTO 5	Complete ozone generation system					
		Supplier 1:					
7.9.1		- Ozone generator (13,2 kg/hr at O_3 concentration of 10 (%wt) and 25°C cooling water temperature) complete with power supply	I	No	2		
7.9.2		- Ozone generation system instrumentation	I	Sum	1		
7.9.3		- Ventilation system in ozone generator room	I	No	1		
7.9.4		- Ozone production control system	I	No	1		
7.9.5		- Ozone generation pipework and valves	I	Sum	1		
7.9.6		- Ozone dosing control system	I	No	1		
7.9.7							
		Supplier 2					
7.9.8		- Ozone generator (13,2 kg/hr at O_3 concentration of 10 (%wt) and 25°C cooling water temperature) complete with power supply	I	No	2		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
7.9.9		- Ozone generation system instrumentation	I	Sum	1		
7.9.10		- Ventilation system in ozone generator room	I	No	1		
7.9.11		- Ozone production control system	I	No	1		
7.9.12		- Ozone generation pipework and valves	I	Sum	1		
7.9.13		- Ozone dosing control system	I	No	1		
		(NOTE: The rates from both suppliers shall be completed, only the highest rate shall be carried forward to the total)					
7.1	PSPTO 7	**SCHEDULE NO: 7.10 - NITROGEN BLEED EQUIPMENT**					
7.10.1		A complete dual air compressor system with air receiver, air filters, refrigerant and desicant driers, flow, pipework, valves, pressure control valves and dew point analyzer with a capacity of at least 10 Nm^3/hr.	I	No	1		
7.11	PSPTP 8	**SCHEDULE NO: 7.11 - COOLING WATER EQUIPMENT**					
7.11.1		Cooling water pumpsets suitable for operation with generators	I	No	2		
7.11.2		Cooling water pipework, valves and instrumentation to ozone complete the cooling water system	I	Sum	1		
7.12		**SCHEDULE NO: 7.12 - OZONE DIFFUSION AND INJECTION EQUIPMENT**					
	PSPTO 9	**MAIN OZONE BUBBLE DIFFUSION EQUIPMENT**					
		Stage 1 diffusers					
7.12.1		Ceramic dome diffusers, manifold, gaskets, couplings supports, valves and feed pipes for dissolved ozone gas into water at a maximum rate of 6 mg/l.	I	No	1		
		Stage 2 and 3 diffusers					
7.12.2		Ceramic dome diffusers, manifold, gaskets, couplings supports, valves and feed pipes for dissolved ozone gas into water at a maximum rate of 3 mg/l.	I	No	2		
7.12.3		200NB pressure relief and vacuum breaker for ozone contact tank	M	No	4		
	PSPTO 10	**(PRE-OZONE)SIDESTREAM DIFFUSION AND DEGASSING EQUIPMENT**					
7.12.4		Pipework and valves from ozone generation to pre-ozone dosing point including pipe special on main pipeline	I	Sum	1		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
7.12.5		Sidestream pumpsets with flow rate of at least 100 m³/hr	I	No	2		
7.12.6		Ozone injection device each capable of 16 m³/hr	I	No	2		
7.12.7	PSPLT 1	Water flow meter with measuring range of 0 - 300 m³/hr	I	No	1		
7.12.8		Pre-ozone diffusion Instrumentation	I	Sum	1		
7.13		**SCHEDULE NO: 7.13 - OZONE DESTRUCTION EQUIPMENT**					
	PSPTO 11	**MAIN OZONE VENT OFF-GAS DESTRUCTION EQUIPMENT**					
7.13.1		Complete off-gas destruction system including extraction fan, thermo-catalytic converter, ozone off-gas analyser,demister, piping and valves	I	Sum	1		
7.13.2		Pipework and valves	I	Sum	1		
7.13.3		Main ozone destruction instrumentation	I	Sum	1		
7.14	PSPTO 15	**SCHEDULE NO: 7.14 - OZONE INSTRUMENTATION**					
7.14.1		Oxygen concentration analyser	I	No	2		
7.14.2		Ozone gas analyser (low concentration)	I	No	4		
7.14.3		Ozone off-gas analyser	I	No	2		
7.14.4		Ozone gas analyser (high concentration)	I	No	4		
7.14.5		UV254 analyser	I	No	4		
7.14.6		Dew point analyser	I	No	4		
7.14.7		Mass flow meter (ozone gas flow)	I	No	5		
		COMMISSIONING					
7.15		**SCHEDULE NO: 7.15 - GENERAL**					
7.15.1	PSPTO18.1	Factory acceptance testing of ozone generators (Client representative and Engineer expenses for 7 days)	I	Sum	1		
7.15.2	PSPTO 18.2	On-site performance testing and fingerprinting of ozone generation and dosing system	I	Sum	1		
7.15.3	PSPTO18.3	Ozone generation and dosing system optimization	I	Sum	1		
7.16	PTO	**SCHEDULE NO: 7.16 - OZONE GENERATION EQUIPMENT**					
	PSPTO 5	Commission complete ozone generation system					
7.16.1		Supplier 1	I	Sum	1		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
7.16.2		Supplier 2	I	Sum	1		
7.17	PSPTO 7	**SCHEDULE NO: 7.17 - NITROGEN BLEED EQUIPMENT**					
7.17.1		Commission nitrogen bleed system complete	I	Sum	1		
7.18	PSPTP 8	**SCHEDULE NO: 7.18 - COOLING WATER EQUIPMENT**					
7.18.1		Commission cooling water system complete	I	Sum	1		
7.19		**SCHEDULE NO: 7.19 - OZONE DIFFUSION AND INJECTION EQUIPMENT**					
	PSPTO 9	**MAIN OZONE BUBBLE DIFFUSION EQUIPMENT**					
7.19.1		Commission main ozone bubble diffusion system complete	I	Sum	1		
	PSPTO 10	**(PRE-OZONE) SIDESTREAM DIFFUSION**					
7.19.2		Commission pre-ozone sidestream diffusion system complete	I	Sum	1		
7.20		**SCHEDULE NO: 7.20 - OZONE DESTRUCTION EQUIPMENT**					
	PSPTO 11	**MAIN OZONE VENT OFF-GAS DESTRUCTION EQUIPMENT**					
7.20.1		Commission main ozone vent off-gas destruction system	I	Sum	1		
7.21	PSPTO 15	**SCHEDULE NO: 7.21 - OZONE INSTRUMENTATION**					
7.21.1		Commission all instrumentation complete	I	Sum	1		
		MISCELLANEOUS					
7.22	PSPTO 19	**SCHEDULE NO: 7.22 - CRITICAL SPARES**					
		Suggested critical spares:					
		Item **Description**					
7.22.1		No 1 _____	I	No	1		
7.22.2		No 2 _____	I	No			
7.22.3		No 3 _____	I	No			
7.22.4		No 4 _____	I	No			
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
7.22.5		No 5 _____	I	No			
7.22.6		No 6 _____	I	No			
	PSPT0 19.2	**MAINTENANCE AGREEMENT**					
7.22.7		Optional support agreement for first year after defects notification period	I	Sum	1		
7.23	PSPTO 20	**SCHEDULE NO: 7.23 - TRAINING**					
7.23.1	PSPTO 20.1	Training of operating and maintenance personnel during and after commissioning	I	Sum	1		
7.23.2	PSPTO 20.2	Servicing of ozone equipment during defects notification period	I	Sum	1		
7.24	PSPTO 22	**SCHEDULE NO: 7.24 - OCCUPATIONAL, HEALTH AND SAFETY REQUIREMENTS**					
7.24.1	PSPTO 22.1	Ambient ozone analyser in ozone generator building	I	No	1		
7.24.2		Ozone gas mask and throw-away cartridge	I	No	3		
7.24.3	PSPTO 22.2	Self contained breathing apparatus set	I	No	2		
7.25	PSPTO 16.2	**SCHEDULE NO: 7.25 - HAND HELD INSTRUMENTS**					
7.25.1		Residual ozone analyser	I	No	1		
7.25.2		Ozone gas analyser (low concentration)	I	No	1		
7.25.3		ORP analyser	I	No	1		
7.25.4		UV254 analyser	I	No	1		
		SCHEDULE: 7 **OZONE EQUIPMENT** **CARRIED FORWARD TO SUMMARY**					
						TOTAL	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
8	*PTG PTTG PSPTTG*	**SCHEDULE: 8 GAC FILTRATION SYSTEM**					
8.1		**SCHEDULE NO: 8.1 - DESIGN AND DRAWINGS**					
8.1.1		Detail design calculations, as well as submission of quality assurance documentation, detailed P&ID's, and manufacturing GA layouts, pipe work layouts as may be required for complete installation	G	Sum	1		
8.2		**SCHEDULE NO: 8.2 - SUPPLY AND DELIVERY TO SITE GAC FILTER EQUIPMENT**					
	PSPTTG 2.3 & 2.4	**GAC FILTER FLOOR**					
8.2.1		Complete GAC filter floor system including laterals, nozzles, fixing and sealing materials. Nozzles to be embedded in concrete. (refer to dwgs 1890.08.FB.14.D005 - D007 and X002 to X004)	M	No	6		
8.3		**SCHEDULE NO: 8.3 - INSTALLATION OF GAC FILTER EQUIPMENT**					
	PSPTTG 2.3 & 2.4	**GAC FILTER FLOOR**					
8.3.1		Complete GAC filter floor system including laterals, nozzles, fixing and sealing materials. Nozzles to be embedded in concrete. (refer to dwgs 1890.08.FB.14.D005 - D007 and X002 to X004)	I	No	6		
8.4		**SCHEDULE NO: 8.4 - COMMISIONING OF GAC FILTER EQUIPMENT**					
	PSPTTG 2.3 & 2.4	**GAC FILTER FLOOR**					
8.4.1		Commissioning of GAC Filter complete	I	Sum	1		
		SCHEDULE: 8 GAC FILTRATION SYSTEM CARRIED FORWARD TO SUMMARY					
						TOTAL	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
9	*PTG PSPTG PSPTTG*	**SCHEDULE: 9 GAC MEDIA**					
9.1		**SCHEDULE NO : 8.1 - SUPPLY AND DELIVER TO SITE GAC MEDIA AS SPECIFIED**					
	PSPTTG 2.5	**GAC MEDIA**					
		Supplier 1 : _____					
9.1.1		i) 8 X 16 GAC	M	m^3	180		
		Supplier 2 : _____					
9.1.2		ii) 8 X 16 GAC	M	m^3	180		
		Supplier 3 : _____					
9.1.3		iii) 8 X 16 GAC	M	m^3	180		
		Supplier 4 : _____					
9.1.4		iv) 8 X 16 GAC	M	m^3	180		
		(NOTE: Only highest rate to be carried forward to schedule total)					
	PTG5	**PROVISIONAL SUM FOR TESTING OF GAC MEDIA**					
9.1.5		Laboratory Testing of GAC media	G	Sum	1		
9.2		**SCHEDULE NO : 9.2 - INSTALLATION AND HANDLING OF GAC MEDIA AS SPECIFIED**					
	PSPTTG 2.5	**GAC MEDIA**					
		Supplier 1 : _____					
9.2.1		i) 8 X 16 GAC	M	m^3	180		
		Supplier 2 : _____					
9.2.2		ii) 8 X 16 GAC	M	m^3	180		
		Supplier 3 : _____					
9.2.3		iii) 8 X 16 GAC	M	m^3	180		
		Supplier 4 : _____					
9.2.4		iv) 8 X 16 GAC **(NOTE: Only highest rate to be carried forward to schedule total)** **SCHEDULE: 9** **GAC MEDIA** **CARRIED FORWARD TO SUMMARY**	M	m^3	180		
						TOTAL	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
10	*PT* *PSPT*	**SCHEDULE NO. 10** **PUMPS**					
10.1		**SCHEDULE NO: 10.1 - DAF RECYCLE PUMPS**					
10.1.1		**DESIGN, DRAWING AND GENERAL**					
10.1.1.1	PT12.1	Provide design drawings and information as specified	G	Sum	1		
10.1.1.2		Provide operating and maintenance manuals and "as built" drawings as specified	G	Sum	1		
10.1.2	PT12.2	**SUPPLY AND DELIVERY TO SITE**					
10.1.2.1	PSPT1.1	DAF recycle water pump	M	No	1		
10.1.2.2	PT12.2.2	Monitoring Devices					
		a) Pressure gauges, piping	M	Sum	1		
		b) Pedestals and number plates	M	Sum	1		
		c) Pump vents and drain fittings	M	Sum	1		
10.1.3	PT12.3	**INSTALLATION WORK**					
10.1.3.1	PSPT1.1	DAF recycle water pumps (PSPT 1.1)	I	No	1		
10.1.3.2	PT12.3.2	Monitoring Devices					
		a) Pressure gauges, piping	I	Sum	1		
		b) Pedestals and number plates	I	Sum	1		
		c) Pump vents and drain fittings	I	Sum	1		
10.1.4	PT	**COMMISSIONING**					
10.1.4.1	PT10	Testing and commmissioning of pumps and appertaining pipework					
10.1.4.2	PSPT1.1	DAF recycle water pumps	I	No	1		
10.2		**SCHEDULE NO: 10.2 - FILTRATE PUMPS**					
10.2.1		**DESIGN, DRAWING AND GENERAL**					
10.2.1.1	PT12.1	Provide design drawings and information as specified	G	Sum	1		
10.2.1.2		Provide operating and maintenance manuals and "as built" drawings as specified	G	Sum	1		
10.2.2	PT12.2	**SUPPLY AND DELIVERY TO SITE**					
10.2.2.1	PSPT1.2	Filtrate pumps	M	No	2		
					Carried Forward		

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward		
10.2.2.2	PT12.2.2	Monitoring Devices					
		a) Pressure gauges, piping	M	Sum	1		
		b) Pedestals and number plates	M	Sum	1		
		c) Pump vents and drain fittings	M	Sum	1		
10.2.3	PT12.3	**INSTALLATION WORK**					
10.2.3.1	PSPT1.2	Filtrate pumps	I	No	2		
10.2.3.2	PT12.3.2	Monitoring Devices					
		a) Pressure gauges, piping	I	Sum	1		
		b) Pedestals and number plates	I	Sum	1		
		c) Pump vents and drain fittings	I	Sum	1		
10.2.4	PT	**COMMISSIONING**					
10.2.4.1	PT10	Testing and commmissioning of pumps and appertaining pipework:					
	PSPT1.2	Filtrate pumps	I	No	2		
10.3		**SCHEDULE NO: 10.3 - LOW LIFT PUMPS**					
10.3.1		**DESIGN, DRAWING AND GENERAL**					
10.3.1.1	PT12.1	Provide design drawings and information as specified	G	Sum	1		
10.3.1.2		Provide operating and maintenance manuals and "as built" drawings as specified	G	Sum	1		
10.3.2	PT12.2	**SUPPLY AND DELIVERY TO SITE**					
10.3.2.1	PSPT1.3	Low Lift pumps	M	No	2		
10.3.2.2	PT12.2.2	Monitoring Devices					
		a) Pressure gauges, piping	M	Sum	1		
		b) Pedestals and number plates	M	Sum	1		
		c) Pump vents and drain fittings	M	Sum	1		
10.3.3	PT12.3	**INSTALLATION WORK**					
10.3.3.1	PSPT1.3	Low Lift pumps	I	No	2		
					Carried Forward		

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward		
10.3.3.2	PT12.3.2	Monitoring Devices					
		a) Pressure gauges, piping	I	Sum	1		
		b) Pedestals and number plates	I	Sum	1		
		c) Pump vents and drain fittings	I	Sum	1		
10.3.4	PT	**COMMISSIONING**					
10.3.4.1	PT10	Testing and commmissioning of pumps and appertaining pipework					
10.3.4.2	PSPT1.3	Low Lift pumps	I	No	2		
10.4		**SCHEDULE NO: 10.4 - REFURBISHMENT OF SLUDGE PUMPS**					
10.4.1	PSPT1.4	Rate to include for supply and installation of VSD's for the existing sludge pumps	M	No	2		
10.5		**SCHEDULE NO: 10.5 - REFURBISHMENT OF RAW WATER PUMPS**					
10.5.1		Rate to include for removal and transport of pumps to workshop, replacement of all seals and bearings, sand blasting and re-coating, installation and comissioning	N	Prov-Sum	1	250,000.00	250,000.00
10.6		**HIGH LIFT PUMPS**					
10.6.1	*PT12.1*	**DESIGN, DRAWINGS AND GENERAL**					
10.6.1.1		Provide design drawings and information as specified	G	Sum	1		
10.6.1.2		Provide operating and maintenance manuals and "as built" drawings as specified	G	Sum	1		
10.6.2	*PT12.2*	**SUPPLY AND DELIVERY TO SITE**					
10.6.2.1		Pump and motor set complete with pump, motor, couplings, foundation steelwork and baseplate	M	No	4		
10.6.2.2		Monitoring Devices					
		a) Pressure gauges, piping	M	Sum	1		
		b) Temperature sensors	M	Sum	1		
		c) Vibration sensors	M	Sum	1		
		d) Air vents and gland leakage detection	M	Sum	1		
					Carried Forward		

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
10.6.3	*PT12.3*	**INSTALLATION WORK**					
10.6.3.1	*PSPT 1*	Dismantle existing pumps, motors, couplings foundation steelwork, baseplates, and other redundant equipment	I	No	4		
10.6.3.2	*PSPT 1*	Adjust plinth level and dimensions to suit new pumps	I	No	4		
10.6.3.3		Pump and motor set complete on base plate	I	No	4		
10.6.3.4		Monitoring Devices					
		a) Pressure gauges, piping	I	Sum	1		
		b) Temperature sensors	I	Sum	1		
		c) Vibration sensors	I	Sum	1		
		d) Air vents and gland leakage detection	I	Sum	1		
10.6.4		**COMMISSIONING**					
10.6.4.1	*PT12.4.1*	Testing and commmissioning of pumps and appertaining pipework	I	Sum	1		
10.6.4.2	*PT12.5.1*	Supply and delivery of specified equipment to the store facility of the Employer	I	Sum	1		
		SCHEDULE: 10 **PUMPS** **CARRIED FORWARD TO SUMMARY**					
						TOTAL	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
11	PTN PSPTN	**SCHEDULE: 11** **DEWATERING EQUIPMENT**					
11.1	PSPTN 15.1	**SECTION NO: 11.1 - DESIGN, DRAWING AND GENERAL**					
11.1.1		Detail design calculations, as well as submission of quality assurance documentation, detailed P&ID's, and manufacturing GA layouts, pipe work layouts as may be required for complete installation	G	Sum	1		
11.2	PSPTN 15.2	**SCHEDULE NO: 11.2 - SUPPLY AND DELIVERY TO SITE**					
		The tendered rate shall include for the ordering, manufacture, factory-acceptance testing, factory-applied corrosion protection, supply and delivery to Site. Tendered rate shall include supply of spares for key components. Spares list shall be included in Technical Schedules.					
11.2.1		**Dewatering Equipment**					
11.2.1.1	PSPTN 15.2.1	Mechanical dewatering belt filter press complete, including flocculation tanks, in-line mixers, pressure transmitters, piping and valves;					
		Supplier 1:	M	No	2		
		Supplier 2:	M	No	2		
		Supplier 3:	M	No	2		
		(NOTE: Only highest rate to be carried forward to schedule total)					
11.2.1.2	PSPTN 15.2.3	Poly-electolyte batching and dosing system		Sum	1		
11.2.2		**Pumping Equipment**					
11.2.2.1	PSPTN 15.2.2 PSPLT 1	Belt filter press feed pipework, valves, flow meters and ultrasonic level transmitter, pressure gauges and transmitters etc.	M	Sum	1		
11.2.2.2	PSPTN 15.2.5 PSPLT 1	Belt filter press Washwater pumps, including all pipework, valves, flow meters and ultrasonic level transmitter. pressure gauges and transmitters etc.	M	Sum	1		
11.2.3		**Pipework and Specials**					
11.2.3.1	PSPTN 15.2.4	a) Filtrate & Washwater pipework and specials	P	Sum	1		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
11.2.3.2	PSPTN 15.2.6	b) Sludge feed pipework and specials	P	Sum	1		
11.2.4	PSPTN 15.2.7	**Sludge outloading equipment**	M	No	1		
11.2.5	PSPTN 15.2.12	7 m³ waste skip	M	Sum	1		
11.3	PSPTN 15.3	**SCHEDULE NO: 11.3 - INSTALLATION**					
11.3.1		**Dewatering Equipment**					
11.3.1.1	PSPTN 15.3.1	Mechanical dewatering belt filter press complete, including flocculation tanks, in-line mixers, pressure transmitters, piping and valves;					
		Supplier 1:	I	No	2		
		Supplier 2:	I	No	2		
		Supplier 3:	I	No	2		
		(NOTE: Only highest rate to be carried forward to schedule total)					
11.3.1.2	PSPTN 15.3.3	Poly-electolyte batching and dosing system	I	Sum	1		
11.3.2		**Pumping Equipment**					
11.3.2.1	PSPTN 15.3.2 PSPLT 1	Belt filter press feed pipework, valves, flow meters and ultrasonic level transmitter, pressure gauges and transmitters etc.	I	Sum	1		
11.3.2.2	PSPTN 15.3.5 PSPLT 1	Belt filter press washwater pumps, including all pipework, valves, flow meters and ultrasonic level transmitter.	I	Sum	1		
11.3.3		**Pipework and Specials**					
11.3.3.1	PSPTN 15.3.4	a) Filtrate & Washwater pipework and specials	I	Sum	1		
11.3.3.2	PSPTN 15.3.6	b) Sludge feed pipework and specials	I	Sum	1		
11.3.4	PSPTN 15.3.7	**Sludge outloading equipment**	I	No	1		
11.3.6	PSPTN	7 m³ waste skip	I	Sum	1		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
	15.3.12						
11.4	PSPTN	**SCHEDULE NO: 10.4 - COMMISSIONING**					
	15.4						
11.4.1	PSPTN 15.4.1	Testing, Comissioning and trial and operation of the Complete Sludge Dewatering system	I	Sum	1		
		SCHEDULE: 11 **DEWATERING EQUIPMENT** **CARRIED TO SUMMARY**					
						TOTAL	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
12	*PLC, PSPLC*	**SCHEDULE: 12** **CHEMICAL DOSING SYSTEM**					
12.1		**SCHEDULE NO: 12.1 - DESIGN, DRAWING AND GENERAL**					
12.1.1		Detail design calculations, as well as submission of quality assurance documentation, detailed P&ID's, and manufacturing GA layouts, pipe work layouts as may be required for complete installation	G	Sum	1		
12.2		**SCHEDULE NO: 12.2 - SUPPLY AND DELIVERY TO SITE**					
12.2.1		**POLY-ELECTROLYTE DOSING SYSTEM** (Drawing No 1890.08.AA.01.A12)					
12.2.2.1	*PLC 6 (a)*	Poly-electrolyte dosing pumps (PSPLC 5.1.1)	M	No	1		
12.2.2.2	*PLC 6 (b)*	Poly-electrolyte pipework (excluding clearwater feed) complete including bends fixing brackets, calibrating cylinder, etc. all as shown on the drawings in Class 16 uPVC from the bulk tanks to the dosing points.	M	Sum	1		
12.2.2		**FERRIC-CHLORIDE DOSING SYSTEM** (Drawing No 1890.08.AA.01.A12)					
12.2.2.1	*PLC 6 (a)*	Ferric Chloride dosing pumps (PSPLC 5.1.1)	M	No	1		
12.2.2.2	*PLC 6 (b)*	Ferri-chloride pipework (excluding clearwater feed) complete including bends fixing brackets, calibrating cylinder, etc all as shown on the drawings in Class 16 uPVC from the bulk tanks to the dosing points.	M	Sum	1		
12.2.3		**HYDROGEN PEROXIDE DOSING SYSTEM** (Drawing No 1890.08.SUG.16.D001)					
12.2.3.1	*PLC 6 (a)*	Hydrogen Peroxide dosing pumps (PSPLC 5.1.2)	M	No	2		
12.2.3.2	*PLC 6 (c)*	5000 ℓ Storage Tank for Hydrogen Peroxide complete with sight glass entry manhole, nozzels and emergency vent etc complete. (PSPLC5.2.1)	M	No	2		
12.2.3.3	*PLC 6 (b)*	Hydrogen Peroxide pipework (including clearwater feed) complete including bends fixing brackets, calibrating cylinder, etc. all as shown on the drawings from the bulk tanks to the dosing points.	M	Sum	1		
12.2.3.4		Spraydrench epoxy coated, platform-operated emergency safety shower with eyewash station	M	No	1		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
12.2.4		**CHLORINE DOSING SYSTEM**					
12.2.4.1	PTU 6.4 PSPTU 3	Chlorinators complete with ejectors, multiple flow meter assemblies, control valves, clear water supply piping to clear water supply connection, solenoid valves, inline strainers, pressure gauges, by-pass connection, vacuum regultors, auto change over system and inter connecting pipework	M	No	1		
12.3		**SCHEDULE NO: 12.3 - INSTALLATION**					
12.3.1		**POLY-ELECTROLYTE DOSING SYSTEM** (Drawing No 1890.08.AA.01.A12)					
12.3.1.1	PLC 6 (a)	Poly-electrolyte dosing pumps (PSPLC 5.1.1)	I	No	1		
12.3.1.2	PLC 6 (b)	Poly-electrolyte pipework (excluding clearwater feed) complete including bends fixing brackets, calibrating cylinder, etc. all as shown on the drawings in Class 16 uPVC from the bulk tanks to the dosing points.	I	Sum	1		
12.3.2		**FERRIC-CHLORIDE DOSING SYSTEM** (Drawing No 1890.08.AA.01.A12)					
12.3.2.1	PLC 6 (a)	Ferric Chloride dosing pumps (PSPLC 5.1.1)	I	No	1		
12.3.2.2	PLC 6 (b)	Ferri-chloride pipework (excluding clearwater feed) complete including bends fixing brackets, calibrating cylinder, etc all as shown on the drawings in Class 16 uPVC from the bulk tanks to the dosing points.	I	Sum	1		
12.3.3		**HYDROGEN PEROXIDE DOSING SYSTEM** (Drawing No 1890.08.SUG.16.D001)					
12.3.3.1	*PLC 6 (a)*	Hydrogen Peroxide dosing pumps (PSPLC 5.1.2)	I	No	2		
12.3.3.2	*PLC 6 (c)*	5000 ℓ Storage Tank for Hydrogen Peroxide complete with sight glass entry manhole, nozzels and emergency vent etc complete. (PSPLC5.2.1)	I	No	2		
12.3.3.3	*PLC 6 (b)*	Hydrogen Peroxide pipework (including clearwater feed/injector) complete including bends fixing brackets, calibrating cylinder, etc. all as shown on the drawings from the bulk tanks to the dosing points.	I	Sum	1		
12.3.3.4		Spraydrench epoxy coated, platform-operated emergency safety shower with eyewash station	I	No	1		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
12.3.4		**CHLORINE DOSING SYSTEM**					
12.3.4.1	PTU 6.4 PSPTU 3	Chlorinators complete with ejectors, multiple flow meter assemblies, control valves, clear water supply piping to clear water supply connection, solenoid valves, inline strainers, pressure gauges, by-pass connection, vacuum regultors, auto change over system and inter connecting pipework	I	No	1		
12.4		**SCHEDULE NO: 11.4 - COMMISSIONING**					
12.4.1		Commissioning of Chemical Dosing system complete	I	Sum	1		
12.4.2		Commissioning of Chlorination system complete	I	Sum	1		
		SCHEDULE: 12 **CHEMICAL DOSING SYSTEM** **CARRIED TO SUMMARY**					
						TOTAL	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
13	PTP, PSPTP	**SCHEDULE: 13** **HOISTING EQUIPMENT**					
13.1		**SCHEDULE NO: 13.1 - SUPPLY AND DELIVERY TO SITE OF HOISTING EQUIPMENT**					
		Low Lift Pump Station					
13.1.1	PSPTP	Portal A - frame bolted to concrete floor complete with i-beam, trolley and chain hoist for a max load of 750kg complete as shown on drg 1890.08.OA.13.D002	M	Sum	1		
		Pre-Ozone Building					
13.1.2	PSPTP	i-beam fixed to ring beam with trolley and chain hoist for max load of 1000 kg complete as shown on drg 1890.08.SUF.14.D001 and D002	M	Sum	1		
		Dewatering Building					
13.1.3	PSPTP	Portal A - frame bolted to concrete floor complete with i-beam, trolley and chain hoist for a max load of 1500 kg complete as shown on drg 1890.08.SUD.16.X002	M	Sum	1		
		GAC Filters					
13.1.4	PSPTP	i-beam fixed to beams with trolley and chain hoist for max load of 1000 kg complete as shown on drg 1890.08.FB.14.X002	M	No	1		
13.2		**SCHEDULE NO: 13.2 - INSTALLATION OF HOISTING EQUIPMENT**					
		Low Lift Pump Station					
13.2.1	PSPTP	Portal A - frame bolted to concrete floor complete with I-beam, trolley and chain hoist for a max load of 750kg complete as shown on drg 1890.08.OA.13.D002	I	Sum	1		
		Pre-Ozone Building					
13.2.2	PSPTP	I-beam fixed to ring beam with trolley and chain hoist for max load of 1000 kg complete as shown on drg 1890.08.SUF.14.D001 and D002	I	Sum	1		
		Dewatering Building					
13.2.3	PSPTP	Portal A - frame bolted to concrete floor complete with I-beam, trolley and chain hoist for a max load of 1500 kg complete as shown on drg 1890.08.SUD.16.X002	I	Sum	1		
		GAC Filters					
13.2.4	PSPTP	I-beam fixed to beams with trolley and chain hoist for max load of 1000 kg complete as shown on drg 1890.08.FB.14.X002	I	No	1		
		SCHEDULE: 13 **HOISTING EQUIPMENT** **CARRIED TO SUMMARY**					
						TOTAL	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E1	***EMVS***	**SCHEDULE NO. E1** **MEDIUM VOLTAGE SWITCHGEAR**					
E1.1	**EMVS**	**SCHEDULE E1.1 - DESIGN, DRAWINGS AND GENERAL**					
	35.1						
E1.1.1	EMVS 35.1 (a)	Provide design drawings and design information for medium voltage switchgear (refer to project specification PSEMVS)	G	Sum	-		
E1.1.2	EMVS 35.1 (b)	Provide operating all maintenance manuals and "as-built" drawings as specified (refer to project specification PSEMVS)	G	Sum	-		
E1.1.3	EMVS 35.1 (c)	Protection short circuit analysis and coordination study and protection setting calculations for protection relays (refer to project specification PSEMVS)	G	Sum	-		
E1.2	**EMVS**	**SCHEDULE E1.2 - SUPPLY AND DELIVERY TO SITE**					
	35.2						
E1.2.1	EMVS 35.2 (a)	Supply and delivery to site of medium voltage switchgear (refer to project specification PSEMVS)	E	Sum	-		
E1.2.2	EMVS 35.2 (b)	Supply and delivery to site of charger and battery unit (refer to project specification PSEMVS)	E	Sum	-		
E1.3	**EMVS**	**SCHEDULE E1.3 - INSTALLATION**					
	35.3						
E1.3.1	EMVS 35.3 (a)	Site installation of medium voltage switchgear (refer to project specification PSEMVS)	I	Sum	-		
E1.3.2	EMVS 35.3 (b)	Installation of charger and battery unit (refer to project specification PSEMVS)	I	Sum	-		
E1.3.3	EMVS 35.3 (d)	Programming of protection settings (refer to project specification PSEMVS)	I	Sum	-		
E1.4	**EMVS**	**SCHEDULE E1.4 - COMMISSIONING**					
	35.4						
E1.4.1	EMVS 35.4 (a)	Commissioning of complete medium voltage switchgear inclusive of charger and battery unit (refer to project specification PSEMVS)	I	Sum	-		
		SCHEDULE NO. E1 **MEDIUM VOLTAGE SWITCHGEAR** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E2	***ERMU***	**SCHEDULE NO. E2** **RING MAIN UNITS**					
E2.1	**ERMU 3.1**	**SCHEDULE E2.1 - DESIGN, DRAWINGS AND GENERAL**					
E2.1.1	ERMU 3.1 (a)	Provide design drawings and design information for ring main units (refer to project specification PSERMU)	G	Sum	-		
E2.1.2	ERMU 3.1 (b)	Provide operating all maintenance manuals and "as-built" drawings as specified (refer to project specification PSERMU)	G	Sum	-		
E2.1.3	ERMU 3.1 (c)	Protection short circuit analysis and coordination study and protection setting calculations for protection relays (refer to project specification PSERMU)	G	Sum	-		
E2.2	**ERMU 3.2**	**SCHEDULE E2.2 - SUPPLY AND DELIVERY TO SITE**					
E2.2.1	ERMU 3.2 (a)	Supply and delivery to site of ring main units complete as specificied (refer to project specification PSERMU)	E	Sum	-		
E2.2.2	ERMU 3.2 (b)	Supply and delivery to site of all additional assosries (refer to project specification PSERMU)	E	Sum	-		
E2.3	**ERMU 3.3**	**SCHEDULE E2.3 - INSTALLATION**					
E2.3.1	ERMU 3.3 (a)	Site installation of ring main units complete as specificied (refer to project specification (refer to project specification PSERMU)	I	Sum	-		
E2.3.2	ERMU 3.3 (b)	Site installation of all additional assosries as specified (refer to project specification PSERMU)	I	Sum	-		
E2.3.3	ERMU 3.3 (d)	Programming of protection settings (refer to project specification PSERMU)	I	Sum	-		
E2.4	**ERMU 3.4**	**SCHEDULE E2.4 - COMMISSIONING**					
E2.4.1	ERMU 3.4 (a)	Commissioning of all complete ring main units on site inclusive of charger and battery unit (refer to project specification PSERMU)	I	Sum	-		
		SCHEDULE NO. E2 **RING MAIN UNITS** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E3	***EPPT***	**SCHEDULE NO. E3** **POWER TRANSFORMERS**					
E3.1	***GEN***	**SCHEDULE E3.1 - DESIGN, DRAWINGS AND GENERAL**					
E3.1.1	PSGEN B	Provide all design drawings and wiring diagrams	G	Sum	-		
E3.1.2	PSGEN B	Provide all operating and maintenance manuals and "as-built" drawings	G	Sum	-		
E3.2	**EPPT 12.1**	**SCHEDULE 3.2 - SUPPLY AND DELIVERY TO SITE**					
E3.2.1	EPPT 12.1 (a)	Supply and delivery to site of power transformers (refer to project specification PSEPPT-2 and PSEPPT-7)	E	Sum	-		
E3.2.2	EPPT 12.1 (b)	Supply and delivery to site of substation earthing system as specified under PSPPT-11	E	Sum	-		
3.3	**EPPT 12.2**	**SCHEDULE 3.3 - INSTALLATION**					
3.3.1	EPPT 12.2 (a)	Site Installation of power transformers (refer to project specification PSEPPT-2 and PSEPPT-7)	I	Sum	-		
3.3.2	EPPT 12.2 (b)	Installation of substation earthing system system as specified under PSPPT-11	I	Sum	-		
3.4	**EPPT 11.3**	**SCHEDULE 3.4 - COMMISSIONING**					
3.4.1	EPPT 12.3 (a)	Commissioning of refurbised power transformers (refer to project specification PSEPPT-2 and PSEPPT-7)	I	Sum	-		
3.4.2	EPPT 12.3 (b)	Commissioning of substation earthing system system as specified under PSPPT-11	I	Sum	-		
		SCHEDULE NO. E3 **POWER TRANSFORMERS** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E4	**EMSS**	**SCHEDULE NO. E4** **MINIATURE SUBSTATIONS**					
E4.1	**EMSS**	**SCHEDULE E4.1 - DESIGN, DRAWINGS AND GENERAL**					
	15.1						
E4.1.1	EMSS 15.1 (a)	Provide design drawings and design information for miniature substation (refer to particular specifications EMVS)	G	Sum	-		
E4.1.2	EMSS 15.1 (b)	Provide operating all maintenance manuals and "as-built" drawings as specified (refer to particular specification EMVS)	G	Sum	-		
E4.1.3	EMSS 15.1 (c)	Protection short circuit analysis and coordination study and protection setting calculations for protection relays (refer to particular specification EMVS)	G	Sum	-		
E4.2	**EMSS**	**SCHEDULE E4.2 - SUPPLY AND DELIVERY TO SITE**					
	15.2						
E4.2.1	EMSS 15.2 (a)	Supply and delivery to site of miniature substations complete with concrete plinth (refer to project specification PSEMSS)	E	Sum	-		
E4.3	**EMSS**	**SCHEDULE E4.3 - INSTALLATION**					
	15.3						
E4.3.1	EMSS 15.3 (a)	Site installation of miniature substation complete with concrete plinth and floor screed (refer to particular specification EMSS)	I	Sum	-		
E4.3.2	EMSS 15.3 (b)	Installation of protection settings (refer to particular specification EMVS)	I	Sum	-		
E4.4	**EMSS**	**SCHEDULE E4.4 - COMMISSIONING**					
	15.4						
E4.4.1	EMSS 15.4 (a)	Commissioning of miniature substation (refer to particular specification EMSS)	I	Sum	-		
E4.4.2	EMSS 15.4 (b)	Commissioning of protection settings (refer to particular specification EMVS)	I	Sum	-		
		SCHEDULE NO. E4 **MINIATURE SUBSTATIONS** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E5	**EMCC**	**SCHEDULE NO. E5** **MOTOR CONTROL CENTERS AND DISTRIBUTION BOARDS**					
E5.1	**EMCC**	**SCHEDULE E5.1 - DESIGN, DRAWINGS AND GENERAL**					
	21.1						
E5.1.1	EMCC 21.1 (a)	Provide motor control center design drawings and wiring diagrams (refer to particular specifications EMCC)	G	Sum	-		
E5.1.2	EMCC 21.1 (b)	Provide operating all maintenance manuals and "as-built" drawings as specified (refer to particular specification EMCC)	G	Sum	-		
E5.2	**EMCC**	**SCHEDULE E5.2 - SUPPLY AND DELIVERY TO SITE**					
	21.2						
E5.2 .1	EMCC 21.2 (a)	Supply and delivery to site complete MCC refer to project specification PSEMCC-6.A)	E	Each	1		
E5.2 .2	EMCC 21.2 (a)	Supply and delivery to site complete VFD enclosure (refer to project specification PSEMCC-6.B)	E	Each	4		
E5.2 .3	EMCC 21.2 (a)	Supply and delivery to site complete MCC (refer to project specification PSEMCC-6.C)	E	Each	1		
E5.2 .4	EMCC 21.2 (a)	Supply and delivery to site complete MCC (refer to project specification PSEMCC-6.D)	E	Each	1		
E5.2 .5	EMCC 21.2 (a)	Supply and delivery to site complete MCC (refer to project specification PSEMCC-6.E)	E	Each	1		
E5.2 .6	EMCC 21.2 (a)	Supply and delivery to site complete RGS FCP (refer to project specification PSEMCC-6.F)	E	Each	4		
E5.2 .7	EMCC 21.2 (a)	Supply and delivery to site complete MCC (refer to project specification PSEMCC-6.G)	E	Each	1		
E5.2 .8	EMCC 21.2 (a)	Supply and delivery to site complete MCC (refer to project specification PSEMCC-6.H)	E	Each	1		
E5.2 .9	EMCC 21.2 (a)	Supply and delivery to site complete BFPP (refer to project specification PSEMCC-6.I)	E	Each	2		
E5.2 .10	EMCC 21.2 (a)	Supply and delivery to site complete MCC (refer to project specification PSEMCC-6.J)	E	Each	1		
E5.2 .11	EMCC 21.2 (a)	Supply and delivery to site complete GAC FCP (refer to project specification PSEMCC-6.K)	E	Each	6		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E5.2 .12	EMCC 21.2 (a)	Supply and delivery to site complete MCC (refer to project specification PSEMCC-6.L)	E	Each	1		
E5.3	**EMCC 21.3**	**SCHEDULE E5.3 - INSTALLATION**					
E5.3 .1	EMCC 21.3 (a)	Site installation to site complete MCC (refer to project specification PSEMCC-6.A)	I	Each	1		
E5.3 .2	EMCC 21.3 (a)	Site installation to site complete VFD enclosure (refer to project specification PSEMCC-6.B)	I	Each	4		
E5.3 .3	EMCC 21.3 (a)	Site installation to site complete MCC (refer to project specification PSEMCC-6.C)	I	Each	1		
E5.3 .4	EMCC 21.3 (a)	Site installation to site complete MCC (refer to project specification PSEMCC-6.D)	I	Each	1		
E5.3 .5	EMCC 21.3 (a)	Site installation to site complete MCC (refer to project specification PSEMCC-6.E)	I	Each	1		
E5.3 .6	EMCC 21.3 (a)	Site installation to site complete RGS FCP (refer to project specification PSEMCC-6.F)	I	Each	4		
E5.3 .7	EMCC 21.3 (a)	Site installation to site complete MCC (refer to project specification PSEMCC-6.G)	I	Each	1		
E5.3 .8	EMCC 21.3 (a)	Site installation to site complete MCC (refer to project specification PSEMCC-6.H)	I	Each	1		
E5.3 .9	EMCC 21.3 (a)	Site installation to site complete BFPP (refer to project specification PSEMCC-6.I)	I	Each	2		
E5.3 .10	EMCC 21.3 (a)	Site installation to site complete MCC (refer to project specification PSEMCC-6.J)	I	Each	1		
E5.3 .11	EMCC 21.3 (a)	Site installation to site complete GAC FCP (refer to project specification PSEMCC-6.K)	I	Each	6		
E5.3 .12	EMCC 21.3 (a)	Site installation to site complete MCC (refer to project specification PSEMCC-6.L)	I	Each	1		
E5.4	**EMCC 21.4**	**SCHEDULE E5.4 - COMMISSIONING**					
E5.4 .1	EMCC 21.4 (a)	Commissioning to site complete MCC (refer to project specification PSEMCC-6.A)	I	Each	1		
E5.4 .2	EMCC 21.4 (a)	Commissioning to site complete VFD enclosure (refer to project specification PSEMCC-6.B)	I	Each	4		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E5.4 .3	EMCC 21.4 (a)	Commissioning to site complete MCC (refer to project specification PSEMCC-6.C)	I	Each	1		
E5.4 .4	EMCC 21.4 (a)	Commissioning to site complete MCC (refer to project specification PSEMCC-6.D)	I	Each	1		
E5.4 .5	EMCC 21.4 (a)	Commissioning to site complete MCC (refer to project specification PSEMCC-6.E)	I	Each	1		
E5.4 .6	EMCC 21.4 (a)	Commissioning to site complete RGS FCP (refer to project specification PSEMCC-6.F)	I	Each	4		
E5.4 .7	EMCC 21.4 (a)	Commissioning to site complete MCC (refer to project specification PSEMCC-6.G)	I	Each	1		
E5.4 .8	EMCC 21.4 (a)	Commissioning to site complete MCC (refer to project specification PSEMCC-6.H)	I	Each	1		
E5.4 .9	EMCC 21.4 (a)	Commissioning to site complete BFPP (refer to project specification PSEMCC-6.I)	I	Each	2		
E5.4 .10	EMCC 21.4 (a)	Commissioning to site complete MCC (refer to project specification PSEMCC-6.J)	I	Each	1		
E5.4 .11	EMCC 21.4 (a)	Commissioning to site complete GAC FCP (refer to project specification PSEMCC-6.K)	I	Each	6		
E5.4 .12	EMCC 21.4 (a)	Commissioning to site complete MCC (refer to project specification PSEMCC-6.L)	I	Each	1		
		SCHEDULE NO. E5 **MOTOR CONTROL CENTRE & DISTRIBUTION BOARDS** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E6	**EPLC**	**SCHEDULE NO. E6** **PROGRAMMABLE & LOGIC CONTROLLERS**					
E6.1	**EPLC**	**SCHEDULE E6.1 - DESIGN, DRAWINGS AND GENERAL**					
	26.1						
	EPLC 26.1 (a)	The Contractor will provide the following design calculations, Drawings and wiring diagrams for approval by the Engineer: a) Fibre loss design calculations in excel format which will include but limited to From, To, Distance losses and Tag numbers and total losses through the fibre network [fibre losses] b) Electrical Load lists in excel format of all PLC equipment c) Engineer design drawings of network layout which contains all IP addresses, equipment and drawings d) Report which will include antennae radio paths, drawings which have line of sight of all locations in AutoCad Format, Connection speeds with the radio or wireless communication, details of all Radio & Wireless Radio losses e) Input and Output schedules in excel format which contains all tag numbers, names, commands, and description of all I/O f) Loop diagrams in AutoCAD format g) Cable schedules in excel format which will include but limited to From, To, Distance and Tag numbers h) AutoCAD drawing of all equipment positions, equipment layouts, cable layouts, rack layouts, router / modems, switches connections and layouts. i) P&ID drawings of the entire system which is implemented and equipment in AutoCAD format which shall strictly accordance to ANSI/ISA-5.1 [American national Standard] j) Functional design specification which will include but not limited to all mimic diagrams, control procedures compared to control philosophy and a detail description how the PLC will control the entire system [broken down into each component].					
E6.1.1		(Refer to particular specifications)	G	Sum	-		
	EPLC 26.1 (b)	Provide operating all maintenance manuals and "as-built" drawings as specified (refer to particular					
E6.1.2		specification EPLC)	G	Sum	-		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.2	**EPLC 26.2**	**SCHEDULE E6.2- SUPPLY AND DELIVERY TO SITE**					
E6.2.1	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.A]	E	Each	1		
E6.2.2	EPLC 26.2 (b)	Supply and delivery to site complete UPS as specified [refer to project specification PSEPLC-6.A]	E	Each	1		
E6.2.3	EPLC 26.2 (c)	Supply and delivery to site complete HMI as specified [refer to project specification PSEPLC-6.A]	E	Each	1		
E6.2.4	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.B]	E	Each	1		
E6.2.5	EPLC 26.2 (b)	Supply and delivery to site complete UPS as [refer to project specification PSEPLC-6.B]	E	Each	1		
E6.2.6	EPLC 26.2 (c)	Supply and delivery to site complete HMI as [refer to project specification PSEPLC-6.B]	E	Each	1		
E6.2.7	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.C]	E	Each	1		
E6.2.8	EPLC 26.2 (b)	Supply and delivery to site complete UPS as [refer to project specification PSEPLC-6.C]	E	Each	1		
E6.2.9	EPLC 26.2 (c)	Supply and delivery to site complete HMI as [refer to project specification PSEPLC-6.C]	E	Each	1		
E6.2.10	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.D]	E	Each	1		
E6.2.11	EPLC 26.2 (b)	Supply and delivery to site complete UPS as [refer to project specification PSEPLC-6.D]	E	Each	1		
E6.2.12	EPLC 26.2 (c)	Supply and delivery to site complete HMI as specified [refer to project specification PSEPLC-6.D]	E	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.2.13	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.E]	E	Each	4		
E6.2.14	EPLC 26.2 (c)	Supply and delivery to site complete HMI as specified [refer to project specification PSEPLC-6.E]	E	Each	4		
E6.2.15	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.F]	E	Each	1		
E6.2.16	EPLC 26.2 (b)	Supply and delivery to site complete UPS as [refer to project specification PSEPLC-6.F]	E	Each	1		
E6.2.17	EPLC 26.2 (c)	Supply and delivery to site complete HMI as specified [refer to project specification PSEPLC-6.F]	E	Each	1		
E6.2.18	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.G]	E	Each	1		
E6.2.19	EPLC 26.2 (b)	Supply and delivery to site complete UPS as specified [refer to project specification PSEPLC-6.G]	E	Each	1		
E6.2.20	EPLC 26.2 (c)	Supply and delivery to site complete HMI as specified [refer to project specification PSEPLC-6.G]	E	Each	1		
E6.2.21	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.H]	E	Each	2		
E6.2.22	EPLC 26.2 (c)	Supply and delivery to site complete HMI as specified [refer to project specification PSEPLC-6.H]	E	Each	2		
E6.2.23	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.I]	E	Each	1		
E6.2.24	EPLC 26.2 (b)	Supply and delivery to site complete UPS as specified [refer to project specification PSEPLC-6.I]	E	Each	1		
E6.2.25	EPLC 26.2 (c)	Supply and delivery to site complete HMI as specified [refer to project specification PSEPLC-6.I]	E	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.2.26	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.J]	E	Each	6		
E6.2.27	EPLC 26.2 (c)	Supply and delivery to site complete HMI as specified [refer to project specification PSEPLC-6.J]	E	Each	6		
E6.2.28	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.K]	E	Each	1		
E6.2.29	EPLC 26.2 (b)	Supply and delivery to site a complete UPS (refer to project specificaion PSPLC-6.K)	E	Each	1		
E6.2.30	EPLC 26.2 (c)	Supply and delivery to site a complete of HMI (refer to project specification PSPLC-6.K)	E	Each	1		
E6.2.31	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.L]	E	Each	1		
E6.2.32	EPLC 26.2 (b)	Supply and delivery to site a complete UPS (refer to project specificaion PSPLC-6.L)	E	Each	1		
E6.2.33	EPLC 26.2 (c)	Supply and delivery to site a complete of HMI (refer to project specification PSPLC-6.L)	E	Each	1		
E6.2.34	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.M]	E	Each	1		
E6.2.35	EPLC 26.2 (b)	Supply and delivery to site a complete UPS (refer to project specificaion PSPLC-6.M)	E	Each	1		
E6.2.36	EPLC 26.2 (c)	Supply and delivery to site a complete of HMI (refer to project specification PSPLC-6.M)	E	Each	1		
E6.2.37	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.N]	E	Each	1		
E6.2.38	EPLC 26.2 (b)	Supply and delivery to site a complete UPS (refer to project specificaion PSPLC-6.N)	E	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.2.39	EPLC 26.2 (c)	Supply and delivery to site a complete of HMI (refer to project specification PSPLC-6.N)	E	Each	1		
E6.2.40	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.O]	E	Each	1		
E6.2.41	EPLC 26.2 (b)	Supply and delivery to site a complete UPS (refer to project specificaion PSPLC-6.O)	E	Each	1		
E6.2.42	EPLC 26.2 (c)	Supply and delivery to site a complete of HMI (refer to project specification PSPLC-6.O)	E	Each	1		
E6.2.43	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.P]	E	Each	1		
E6.2.44	EPLC 26.2 (b)	Supply and delivery to site a complete UPS (refer to project specificaion PSPLC-6.P)	E	Each	1		
E6.2.45	EPLC 26.2 (c)	Supply and delivery to site a complete of HMI (refer to project specification PSPLC-6.P)	E	Each	1		
E6.2.46	EPLC 26.2 (a)	Supply and delivery to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.Q]	E	Each	1		
E6.2.47	EPLC 26.2 (c)	Supply and delivery to site a complete of HMI (refer to project specification PSPLC-6.Q)	E	Each	1		
E6.2.48	EPLC 26.2 (d)	Supply and delivery to site complete cable connections and programming of SCADA, PLC's & HMI's and peripheral equipment for an complete system	E	Each	1		
E6.3	**EPLC 26.3**	**SCHEDULE E6.3 - INSTALLATION**					
E6.3.1	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.A]	I	Each	1		
E6.3.2	EPLC 26.3 (b)	Installation to site complete UPS as specified [refer to project specification PSEPLC-6.A]	I	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.3.3	EPLC 26.3 (c)	Installation to site complete HMI as specified [refer to project specification PSEPLC-6.A]	I	Each	1		
E6.3.4	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.B]	I	Each	1		
E6.3.5	EPLC 26.3 (b)	Installation to site complete UPS as [refer to project specification PSEPLC-6.B]	I	Each	1		
E6.3.6	EPLC 26.3 (c)	Installation to site complete HMI as [refer to project specification PSEPLC-6.B]	I	Each	1		
E6.3.7	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.C]	I	Each	1		
E6.3.8	EPLC 26.3 (b)	Installation to site complete UPS as [refer to project specification PSEPLC-6.C]	I	Each	1		
E6.3.9	EPLC 26.3 (c)	Installation to site complete HMI as [refer to project specification PSEPLC-6.C]	I	Each	1		
E6.3.10	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.D]	I	Each	1		
E6.3.11	EPLC 26.3 ©	Installation to site complete HMI as specified [refer to project specification PSEPLC-6.D]	I	Each	1		
E6.3.12	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.E]	I	Each	4		
E6.3.13	EPLC 26.3 (c)	Installation to site complete HMI as specified [refer to project specification PSEPLC-6.E]	I	Each	4		
E6.3.14	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.F]	I	Each	1		
E6.3.15	EPLC 26.3 (c)	Installation to site complete HMI as specified [refer to project specification PSEPLC-6.F]	I	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.3.16	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.G]	I	Each	1		
E6.3.17	EPLC 26.3 (b)	Installation to site complete UPS as specified [refer to project specification PSEPLC-6.G]	I	Each	1		
E6.3.18	EPLC 26.3 (c)	Installation to site complete HMI as specified [refer to project specification PSEPLC-6.G]	I	Each	1		
E6.3.19	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.H]	I	Each	2		
E6.3.20	EPLC 26.3 (c)	Installation to site complete HMI as specified [refer to project specification PSEPLC-6.H]	I	Each	2		
E6.3.21	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.I]	I	Each	1		
E6.3.22	EPLC 26.3 (b)	Installation to site complete UPS as specified [refer to project specification PSEPLC-6.I]	I	Each	1		
E6.3.23	EPLC 26.3 (c)	Installation to site complete HMI as specified [refer to project specification PSEPLC-6.I]	I	Each	1		
E6.3.24	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.J]	I	Each	6		
E6.3.25	EPLC 26.3 (c)	Installation to site complete HMI as specified [refer to project specification PSEPLC-6.J]	I	Each	6		
E6.3.26	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.K]	I	Each	1		
E6.3.27	EPLC 26.3 (b)	Installation to site a complete UPS (refer to project specificaion PSPLC-6.K)	I	Each	1		
E6.3.28	EPLC 26.3 (c)	Installation to site a complete of HMI (refer to project specification PSPLC-6.K)	I	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.3.29	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.L]	I	Each	1		
E6.3.30	EPLC 26.3 (b)	Installation to site a complete UPS (refer to project specificaion PSPLC-6.L)	I	Each	1		
E6.3.31	EPLC 26.3 (c)	Installation to site a complete of HMI (refer to project specification PSPLC-6.L)	I	Each	1		
E6.3.32	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.M]	I	Each	1		
E6.3.33	EPLC 26.3 (b)	Installation to site a complete UPS (refer to project specificaion PSPLC-6.M)	I	Each	1		
E6.3.34	EPLC 26.3 (c)	Installation to site a complete of HMI (refer to project specification PSPLC-6.M)	I	Each	1		
E6.3.35	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.N]	I	Each	1		
E6.3.36	EPLC 26.3 (b)	Installation to site a complete UPS (refer to project specificaion PSPLC-6.N)	I	Each	1		
E6.3.37	EPLC 26.3 (c)	Installation to site a complete of HMI (refer to project specification PSPLC-6.N)	I	Each	1		
E6.3.38	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.O]	I	Each	1		
E6.3.39	EPLC 26.3 (b)	Installation to site a complete UPS (refer to project specificaion PSPLC-6.O)	I	Each	1		
E6.3.40	EPLC 26.3 (c)	Installation to site a complete of HMI (refer to project specification PSPLC-6.O)	I	Each	1		
E6.3.41	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.P]	I	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.3.42	EPLC 26.3 (b)	Installation to site a complete UPS (refer to project specificaion PSPLC-6.P)	I	Each	1		
E6.3.43	EPLC 26.3 (c)	Installation to site a complete of HMI (refer to project specification PSPLC-6.P)	I	Each	1		
E6.3.44	EPLC 26.3 (a)	Installation to site complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.Q]	I	Each	1		
E6.3.45	EPLC 26.3 (c)	Installation to site a complete of HMI (refer to project specification PSPLC-6.Q)	I	Each	1		
E6.3.46	EPLC 26.3 (d)	Installation to site complete cable connections and programming of SCADA, PLC's & HMI's and peripheral equipment for an complete system	I	Each	1		
E6.4	**EPLC 26.4**	**SCHEDULE E6.4 - COMMISSIONING**					
E6.4.1	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.A]	I	Each	1		
E6.4.2	EPLC 26.4 (b)	Commissioning of complete UPS as specified [refer to project specification PSEPLC-6.A]	I	Each	1		
E6.4.3	EPLC 26.4 (c)	Commissioning of complete HMI as specified [refer to project specification PSEPLC-6.A]	I	Each	1		
E6.4.4	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.B]	I	Each	1		
E6.4.5	EPLC 26.4 (b)	Commissioning of complete UPS as [refer to project specification PSEPLC-6.B]	I	Each	1		
E6.4.6	EPLC 26.4 (c)	Commissioning of complete HMI as [refer to project specification PSEPLC-6.B]	I	Each	1		
E6.4.7	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.C]	I	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.4.8	EPLC 26.4 (b)	Commissioning of complete UPS as [refer to project specification PSEPLC-6.C]	I	Each	1		
E6.4.9	EPLC 26.4 (c)	Commissioning of complete HMI as [refer to project specification PSEPLC-6.C]	I	Each	1		
E6.4.10	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.D]	I	Each	1		
E6.4.11	EPLC 26.4 (c)	Commissioning of complete HMI as specified [refer to project specification PSEPLC-6.D]	I	Each	1		
E6.4.13	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.E]	I	Each	4		
E6.4.13	EPLC 26.4 (c)	Commissioning of complete HMI as specified [refer to project specification PSEPLC-6.E]	I	Each	4		
E6.4.14	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.F]	I	Each	1		
E6.4.15	EPLC 26.4 (c)	Commissioning of complete HMI as specified [refer to project specification PSEPLC-6.F]	I	Each	1		
E6.4.16	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.G]	I	Each	1		
E6.4.17	EPLC 26.4 (b)	Commissioning of complete UPS as specified [refer to project specification PSEPLC-6.G]	I	Each	1		
E6.4.18	EPLC 26.4 (c)	Commissioning of complete HMI as specified [refer to project specification PSEPLC-6.G]	I	Each	1		
E6.4.19	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.H]	I	Each	2		
E6.4.20	EPLC 26.4 (c)	Commissioning of complete HMI as specified [refer to project specification PSEPLC-6.H]	I	Each	2		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.4.21	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.I]	I	Each	1		
E6.4.22	EPLC 26.4 (b)	Commissioning of complete UPS as specified [refer to project specification PSEPLC-6.I]	I	Each	1		
E6.4.23	EPLC 26.4 (c)	Commissioning of complete HMI as specified [refer to project specification PSEPLC-6.I]	I	Each	1		
E6.4.24	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.J]	I	Each	6		
E6.4.25	EPLC 26.4 (c)	Commissioning of complete HMI as specified [refer to project specification PSEPLC-6.J]	I	Each	6		
E6.4.26	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.K]	I	Each	1		
E6.4.27	EPLC 26.4 (b)	Commissioning of a complete UPS (refer to project specificaion PSPLC-6.K)	I	Each	1		
E6.4.28	EPLC 26.4 (c)	Commissioning of a complete of HMI (refer to project specification PSPLC-6.K)	I	Each	1		
E6.4.29	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.L]	I	Each	1		
E6.4.30	EPLC 26.4 (b)	Commissioning of a complete UPS (refer to project specificaion PSPLC-6.L)	I	Each	1		
E6.4.31	EPLC 26.4 (c)	Commissioning of a complete of HMI (refer to project specification PSPLC-6.L)	I	Each	1		
E6.4.32	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.M]	I	Each	1		
E6.4.33	EPLC 26.4 (b)	Commissioning of a complete UPS (refer to project specificaion PSPLC-6.M)	I	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E6.4.34	EPLC 26.4 (c)	Commissioning of a complete of HMI (refer to project specification PSPLC-6.M)	I	Each	1		
E6.4.35	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.N]	I	Each	1		
E6.4.36	EPLC 26.4 (b)	Commissioning of a complete UPS (refer to project specificaion PSPLC-6.N)	I	Each	1		
E6.4.37	EPLC 26.4 (c)	Commissioning of a complete of HMI (refer to project specification PSPLC-6.N)	I	Each	1		
E6.4.38	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.O]	I	Each	1		
E6.4.39	EPLC 26.4 (b)	Commissioning of a complete UPS (refer to project specificaion PSPLC-6.O)	I	Each	1		
E6.4.40	EPLC 26.4 (c)	Commissioning of a complete of HMI (refer to project specification PSPLC-6.O)	I	Each	1		
E6.4.41	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.P]	I	Each	1		
E6.4.42	EPLC 26.4 (b)	Commissioning of a complete UPS (refer to project specificaion PSPLC-6.P)	I	Each	1		
E6.4.43	EPLC 26.4 (a)	Commissioning of a complete of HMI (refer to project specification PSPLC-6.P)	I	Each	1		
E6.4.44	EPLC 26.4 (a)	Commissioning of complete PLC and peripheral equipment installed in or other specified enclosures, all as specified [refer to project specification PSEPLC-6.Q]	I	Each	1		
E6.4.45	EPLC 26.4 (c)	Commissioning of a complete of HMI (refer to project specification PSPLC-6.Q)	I	Each	1		
E6.4.46	EPLC 26.4 (d)	Commissioning of complete cable connections and programming of SCADA, PLC's & HMI's and peripheral equipment for an complete system	I	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
		Provisional Sums					
E6.4.47		a) Rocla Telemetry Hut Prov. Sum and offloading to site	E	Prov. Sum	1		300,000.00
E6.4.48		b) Overheads, charges and profit on above	E	%			
E6.4.49		c) Rerbishment of existing electrical infrastructure to Engineers approval	E	Prov. Sum	1		250,000.00
E6.4.50		d) Overheads, charges and profit on above	E	%			
E6.4.51		e) Removal of existing PLC backplane and equipment in PLC Cubicle	E	Prov. Sum	1		350,000.00
E6.4.52		f) Overheads, charges and profit on above	E	%			
		SCHEDULE NO. E6 **PROGRAMMABLE & LOGIC CONTROLLERS** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E7	***ESCA***	**SCHEDULE NO. E7 SCADA SYSTEM**					
E7.1	***GEN***	**SCHEDULE E7.1 - DESIGN, DRAWINGS AND GENERAL**					
E7.1.1	PSGEN B	Provide all design drawings and wiring diagrams	G	Sum	-		
E7.1.2	PSGEN B	Provide all operating and maintenance manuals and "as-built" drawings	G	Sum	-		
E7.2	**ESCA 12.1**	**SCHEDULE E7.2 - SUPPLY AND DELIVERY TO SITE**					
E7.2.1	ESCA 12.1 (a)	Supply and delivery to site of SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.A]	E	Each	1		
E7.2.2	ESCA 12.1 (a)	Supply and delivery to site of SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.B]	E	Each	1		
E7.2.3	ESCA 12.1 (a)	Supply and delivery to site of SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.C]	E	Each	1		
E7.2.4	ESCA 12.1 (a)	Supply and delivery to site of SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.D]	E	Each	2		
E7.2.5	ESCA 12.1 (b)	Supply and delivery to site of SCADA system associated soft ware as specified. [refer to project specification PSESCA]	E	Sum	-		
E7.2.6	ESCA 12.1 (c)	Supply and delivery to site of SCADA UPS [refer to project specification PSESCA]	E	Sum	-		
E7.3	**ESCA 12.2**	**SCHEDULE E7.3 - INSTALLATION**					
E7.3.1	ESCA 12.2 (a)	Site installation of SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.A]	I	Each	1		
E7.3.2	ESCA 12.2 (a)	Site installation of SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.B]	I	Each	1		
E7.3.3	ESCA 12.2 (a)	Site installation of SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.C]	I	Each	1		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E7.3.4	ESCA 12.2 (a)	Site installation of SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.D]	I	Each	2		
E7.3.5	ESCA 12.2 (b)	Configuration of SCADA system associated hardware and software	I	Sum	-		
E7.3.6	ESCA 12.4 (c)	Site installation of SCADA UPS [refer to project specification PSESCA]	I	Sum	-		
E7.4	**ESCA 12.3**	**SCHEDULE E7.4 - COMMISSIONING**					
E7.4.1	ESCA 12.3 (a)	Commissioning of complete SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.A]	I	Each	1		
E7.4.2	ESCA 12.3 (a)	Commissioning of complete SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.B]	I	Each	1		
E7.4.3	ESCA 12.3 (a)	Commissioning of complete SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.C]	I	Each	1		
E7.4.4	ESCA 12.3 (a)	Commissioning of complete SCADA system associated hardware as specified. [refer to project specification PSESCA-4-5.D]	I	Each	2		
E7.4.5	ESCA 12.3 (b)	Commissioning of complete SCADA supplementary soft ware as specified. [refer to project specification PSESCA]	I	Sum	-		
E7.4.6		Commissioning of configuration of SCADA system associated hardware and software	I	Sum	-		
E7.4.7	ESCA 12.3 (d)	Commissioning of complete SCADA UPS. [refer to project specification PSESCA]	I	Sum	-		
E7.4.8	PSESCA 1	New Tag no./code allocation [refer to project specification PSESCA]	I	Sum	-		
		SCHEDULE NO. E7 **SCADA SYSTEM** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate	Amount (R)
E8	***ECIS***	**SCHEDULE NO. E8** **CONTROL AND INSTRUMENTATION SYSTEM**					
E8.1	***ECIS***	**SCHEDULE E8.1 - DESIGN, DRAWINGS AND GENERAL**					
	13.1						
E8.1.1	ECIS 13.1 (a)	Provide general layout drawings and wiring diagrams of the enclosure and instrumentation for approval [Refer to particular specification]	G	Sum	-		
E8.1.2	ECIS 13.1 (b)	Provide operating and maintenance manuals, data sheets of all equipment and "as built" drawings	G	Sum	-		
E8.2	**ECIS**	**SCHEDULE E8.2 - SUPPLY AND DELIVERY TO SITE**					
	13.2						
E8.2.1	ECIS 13.2 (a)	Supply and delivery to site a complete pressure transducer (refer to project specification PSECIS-2.A)	E	Each	20		
E8.2.2	ECIS 13.2 (c)	Supply and delivery to site of electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.A)	E	Each	3		
E8.2.3	ECIS 13.2 (c)	Supply and delivery to site of electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.B)	E	Each	2		
E8.2.4	ECIS 13.2 (c)	Supply and delivery to site of electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.C)	E	Each	4		
E8.2.5	ECIS 13.2 (c)	Supply and delivery to site of electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.D)	E	Each	4		
E8.2.6	ECIS 13.2 (c)	Supply and delivery to site of electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.E)	E	Each	6		
E8.2.7	ECIS 13.2 (b)	Supply and delivery to site a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.A)	E	Each	2		
E8.2.8	ECIS 13.2 (b)	Supply and delivery to site a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.B)	E	Each	30		
E8.2.9	ECIS 13.2 (b)	Supply and delivery to site a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.C)	E	Each	4		
					Carried Forward		

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate	Amount (R)
						Brought Forward	
E8.2.10	ECIS 13.2 (b)	Supply and delivery to site a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.D)	E	Each	3		
E8.2.11	ECIS 13.2 (a)	Supply and delivery to site a complete no-flow sensor transducer (refer to project specification PS ECIS-5.A)	E	Each	12		
E8.2.12	ECIS 13.2 (a)	Supply and delivery to site a complete Free Chlorine Analyzer (refer to project specification PS ECIS-6)	E	Each	2		
E8.2.13	ECIS 13.2 (b)	Supply and delivery to site a complete pH transducer and controller complete with mounting bracket (refer to project specification PS ECIS-7.A)	E	Each	2		
E8.2.14	ECIS 13.2 (b)	Supply and delivery to site a complete turbidity transducer and controller complete with mounting bracket (refer to project specification PS ECIS-8.A)	E	Each	16		
E8.2.15	ECIS 13.2 (b)	Supply and delivery to site a complete turbidity and pH transducer and controller complete with mounting bracket (refer to project specification PS ECIS-8.B)	E	Each	2		
E8.2.16	ECIS 13.2 (b)	Supply and delivery to site all instrumentation for Dewatering System. All complete with mounting bracket and all coordination with mechanical Contrator for Instrumentation (refer to project specification PSECIS-12)	E	Sum	1		
E8.2.17	ECIS 13.2 (b)	Supply and delivery to site all instrumentation for Ozone System. All complete with mounting bracket and all coordination with mechanical Contrator for Instrumentation (refer to project specification PSECIS-13)	E	Sum	1		
E8.2.18	ECIS 13.2 (b)	Supply and delivery to site a complete Thermal Mass Flow meter and controller complete with mounting bracket and kiosk (refer to project specification PSECIS-14)	E	Each	2		
E8.2.19	ECIS 13.2 (b)	Supply and delivery to site a complete proximity sensor complete with mounting bracket and kiosk (refer to project specification PSECIS-15)	E	Each	26		
E8.3	**ECIS 13.3**	**SCHEDULE E8.3 - INSTALLATION**					
E8.3.1	ECIS 13.3 (a)	Installation on site of a complete pressure transducer (refer to project specification PSECIS-2.A)	I	Each	20		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate	Amount (R)
						Brought Forward	
E8.3.2	ECIS 13.3 (c)	Installation on site of a complete electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.A)	I	Each	3		
E8.3.3	ECIS 13.3 (c)	Installation on site of a complete electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.B)	I	Each	2		
E8.3.4	ECIS 13.3 (c)	Installation on site of a complete electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.C)	I	Each	4		
E8.3.5	ECIS 13.3 (c)	Installation on site of a complete electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.D)	I	Each	4		
E8.3.6	ECIS 13.3 (c)	Installation on site of a complete electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.E)	I	Each	6		
E8.3.7	ECIS 13.3 (b)	Installation on site of a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.A)	I	Each	2		
E8.3.8	ECIS 13.3 (b)	Installation on site of a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.B)	I	Each	30		
E8.3.9	ECIS 13.3 (b)	Installation on site of a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.C)	I	Each	4		
E8.3.10	ECIS 13.3 (b)	Installation on site of a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.D)	I	Each	3		
E8.3.11	ECIS 13.3 (a)	Installation on site of a complete no-flow sensor transducer (refer to project specification PS ECIS-5)	I	Each	12		
E8.3.12	ECIS 13.3 (a)	Installation on site of a complete Free Chlorine Analyzer (refer to project specification PS ECIS-6)	I	Each	2		
E8.3.13	ECIS 13.3 (b)	Installation on site of a complete pH transducer and controller complete with mounting bracket (refer to project specification PS ECIS-7.A)	I	Each	2		
E8.3.14	ECIS 13.3 (b)	Installation on site of a complete turbidity transducer and controller complete with mounting bracket (refer to project specification PS ECIS-8.A)	I	Each	16		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate	Amount (R)
						Brought Forward	
E8.3.15	ECIS 13.3 (b)	Installation on site of a complete turbidity and pH transducer and controller complete with mounting bracket (refer to project specification PS ECIS-8.B)	I	Each	2		
E8.3.16	ECIS 13.3 (b)	Installation on site all instrumentation for the Dewatering System. All complete with mounting bracket and all coordination with mechanical Contrator for Instrumentation (refer to project specification PSECIS-12)	I	Sum	1		
E8.3.17	ECIS 13.3 (b)	Installation on site all instrumentation for Ozone System. All complete with mounting bracket and all coordination with mechanical Contrator for Instrumentation (refer to project specification PSECIS-13)	I	Sum	1		
E8.3.18	ECIS 13.3 (b)	Installation on site of a complete complete Thermal Mass Flow meter and controller complete with mounting bracket and kiosk (refer to project specification PSECIS-14)	I	Each	2		
E8.3.19	ECIS 13.3 (b)	Installation on site a complete proximity sensor complete with mounting bracket and kiosk (refer to project specification PSECIS-15)	I	Each	26		
E8.4	**ECIS 13.4**	**SCHEDULE E8.4 - COMMISSIONING**					
E8.4.1	ECIS 13.4 (a)	Commissioning of a complete pressure transducer (refer to project specification PSECIS-2.A)	I	Each	20		
E8.4.2	ECIS 13.4 (c)	Commissioning of a complete electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.A)	I	Each	3		
E8.4.3	ECIS 13.4 (c)	Commissioning of a complete electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.B)	I	Each	2		
E8.4.4	ECIS 13.4 (c)	Commissioning of a complete electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.C)	I	Each	4		
E8.4.5	ECIS 13.4 (c)	Commissioning of a complete electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.D)	I	Each	4		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate	Amount (R)
						Brought Forward	
E8.4.6	ECIS 13.4 (c)	Commissioning of a complete electrical installation equipment at and in flow meter manholes (refer to project specification PSECIS-3.E)	I	Each	6		
E8.4.7	ECIS 13.4 (b)	Commissioning of a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.A)	I	Each	2		
E8.4.8	ECIS 13.4 (b)	Commissioning of a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.B)	I	Each	30		
E8.4.9	ECIS 13.4 (b)	Commissioning of a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.C)	I	Each	4		
E8.4.10	ECIS 13.4 (b)	Commissioning of a complete level transducer and controller complete with mounting bracket (refer to project specification PS ECIS-4.D)	I	Each	3		
E8.4.11	ECIS 13.4 (a)	Commissioning of a complete no-flow sensor transducer (refer to project specification PS ECIS-5)	I	Each	12		
E8.4.12	ECIS 13.4 (a)	Commissioning of a complete Free Chlorine Analyzer (refer to project specification PS ECIS-6)	I	Each	2		
E8.4.13	ECIS 13.4 (b)	Commissioning of a complete pH transducer and controller complete with mounting bracket (refer to project specification PS ECIS-7.A)	I	Each	2		
E8.4.14	ECIS 13.4 (b)	Commissioning of a completete turbidity transducer and controller complete with mounting bracket (refer to project specification PS ECIS-8.A)	I	Each	16		
E8.4.15	ECIS 13.4 (b)	Commissioning of a complete turbidity and pH transducer and controller complete with mounting bracket (refer to project specification PS ECIS-8.B)	I	Each	2		
E8.4.16	ECIS 13.4 (b)	Commissioning of all instrumentation for the Dewatering System. All complete with mounting bracket and all coordination with mechanical Contrator for Instrumentation (refer to project specification PSECIS-12)	I	Sum	1		
E8.4.17	ECIS 13.4 (b)	Commissioning of all instrumentation for Ozone System. All complete with mounting bracket and all coordination with mechanical Contrator for Instrumentation (refer to project specification PSECIS-13)	I	Sum	1		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate	Amount (R)
						Brought Forward	
E8.4.18	ECIS 13.4 (b)	Commissioning of a complete Thermal Mass Flow meter and controller complete with mounting bracket and kiosk (refer to project specification PSECIS-14)	I	Each	2		
E8.4.19	ECIS 13.3 (b)	Commissioning of a complete proximity sensor complete with mounting bracket and kiosk (refer to project specification PSECIS-15)	I	Each	26		
		SCHEDULE NO. E8 **CONTROL INSTRUMENTATION SYSTEM** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate	Amount (R)
E9	***EG&M***	**SCHEDULE NO. E9** **GENERAL AND MISCELLANEOUS**					
E9.1	**EG&M**	**SCHEDULE E9.1 - DESIGN, DRAWINGS AND GENERAL**					
	13.1						
E9.1.1	EG&M 13.1 (a)	Provide general layouts drawings, notice drawings and wiring diagrams for approval.	G	Sum	-		
E9.1.2	EG&M 13.1 (b)	Provide operating and maintenance manuals, data sheets of all equipment and "as built" drawings	G	Sum	-		
E9.2	**EG&M**	**SCHEDULE E9.2 - SUPPLY AND DELIVERY TO SITE**					
	13.2						
E9.2.1	EG&M 13.2 (a)	Supply and delivery to site of emergency stop stations [Refer to particular specification specification EG&M 10]	E	Each	78		
E9.2.2	EG&M 13.2 (b)	Supply and delivery to site of emergency stop stations with built in motor cable termination box [refer to particular specification EG&M 10]	E	Each	6		
E9.2.3	EG&M 13.2 (c)	Supply and delivery to site of complete fire extinguishers with outdoor bracket, enclosure and fire signage (refer to project specifications PS EG&M-9)	E	Each	26		
E9.2.4	EG&M 13.2 (d)	Supply and delivery to site of complete all notices and all danger plates as may be required (refer to project specifications PS EG&M-8)	E	Sum	-		
E9.3	**EG&M**	**SCHEDULE E9.3 - INSTALLATION**					
	13.3						
E9.3.1	EG&M 13.3 (a)	Installation on site of emergency stop stations [refer to particular specification EG&M 10]	I	Each	78		
E9.3.2	EG&M 13.3 (b)	Installation on site of emergency stop stations with built in motor cable termination box [refer to particular specification EG&M 10]	I	Each	6		
E9.3.3	EG&M 13.3 (c)	Installation on site of fire extinguishers with outdoor bracket, enclosure and fire signage (refer to project specifications PS EG&M-9)	I	Each	26		
E9.3.4	EG&M 13.3 (d)	Installation on site of all notices and all danger plates as may be required (refer to project specifications PS EG&M-8)	I	Sum	-		
						Carried Forward	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate	Amount (R)
						Brought Forward	
E9.4	**EG&M 13.4**	**SCHEDULE E9.4 - COMMISSIONING**					
E9.4.1	EG&M 13.4 (a)	Commissioning of a complete of emergency stop stations [refer to particular specification EG&M 10]	I	Each	78		
E9.4.2	EG&M 13.4 (b)	Commissioning of a complete of emergency stop stations with built in motor cable termination box [refer to particular specification EG&M 10]	I	Each	6		
E9.4.3	EG&M 13.4 (c)	Commissioning of a complete of fire extinguishers with outdoor bracket, enclosure and fire signage (refer to project specifications PS EG&M-9)	I	Each	26		
E9.4.4	EG&M 13.4 (d)	Commissioning of a complete of all notices and all danger plates as may be required (refer to project specifications PS EG&M-8)	I	Sum	-		
		SCHEDULE NO. E9 GENERAL AND MISCELLANEOUS CARRIED TO SUMMARY					
						Total	

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E10	**EPTM**	**SCHEDULE NO. E10 TELEMETRY SYSTEM**					
E10.1	**EPTM**	**SCHEDULE E10.1 - DESIGN, DRAWINGS AND GENERAL**					
	25.1						
E10.1.1	EPTM 25.1 (a)	Provide design calculations, design drawings and drawings for programmable & logic controllers, antennae, Input and output schedules, loop diagrams, cable schedules, cable layouts, control philiosphy, control network layout and wiring diagrams (refer to particular specifications EPTM)	G	Sum	1		
E10.1.2	EPTM 25.1 (b)	Provide operating all maintenance manuals and "as-built" drawings as specified (refer to particular specification EPTM)	G	Sum	1		
E10.2	**EPTM**	**SCHEDULE E10.2 - SUPPLY AND DELIVERY TO SITE**					
	25.2						
E10.2.1	EPTM 25.2 (a)	Supply and delivery to site of complete telemetry outstation with antenna and earthing system at the Bospoort to Vaalkop / Bospoort North HLPL Link Chamber (refer to project specifications PSEPTM-6.A & PSEPTM-19.A)	E	Sum	1		
E10.2.2	EPTM 25.2 (a)	Supply and delivery to site of complete telemetry outstation with antenna and earthing system at the Bospoort Reservoirs [Megalies Water] (refer to project specifications PSEPTM-6.B & PSEPTM-19.B)	E	Sum	1		
E10.2.3	EPTM 25.2 (a)	Supply and delivery to site of complete telemetry outstation with antenna and earthing system at the Bospoort Water Treatment Works (refer to project specifications PSEPTM-6.C & PSEPTM-19.C)	E	Sum	1		
E10.3	**EPTM**	**SCHEDULE E10.3 - INSTALLATION**					
	25.3						
E10.3.1	EPTM 25.3 (a)	Installation of a complete telemetry outstation with antenna and earthing system at the Bospoort to Vaalkop / Bospoort North HLPL Link Chamber (refer to project specifications PSEPTM-6.A & PSEPTM-19.A)	I	Sum	1		
	EPTM 25.3 (a)	Installation of a complete telemetry outstation with antenna and earthing system at the Bospoort tReservoirs [Megalies Water] (refer to project specifications PSEPTM-6.B &					
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E10.3.2		PSEPTM-19.B)	I	Sum	1		
	EPTM 25.3 (a)	Installation of a complete telemetry outstation with antenna and earthing system at the Bospoort Water Treatment Works (refer to project specifications PSEPTM-6.C &					
E10.3.3		PSEPTM-19.C)	I	Sum	1		
	EPTM 25.3 (c)	Complete site cable connections, programming of the entire Telemetry System and all peripheral					
E10.3.4		equipment	I	Sum	1		
E10.4	**EPTM 25.4**	**SCHEDULE E10.4 - COMMISSIONING**					
	EPTM 25.4 (a)	Commissioning of a complete telemetry outstation with antenna and earthing system at the Bospoort to Vaalkop / Bospoort North HLPL Link Chamber (refer to project specifications					
E10.4.1		PSEPTM-6.A & PSEPTM-19.A)	I	Sum	1		
	EPTM 25.4 (a)	Commissioning of a complete telemetry outstation with antenna and earthing system at the Bospoort Reservoirs [Megalies Water] (refer to project specifications PSEPTM-6.B &					
E10.4.2		PSEPTM-19.B)	I	Sum	1		
	EPTM 25.4 (a)	Commissioning of a complete telemetry outstation with antenna and earthing system at the Bospoort Water Treatment Works (refer to project specifications PSEPTM-6.C &					
E10.4.3		PSEPTM-19.C)	I	Sum	1		
	EPTM 25.4 (c)	Commissioning site cable connections, programming of the entire Telemetry System and all peripheral					
E10.4.4		equipment	I	Sum	1		
		SCHEDULE NO. E10 TELEMETRY SYSTEM CARRIED TO SUMMARY					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E11	***EELP***	**SCHEDULE NO. E11** **EARTHING & LIGHTNING PROTECTION**					
E11.1	**EELP**	**SCHEDULE E11.1 - DESIGN, DRAWINGS AND GENERAL**					
	22.1						
E11.1.1	PSGEN B	Provide designs, calculations as stipulated in the contract (refer to PSGEN.B Design and Drawings)	G	Sum	-		
E11.1.2	EELP 22.1 (a)	Provide design drawings and design information for Earthing and Lightning Protection System	G	Sum	-		
E11.1.3	EELP 22.1 (b)	Provide operating and maintenance manuals and “as built” drawings as specified	G	Sum	-		
E11.1.4	EELP 22.1 (c)	Provide risk management calculations and IEC Program as specified	G	Sum	-		
E11.2	**EELP**	**SCHEDULE E11.2- SUPPLY AND DELIVERY TO SITE**					
	22.2						
E11.2.1		Allowance for specialist to visit the site and measure the earth readings, record and complete a detail soil resistivity survey. Earth resistance report shall be sent for approval to the Engineer	E	Sum	-		
E11.2.2	EELP 22.2	Earth rods - 1500mm long driven into ground with top ends up to 500mm below escavation level.	E	Each	98		
E11.2.3	EELP 22.2	Earth rods - 2400mm long driven into ground with top ends up to 500mm below escavation level. Holes predrilled as mentioned below.	E	Each	4		
E11.2.4	EELP 22.2	Earth rods - 3000mm long driven into ground with top ends up to 500mm below escavation level. Holes predrilled as mentioned below.	E	Each	2		
E11.2.5	EELP 22.2	Drill 1500mm holes for earth rods in hard soil conditions as for 1500mm holes [10% allowance]	E	Each	98		
E11.2.6	EELP 22.2	Drill 2400mm holes for earth rods in hard soil conditions as for 2400mm holes [10% allowance]	E	Each	4		
E11.2.7	EELP 22.2	Drill 3000mm holes for earth rods in hard soil conditions as for 3000mm holes [10% allowance]	E	Each	2		
E11.2.8	EELP 22.2	Marcionite conductive slurry including installing slurry into drilled holes as required	E	m³	18		
					Carried Forward		

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E11.2.9	EELP 22.2	Earth wells or test points against building for future earth readings and continuity tests. Include for all concrete work and manhole covers. 300x300mm min.	E	Each	20		
E11.2.10	EELP 22.2	Supply 70mm² bare copper earth 1mx1mx1m earth mat	E	Each	20		
E11.2.11	EELP 22.2	Earth bar mounted on two insulators against wall at 300mm above final floor level below DB / MCC. 500mm x 80mm x 6mm minimum	E	Each	40		
E11.2.12	EELP 22.2	70mm² PVC insulated green / yellow earth conductor	E	m	400		
E11.2.13	EELP 22.2	70mm² insulated green earth conductor terminations.	E	Each	80		
E11.2.14	EELP 22.2	70mm² bare copper earth conductor [earth ring]	E	m	1070		
E11.2.15	EELP 22.2	70mm² bare copper earth conductor [earth ring] terminiations	E	Each	138		
E11.2.16	EELP 22.2	70mm² galvanised anti-theft conductor (avoid galvanic corrosion).	E	m	490		
E11.2.17	EELP 22.2	70mm² galvanised anti-theft conductor terminiations (avoid galvanic corrosion).	E	Each	196		
E11.2.18	EELP 22.2	Clamps/bolts at each rod connection plus seal termination as per specification (avoid galvanic corrosion).	E	Each	98		
E11.2.19	EELP 22.2	Exothermic weld at earth wire connection plus seal termination as per specification (avoid galvanic corrosion).	E	Each	196		
E11.2.20	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Clear Water Tank' [7m(W), 21m(L) and 3m(H)]	E	Each	1		
E11.2.32	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'DAF Tank No.3 Extension' [26m(W), 27m(L) and 6m(H)]	E	Each	1		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E11.2.22	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'RGS Filters' [19m(W), 26m(L) and 9m(H)]	E	Each	1		
E11.2.23	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Ozone Contact Tank' [16m(W), 62m(L) and 11m(H)]	E	Each	1		
E11.2.31	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Ozone Building' [7m(W), 20m(L) and 8m(H)]	E	Each	1		
E11.2.25	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Dewatering Building' [12m(W), 20m(L) and 9m(H)]	E	Each	1		
E11.2.26	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Filtrate Washwater Sump' [10m(W), 12m(L) and 1m(H)]	E	Each	1		
E11.2.31	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Hydrogen Peroxide Store' [7m(W), 7m(L) and 4.5m(H)]	E	Each	1		
E11.2.28	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'GAC Filters' [18.5m(W), 29.5m(L) and 9m(H)]	E	Each	1		
E11.2.29	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Transformer Yard' [9m(W), 12m(L) and 3m(H)]	E	Each	1		
E11.2.30	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Miniature Substation' [1m(W), 2.6m(L) and 2m(H)]	E	Each	1		
E11.2.31	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Containerised Standby Generators on a concrete' plinth [10m(W), 30m(L) and 0.5m(H)]	E	Each	1		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E11.2.32	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Pre-Ozonation Building' [7m(W), 10m(L) and 9m(H)]	E	Each	1		
E11.2.33	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Lox Building' [8m(W), 10m(L) and 3m(H)]	E	Each	1		
E11.2.34	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Bospoort to Vaalkop/ Bospoort North Link Chamber' [3m(W), 3m(L) and 3m(H)]	E	Each	1		
E11.2.35	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Bospoort Reservoirs Telemetry' [3m(W), 3m(L) and 3m(H)]	E	Each	1		
E11.2.36	EELP 22.2 (a)	Supply and delivery to site of a complete surface mounted Class 4 lightning protection system for the 'Bospoort - Thlabane - Boitekong Chamber Telemetry' [3m(W), 3m(L) and 3m(H)]	E	Each	1		
E11.2.37	EELP 22.2 (d)	Supply and delivery all connection points, terminals, interconnections, bonding points and test joints for the entire system including for "natural" components all for above specified location	E	Sum	-		
E11.3	**EELP 22.3**	**SCHEDULE E11.3 - INSTALLATION**					
E11.3.1		Allowance for specialist to visit the site and measure the earth readings, record and complete a detail soil resistivity survey. Earth resistance report shall be sent for approval to the Engineer	I	Sum	-		
E11.3.2	EELP 22.3	Earth rods - 1500mm long driven into ground with top ends up to 500mm below escavation level.	I	Each	98		
E11.3.3	EELP 22.3	Earth rods - 2400mm long driven into ground with top ends up to 500mm below escavation level. Holes predrilled as mentioned below.	I	Each	4		
E11.3.4	EELP 22.3	Earth rods - 3000mm long driven into ground with top ends up to 500mm below escavation level. Holes predrilled as mentioned below.	I	Each	2		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E11.3.5	EELP 22.3	Drill 1500mm holes for earth rods in hard soil conditions as for 1500mm holes [10% allowance]	I	Each	98		
E11.3.6	EELP 22.3	Drill 2400mm holes for earth rods in hard soil conditions as for 2400mm holes [10% allowance]	I	Each	4		
E11.3.7	EELP 22.3	Drill 3000mm holes for earth rods in hard soil conditions as for 3000mm holes [10% allowance]	I	Each	2		
E11.3.8	EELP 22.3	Marcionite conductive slurry including installing slurry into drilled holes as required	I	m³	18		
E11.3.9	EELP 22.3	Earth wells or test points against building for future earth readings and continuity tests. Include for all concrete work and manhole covers. 300x300mm min.	I	Each	20		
E11.3.10	EELP 22.3	Install 70mm² bare copper earth 1mx1mx1m earth mat	I	Each	20		
E11.3.11	EELP 22.3	Earth bar mounted on two insulators against wall at 300mm above final floor level below DB / MCC. 500mm x 80mm x 6mm minimum	I	Each	40		
E11.3.12	EELP 22.3	70mm² PVC insulated green / yellow earth conductor	I	m	400		
E11.3.13	EELP 22.3	70mm² insulated green earth conductor terminations.	I	Each	80		
E11.3.14	EELP 22.3	70mm² bare copper earth conductor [earth ring]	I	m	1070		
E11.3.15	EELP 22.3	70mm² bare copper earth conductor [earth ring] terminiations	I	Each	138		
E11.3.16	EELP 22.3	70mm² galvanised anti-theft conductor (avoid galvanic corrosion).	I	m	490		
E11.3.17	EELP 22.3	70mm² galvanised anti-theft conductor terminiations (avoid galvanic corrosion).	I	Each	196		
E11.3.18	EELP 22.3	Clamps/bolts at each rod connection plus seal termination as per specification (avoid galvanic corrosion).	I	Each	98		
E11.3.19	EELP 22.3	Exothermic weld at earth wire connection plus seal termination as per specification (avoid galvanic corrosion).	I	Each	196		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E11.2.57	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Clear Water Tank' [7m(W), 21m(L) and 3m(H)]	I	Each	1		
E11.2.69	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'DAF Tank No.3 Extension' [26m(W), 27m(L) and 6m(H)]	I	Each	1		
E11.2.59	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'RGS Filters' [19m(W), 26m(L) and 9m(H)]	I	Each	1		
E11.2.60	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Ozone Contact Tank' [16m(W), 62m(L) and 11m(H)]	I	Each	1		
E11.2.68	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Ozone Building' [7m(W), 20m(L) and 8m(H)]	I	Each	1		
E11.2.62	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Dewatering Building' [12m(W), 20m(L) and 9m(H)]	I	Each	1		
E11.2.63	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Filtrate Washwater Sump' [10m(W), 12m(L) and 1m(H)]	I	Each	1		
E11.2.68	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Hydrogen Peroxide Store' [7m(W), 7m(L) and 4.5m(H)]	I	Each	1		
E11.2.65	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'GAC Filters' [18.5m(W), 29.5m(L) and 9m(H)]	I	Each	1		
E11.2.66	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Transformer Yard' [9m(W), 12m(L) and 3m(H)]	I	Each	1		
						Carried Forward	

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E11.2.67	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Miniature Substation' [1m(W), 2.6m(L) and 2m(H)]	I	Each	1		
E11.2.68	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Containerised Standby Generators on a concrete' plinth [10m(W), 30m(L) and 0.5m(H)]	I	Each	1		
E11.2.69	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Pre-Ozonation Building' [7m(W), 10m(L) and 9m(H)]	I	Each	1		
E11.2.70	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Lox Building' [8m(W), 10m(L) and 3m(H)]	I	Each	1		
E11.2.71	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Bospoort to Vaalkop/ Bospoort North Link Chamber' [3m(W), 3m(L) and 3m(H)]	I	Each	1		
E11.2.72	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Bospoort Reservoirs Telemetry' [3m(W), 3m(L) and 3m(H)]	I	Each	1		
E11.2.73	EELP 22.3 (a)	Site installation of a complete surface mounted Class 4 lightning protection system for the 'Bospoort - Thlabane - Boitekong Chamber Telemetry' [3m(W), 3m(L) and 3m(H)]	I	Each	1		
E11.3.37	EELP 22.3 (d)	Site installation of a complete surface terminals, interconnections, bonding points and test joints for the entire system including for "natural" components all for above specified location	I	Sum	-		
		Excavating, back filling, consolidation, importation of soil and dumping of all rock and stone removed during excavations including cleaning of cable routes all according to particular specifications					
E11.3.38		a) Pickable soil	I	m³	390		
E11.3.39		b) Soft rock	I	m³	120		
						Carried Forward	

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E11.3.40		c) Hard rock	I	m³	80		
E11.3.41		Importation of additional soil for the bedding of cables and the backfilling of trenches and drilling complete as per particular specification.	I	m³	33		
E11.3.42		Dumping and removing of all rock and stone removed during excavations including cleaning of cable routes complete as per particular specification.	I	m³	200		
E11.3.43		Nett amount for core drilling 100mm diameter holes through 250mm concrete	I	Each	20		
E11.4	**EELP 22.4**	**SCHEDULE E11.4 - COMMISSIONING**					
E11.4.1	EELP 22.4 (a)	Commissioning of complete lightning protection system (refer to protection system PSEELS-10)	I	Sum	-		
E11.4.2	EELP 22.4 (e)	Certificate of compliance of earthing system as specified under SANS 10313	I	Each	20		
		SCHEDULE NO. E11 **EARTHING & LIGHTNING PROTECTION** **CARRIED TO SUMMARY**					
						Total	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E12	**ESPL**	**SCHEDULE NO. E12** **SMALL POWER AND LIGHTING INSTALLATIONS**					
E12.1	**ESPL**	**SCHEDULE E12.1 - DESIGN, DRAWINGS AND GENERAL**					
	12.1						
E12.1.1	ECIS 12.1 (a)	Provide wiring diagrams for approval [Refer to Motor Control centre and Distribution particular specification]	G	Sum	-		
E12.1.2	ECIS 12.1 (b)	Provide operating and maintenance manuals, data sheets of all equipment and “as built” drawings	G	Sum	-		
E12.2	**ESPL**	**SCHEDULE E12.2 - SUPPLY AND DELIVERY TO SITE**					
	12.2						
E12.2.1	ESPL 12.2 (a)	Supply and delivery to site of a complete electrical installation (refer to project specification PSESPL-A)	E	Sum	-		
E12.2.2	ESPL 12.2 (a)	Supply and delivery to site of a complete electrical installation (refer to project specification PSESPL-B)	E	Sum	-		
E12.2.3	ESPL 12.2 (a)	Supply and delivery to site of a complete electrical installation (refer to project specification PSESPL-C)	E	Sum	-		
E12.2.4	ESPL 12.2 (a)	Supply and delivery to site of a complete electrical installation (refer to project specification PSESPL-D)	E	Sum	-		
E12.2.5	ESPL 12.2 (a)	Supply and delivery to site of a complete electrical installation (refer to project specification PSESPL-E)	E	Sum	-		
E12.2.6	ESPL 12.2 (a)	Supply and delivery to site of a complete electrical installation (refer to project specification PSESPL-F)	E	Sum	-		
E12.2.7	ESPL 12.2 (a)	Supply and delivery to site of a complete electrical installation (refer to project specification PSESPL-G)	E	Sum	-		
E12.2.8	ESPL 12.2 (a)	Supply and delivery to site of a complete electrical installation (refer to project specification PSESPL-H)	E	Sum	-		
E12.2.9	ESPL 12.2 (a)	Supply and delivery to site of a complete electrical installation (refer to project specification PSESPL-I)	E	Sum	-		
E12.2.10	ESPL 12.2 (a)	Supply and delivery to site of a complete electrical installation (refer to project specification PSESPL-J)	E	Sum	-		
E12.3	**ESPL**	**SCHEDULE E12.3 - INSTALLATION**					
	12.3						
E12.3.1	ESPL 12.3 (a)	Site Installation of a complete electrical installation (refer to project specification PSESPL-A)	I	Sum	-		
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E12.3.2	ESPL 12.3 (a)	Site Installation of a complete electrical installation (refer to project specification PSESPL-B)	I	Sum	-		
E12.3.3	ESPL 12.3 (a)	Site Installation of a complete electrical installation (refer to project specification PSESPL-C)	I	Sum	-		
E12.3.4	ESPL 12.3 (a)	Site Installation of a complete electrical installation (refer to project specification PSESPL-D)	I	Sum	-		
E12.3.5	ESPL 12.3 (a)	Site Installation of a complete electrical installation (refer to project specification PSESPL-E)	I	Sum	-		
E12.3.6	ESPL 12.3 (a)	Site Installation of a complete electrical installation (refer to project specification PSESPL-F)	I	Sum	-		
E12.3.7	ESPL 12.3 (a)	Site Installation of a complete electrical installation (refer to project specification PSESPL-G)	I	Sum	-		
E12.3.8	ESPL 12.3 (a)	Site Installation of a complete electrical installation (refer to project specification PSESPL-H)	I	Sum	-		
E12.3.9	ESPL 12.3 (a)	Site Installation of a complete electrical installation (refer to project specification PSESPL-I)	I	Sum	-		
E12.3.10	ESPL 12.3 (a)	Site Installation of a complete electrical installation (refer to project specification PSESPL-J)	I	Sum	-		
E12.4	**ESPL 12.4**	**SCHEDULE E12.4 - COMMISSIONING**					
E12.4.1	ESPL 12.4 (a)	Commissioning to site of a complete electrical installation (refer to project specification PSESPL-A)	I	Sum	-		-
E12.4.2	ESPL 12.4 (a)	Commissioning to site of a complete electrical installation (refer to project specification PSESPL-B)	I	Sum	-		-
E12.4.3	ESPL 12.4 (a)	Commissioning to site of a complete electrical installation (refer to project specification PSESPL-C)	I	Sum	-		-
E12.4.4	ESPL 12.4 (a)	Commissioning to site of a complete electrical installation (refer to project specification PSESPL-D)	I	Sum	-		-
E12.4.5	ESPL 12.4 (a)	Commissioning to site of a complete electrical installation (refer to project specification PSESPL-E)	I	Sum	-		-
E12.4.6	ESPL 12.4 (a)	Commissioning to site of a complete electrical installation (refer to project specification PSESPL-F)	I	Sum	-		-
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E12.4.7	ESPL 12.4 (a)	Commissioning to site of a complete electrical installation (refer to project specification PSESPL-G)	I	Sum	-		-
E12.4.8	ESPL 12.4 (a)	Commissioning to site of a complete electrical installation (refer to project specification PSESPL-H)	I	Sum	-		-
E12.4.9	ESPL 12.4 (a)	Commissioning to site of a complete electrical installation (refer to project specification PSESPL-I)	I	Sum	-		-
E12.4.10	ESPL 12.4 (a)	Commissioning to site of a complete electrical installation (refer to project specification PSESPL-J)	I	Sum	-		-
		SCHEDULE NO. E12 **SMALL POWER AND LIGHTING INSTALLATIONS** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E13	***EMCA***	**SCHEDULE NO. E13** **MULTICORE CABLES & EARTH WIRES**					
E13.1	**EMCA 18.1**	**SCHEDULE E13.1 - DESIGN, DRAWINGS AND GENERAL**					
E13.1.1	EMCA 18.1 (a)	The Contractor will provide the following design calculations, drawings, method statements, cable routes, cable schedules in excel format which will include but limited to From, To, Distance and Tag numbers all to the approval of the Engineer [Refer to particular specification EMCA 3.3.2, 8.7 & 17]	G	Sum	-		
E13.1.2	EMCA 18.1 (b)	Provide operating and maintenance manuals, all data sheets [a) cables, b) joint kits, c) ladders, d) glands, conduit, fasteners and all that are used and etc] and furthermore the Contractor to supply as built" drawings	G	Sum	-		
E13.2	**EMCA 18.2**	**SCHEDULE E13.2 - SUPPLY AND DELIVERY TO SITE**					
E13.2.1	EMCA 18.2 (a)	Supply and delivery to site of multicore cables and earthwires and cable name tags for the following cables as per the particular: 120mm² 3C 12.7kV/22kV XLPE PVC SWA PVC Cable	E	m	335		
E13.2.2		70mm² 3C 12.7kV/22kV XLPE PVC SWA PVC Cable	E	m	20		
E13.2.3		240mm² 4C PVC SWA PVC Cu Cable	E	m	280		
E13.2.4		185mm² 4C PVC SWA PVC Cu Cable	E	m	580		
E13.2.5		150mm² 4C PVC SWA PVC Cu Cable	E	m	300		
E13.2.6		95mm² 4C PVC SWA PVC Cu Cable	E	m	200		
E13.2.7		70mm² 4C PVC SWA PVC Cu Cable	E	m	160		
E13.2.8		50mm² 4C PVC SWA PVC Cu Cable	E	m	260		
E13.2.9		35mm² 4C PVC SWA PVC Cu Cable	E	m	275		
E13.2.10		25mm² 4C PVC SWA PVC Cu Cable	E	m	286		
E13.2.11		16mm² 4C PVC SWA PVC Cu Cable	E	m	1870		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.2.12		10mm² 4C PVC SWA PVC Cu Cable	E	m	540		
E13.2.13		6mm² 4C PVC SWA PVC Cu Cable	E	m	850		
E13.2.14		4mm² 4C PVC SWA PVC Cu Cable	E	m	850		
E13.2.15		2.5mm² 4C PVC SWA PVC Cu Cable	E	m	5979		
E13.2.16		2.5mm² 3C PVC SWA PVC Cu Cable	E	m	2180		
E13.2.17		1.5mm² 3C PVC SWA PVC Cu Cable	E	m	2945		
E13.2.18		1.5mm² 4C PVC SWA PVC Cu Cable	E	m	200		
E13.2.19		95mm² Bare Copper Conductor	E	m	335		
E13.2.20		70mm² Bare Copper Conductor	E	m	940		
E13.2.21		35mm² Bare Copper Conductor	E	m	260		
E13.2.22		25mm² Bare Copper Conductor	E	m	80		
E13.2.23		16mm² Bare Copper Conductor	E	m	286		
E13.2.24		10mm² Bare Copper Conductor	E	m	1624		
E13.2.25		6mm² Bare Copper Conductor	E	m	330		
E13.2.26		4C PVC CST PVC Heavy Duty Fibre Optic Cable Singlemode	E	m	1960		
E13.2.27		1mm² x 1pr twisted PVC SWA PVC (individually and overall screened)	E	m	2081		
E13.2.28		1mm² x 2pr twisted PVC SWA PVC (individually and overall screened)	E	m	1860		
E13.2.29		1mm² x 4pr twisted PVC SWA PVC (individually and overall screened)	E	m	9620		
E13.2.30		1mm² x 6pr twisted PVC SWA PVC (individually and overall screened)	E	m	328		
E13.2.31		1mm² x 8pr twisted PVC SWA PVC (individually and overall screened)	E	m	470		
E13.2.32		4pr twisted PVC, Non-Woven Tape + alu Foil (Industrial CAT6)	E	m	1060		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
	EMCA 18.2 (b)	Supply and delivery to site of all multicore cables and earthwires termination materials [equal or similar to Enviro Glands, neoprene shrouds, lugs, insulating, materials, cable ties and corrosion proof bolts, washers, spring washers, nuts, etc] to terminate the following cables as per the particular specification					
E13.2.33		120mm² 3C 12.7kV/22kV XLPE PVC SWA PVC Cable	E	Each	6		
E13.2.34		70mm² 3C 12.7kV/22kV XLPE PVC SWA PVC Cable	E	Each	4		
E13.2.35		240mm² 4C PVC SWA PVC Cu Cable	E	Each	28		
E13.2.36		185mm² 4C PVC SWA PVC Cu Cable	E	Each	40		
E13.2.37		150mm² 4C PVC SWA PVC Cu Cable	E	Each	12		
E13.2.38		95mm² 4C PVC SWA PVC Cu Cable	E	Each	8		
E13.2.39		70mm² 4C PVC SWA PVC Cu Cable	E	Each	4		
E13.2.40		50mm² 4C PVC SWA PVC Cu Cable	E	Each	6		
E13.2.41		35mm² 4C PVC SWA PVC Cu Cable	E	Each	8		
E13.2.42		25mm² 4C PVC SWA PVC Cu Cable	E	Each	6		
E13.2.43		16mm² 4C PVC SWA PVC Cu Cable	E	Each	52		
E13.2.44		10mm² 4C PVC SWA PVC Cu Cable	E	Each	24		
E13.2.45		6mm² 4C PVC SWA PVC Cu Cable	E	Each	46		
E13.2.46		4mm² 4C PVC SWA PVC Cu Cable	E	Each	28		
E13.2.47		2.5mm² 4C PVC SWA PVC Cu Cable	E	Each	424		
E13.2.48		2.5mm² 3C PVC SWA PVC Cu Cable	E	Each	110		
E13.2.49		1.5mm² 3C PVC SWA PVC Cu Cable	E	Each	158		
E13.2.50		1.5mm² 4C PVC SWA PVC Cu Cable	E	Each	20		
E13.2.51		95mm² Bare Copper Conductor	E	Each	6		
E13.2.52		70mm² Bare Copper Conductor	E	Each	72		
						Carried Forward	

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.2.53		35mm² Bare Copper Conductor	E	Each	6		
E13.2.54		25mm² Bare Copper Conductor	E	Each	2		
E13.2.55		16mm² Bare Copper Conductor	E	Each	6		
E13.2.56		10mm² Bare Copper Conductor	E	Each	76		
E13.2.57		6mm² Bare Copper Conductor	E	Each	26		
E13.2.58		4C PVC CST PVC Heavy Duty Fibre Optic Cable Singlemode	E	Each	44		
E13.2.59		1mm² x 1pr twisted PVC SWA PVC (individually and overall screened)	E	Each	902		
E13.2.60		1mm² x 2pr twisted PVC SWA PVC (individually and overall screened)	E	Each	94		
E13.2.61		1mm² x 4pr twisted PVC SWA PVC (individually and overall screened)	E	Each	638		
E13.2.62		1mm² x 6pr twisted PVC SWA PVC (individually and overall screened)	E	Each	40		
E13.2.63		1mm² x 8pr twisted PVC SWA PVC (individually and overall screened)	E	Each	20		
E13.2.64		4pr twisted PVC, Non-Woven Tape + alu Foil (Industrial CAT6)	E	Each	62		
E13.2.65	EMCA 18.2 (c)	Supply and delivery to site of cable route markers	E	Each	166		
E13.2.66	EMCA 18.2 (d)	Supply and delivery to site of concrete cable slabs	E	Each	80		
	EMCA 18.2 (e)	Supply, delivery to site of **hot dipped galvanised** heavy-duty cable ladder, trunking, welded wire mesh and accessories including all necessary supports, clamps strapping, brackets, reducer splice, hangers, threaded rods, trunking, bolts, nuts and anchor bolts etc as per the particular specification					
E13.2.67		150mm Wide cable ladder	E	m	165		
E13.2.68		200mm Wide cable ladder	E	m	86		
						Carried Forward	

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.2.69		300mm Wide cable ladder	E	m	53		
E13.2.70		400mm Wide cable ladder	E	m	8		
E13.2.71		500mm Wide cable ladder	E	m	13		
E13.2.72		600mm Wide cable ladder	E	m	22		
E13.2.73		800mm Wide cable ladder	E	m	93		
E13.2.74		150mm Wide cable ladder flat covers	E	m	17		
E13.2.75		200mm Wide cable ladder flat covers	E	m	9		
E13.2.76		300mm Wide cable ladder flat covers	E	m	6		
E13.2.77		400mm Wide cable ladder flat covers	E	m	1		
E13.2.78		500mm Wide cable ladder flat covers	E	m	2		
E13.2.79		600mm Wide cable ladder flat covers	E	m	3		
E13.2.80		800mm Wide cable ladder flat covers	E	m	10		
E13.2.81	EMCA 18.2 (g)	Supply, delivery to site of all hot dipped galvanised heavy-duty cable ladder supports, bolts, holders and etc that is required as per the particular specification	E	Sum	-		
E13.2.82	EMCA 18.2 (h)	Supply and delivery to site of pump set sensor termination cubicles	E	Each	20		
	EMCA 18.2 (i)	Supply and delivery to site of HPDE heavy-duty cable sleeves, joints, sealing rings, couplings, end plugs, spacer modules, bell mounth, manderel, duct brush flexibend, stainless steel draw wire long bend as per the particular specification					
E13.2.83		110mm² HDPE Sleeves equal or similar to kabelflex	E	m	250		
E13.2.84		160mm² HDPE Sleeves equal or similar to kabelflex	E	m	150		
	EMCA 18.2 (j)	Equal or similar CCG with solid cover IP68 including non sparking connectors, insulating sleeves,identification tag, mounting screws, locknuts , lockout device with lock, lid securing chain and all accessories					
						Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.2.85		**Box 0**	E	Each	11		
E13.2.86		Compression Kits (Small)	E	Each	44		
E13.2.87		Compression Kits (large)	E	Each	44		
E13.2.88		Blanking Plugs	E	Each	22		
E13.2.89		**Box 1**	E	Each	10		
E13.2.90		Reducing Glands [25-20]	E	Each	20		
E13.2.91		Compression Kits (Small)	E	Each	20		
E13.2.92		Compression Kits (large)	E	Each	20		
E13.2.93		Blanking Plugs	E	Each	20		
E13.2.94		**Box 2**	E	Each	6		
E13.2.95		Reducing Glands [32-20]	E	Each	12		
E13.2.96		Reducing Glands [32-25]	E	Each	12		
E13.2.97		Compression Kits	E	Each	12		
E13.2.98		Blanking Plugs	E	Each	12		
E13.2.99		**Box 3**	E	Each	6		
E13.2.100		Reducing Glands [40-20]	E	Each	12		
E13.2.101		Reducing Glands [40-25]	E	Each	12		
E13.2.102		Reducing Glands [40-32]	E	Each	12		
E13.2.103		Compression Kits	E	Each	12		
E13.2.104		Blanking Plugs	E	Each	12		
E13.2.105		**Box 4**	E	Each	6		
E13.2.106		Reducing Glands [50-20]	E	Each	12		
E13.2.107		Reducing Glands [50-25]	E	Each	12		
E13.2.108		Reducing Glands [50-32]	E	Each	12		
E13.2.109		Reducing Glands [50-40]	E	Each	24		
E13.2.110		Compression Kits	E	Each	12		
E13.2.111		Blanking Plugs	E	Each	12		
	EMCA 18.2 (k)	Hot dipped galvanised conduit with saddles, fasteners,surface mounted against brick or concrete every 500mm and all accessories					
E13.2.112		20mm Conduit	E	m	681		
E13.2.113		20mm conduit saddles	E	Each	350		
E13.2.114		Solid Coupling Female Threaded Adaptor	E	Each	350		
E13.2.115		Round Conduit box plus cover	E	Each	100		
E13.2.116	EMCA 18.2 (l)	Supply and delivery to site of all soil for the bedding of cables during excavations including cleaning of cable routes complete as per particular specification	E	m³	235		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.3	**EMCA 18.3**	**SCHEDULE E13.3 - INSTALLATION**					
	EMCA 18.3 (a)	Installation of all multicore cables and earthwires and cable name tags for the following cables as per the particular:					
E13.3.1		120mm² 3C 12.7kV/22kV XLPE PVC SWA PVC Cable	I	m	335		
E13.3.2		70mm² 3C 12.7kV/22kV XLPE PVC SWA PVC Cable	I	m	20		
E13.3.3		240mm² 4C PVC SWA PVC Cu Cable	I	m	280		
E13.3.4		185mm² 4C PVC SWA PVC Cu Cable	I	m	580		
E13.3.5		150mm² 4C PVC SWA PVC Cu Cable	I	m	300		
E13.3.6		95mm² 4C PVC SWA PVC Cu Cable	I	m	200		
E13.3.7		70mm² 4C PVC SWA PVC Cu Cable	I	m	160		
E13.3.8		50mm² 4C PVC SWA PVC Cu Cable	I	m	260		
E13.3.9		35mm² 4C PVC SWA PVC Cu Cable	I	m	275		
E13.3.10		25mm² 4C PVC SWA PVC Cu Cable	I	m	286		
E13.3.11		16mm² 4C PVC SWA PVC Cu Cable	I	m	1870		
E13.3.12		10mm² 4C PVC SWA PVC Cu Cable	I	m	540		
E13.3.13		6mm² 4C PVC SWA PVC Cu Cable	I	m	850		
E13.3.14		4mm² 4C PVC SWA PVC Cu Cable	I	m	850		
E13.3.15		2.5mm² 4C PVC SWA PVC Cu Cable	I	m	5979		
E13.3.16		2.5mm² 3C PVC SWA PVC Cu Cable	I	m	2180		
E13.3.17		1.5mm² 3C PVC SWA PVC Cu Cable	I	m	2945		
E13.3.18		1.5mm² 4C PVC SWA PVC Cu Cable	I	m	200		
E13.3.19		95mm² Bare Copper Conductor	I	m	335		
E13.3.20		70mm² Bare Copper Conductor	I	m	940		
						Carried Forward	

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.3.21		35mm² Bare Copper Conductor	I	m	260		
E13.3.22		25mm² Bare Copper Conductor	I	m	80		
E13.3.23		16mm² Bare Copper Conductor	I	m	286		
E13.3.24		10mm² Bare Copper Conductor	I	m	1624		
E13.3.25		6mm² Bare Copper Conductor	I	m	330		
E13.3.26		4C PVC CST PVC Heavy Duty Fibre Optic Cable Singlemode	I	m	1960		
E13.3.27		1mm² x 1pr twisted PVC SWA PVC (individually and overall screened)	I	m	2081		
E13.3.28		1mm² x 2pr twisted PVC SWA PVC (individually and overall screened)	I	m	1860		
E13.3.29		1mm² x 4pr twisted PVC SWA PVC (individually and overall screened)	I	m	9620		
E13.3.30		1mm² x 6pr twisted PVC SWA PVC (individually and overall screened)	I	m	328		
E13.3.31		1mm² x 8pr twisted PVC SWA PVC (individually and overall screened)	I	m	470		
E13.3.32		4pr twisted PVC, Non-Woven Tape + alu Foil (Industrial CAT6)	I	m	1060		
	EMCA 18.3 (b)	**Installation of all multicore cables and earthwires termination materials [equal or similar to Enviro Glands, neoprene shrouds, lugs, insulating, materials, cable ties and corrosion proof bolts, washers, spring washers, nuts, etc] to terminate the following cables as per the particular specification**					
E13.3.33		120mm² 3C 12.7kV/22kV XLPE PVC SWA PVC Cable	I	Each	6		
E13.3.34		70mm² 3C 12.7kV/22kV XLPE PVC SWA PVC Cable	I	Each	4		
E13.3.35		240mm² 4C PVC SWA PVC Cu Cable	I	Each	28		
E13.3.36		185mm² 4C PVC SWA PVC Cu Cable	I	Each	40		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.3.37		150mm² 4C PVC SWA PVC Cu Cable	I	Each	12		
E13.3.38		95mm² 4C PVC SWA PVC Cu Cable	I	Each	8		
E13.3.39		70mm² 4C PVC SWA PVC Cu Cable	I	Each	4		
E13.3.40		50mm² 4C PVC SWA PVC Cu Cable	I	Each	6		
E13.3.41		35mm² 4C PVC SWA PVC Cu Cable	I	Each	8		
E13.3.42		25mm² 4C PVC SWA PVC Cu Cable	I	Each	6		
E13.3.43		16mm² 4C PVC SWA PVC Cu Cable	I	Each	52		
E13.3.44		10mm² 4C PVC SWA PVC Cu Cable	I	Each	24		
E13.3.45		6mm² 4C PVC SWA PVC Cu Cable	I	Each	46		
E13.3.46		4mm² 4C PVC SWA PVC Cu Cable	I	Each	28		
E13.3.47		2.5mm² 4C PVC SWA PVC Cu Cable	I	Each	424		
E13.3.48		2.5mm² 3C PVC SWA PVC Cu Cable	I	Each	110		
E13.3.49		1.5mm² 3C PVC SWA PVC Cu Cable	I	Each	158		
E13.3.50		1.5mm² 4C PVC SWA PVC Cu Cable	I	Each	20		
E13.3.51		95mm² Bare Copper Conductor	I	Each	6		
E13.3.52		70mm² Bare Copper Conductor	I	Each	72		
E13.3.53		35mm² Bare Copper Conductor	I	Each	6		
E13.3.54		25mm² Bare Copper Conductor	I	Each	2		
E13.3.55		16mm² Bare Copper Conductor	I	Each	6		
E13.3.56		10mm² Bare Copper Conductor	I	Each	76		
E13.3.57		6mm² Bare Copper Conductor	I	Each	26		
E13.3.58		4C PVC CST PVC Heavy Duty Fibre Optic Cable Singlemode	I	Each	44		
E13.3.59		1mm² x 1pr twisted PVC SWA PVC (individually and overall screened)	I	Each	902		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.3.60		1mm² x 2pr twisted PVC SWA PVC (individually and overall screened)	I	Each	94		
E13.3.61		1mm² x 4pr twisted PVC SWA PVC (individually and overall screened)	I	Each	638		
E13.3.62		1mm² x 6pr twisted PVC SWA PVC (individually and overall screened)	I	Each	40		
E13.3.63		1mm² x 8pr twisted PVC SWA PVC (individually and overall screened)	I	Each	20		
E13.3.64		4pr twisted PVC, Non-Woven Tape + alu Foil (Industrial CAT6)	I	Each	62		
E13.3.65	EMCA 18.3 (c)	Installation of all cable route markers	I	Each	166		
E13.3.66	EMCA 18.3 (d)	Installation of all concrete cable slabs	I	Each	80		
	EMCA 18.3 (e)	Installation of all **hot dipped galvanised** heavy-duty cable ladder, trunking, welded wire mesh and accessories including all necessary supports, clamps strapping, brackets, reducer splice, hangers, threaded rods, trunking, bolts, nuts and anchor bolts etc as per the particular specification					
E13.3.67		150mm Wide cable ladder	I	m	165		
E13.3.68		200mm Wide cable ladder	I	m	86		
E13.3.69		300mm Wide cable ladder	I	m	53		
E13.3.70		400mm Wide cable ladder	I	m	8		
E13.3.71		500mm Wide cable ladder	I	m	13		
E13.3.72		600mm Wide cable ladder	I	m	22		
E13.3.73		800mm Wide cable ladder	I	m	93		
E13.3.74		150mm Wide cable ladder flat covers	I	m	17		
E13.3.75		200mm Wide cable ladder flat covers	I	m	9		
E13.3.76		300mm Wide cable ladder flat covers	I	m	6		
						Carried Forward	

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.3.77		400mm Wide cable ladder flat covers	I	m	1		
E13.3.78		500mm Wide cable ladder flat covers	I	m	2		
E13.3.79		600mm Wide cable ladder flat covers	I	m	3		
E13.3.80		800mm Wide cable ladder flat covers	I	m	10		
E13.3.81	EMCA 18.3 (g)	Installation of all hot dipped galvanised heavy-duty cable ladder supports, bolts, holders and etc that is required as per the particular specification	I	Sum	-		
E13.3.82	EMCA 18.3 (h)	Installation of all pump set sensor termination cubicles	I	Each	20		
	EMCA 18.3 (i)	Installation of all HPDE heavy-duty cable sleeves, joints, sealing rings, couplings, end plugs, spacer modules, bell mounth, manderel, duct brush flexibend, stainless steel draw wire long bend as per the particular specification					
E13.3.83		110mm² HDPE Sleeves equal or similar to kabelflex	I	m	250		
E13.3.84		160mm² HDPE Sleeves equal or similar to kabelflex	I	m	150		
	EMCA 18.3 (j)	Installation of all Equal or similar CCG with solid cover IP68 including non sparking connectors, insulating sleeves,identification tag, mounting screws, locknuts , lockout device with lock, lid securing chain and all accessories					
E13.3.85		**Box 0**	I	Each	11		
E13.3.86		Compression Kits (Small)	I	Each	44		
E13.3.87		Compression Kits (large)	I	Each	44		
E13.3.88		Blanking Plugs	I	Each	22		
E13.3.89		**Box 1**	I	Each	10		
E13.3.90		Reducing Glands [25-20]	I	Each	20		
E13.3.91		Compression Kits (Small)	I	Each	20		
E13.3.92		Compression Kits (large)	I	Each	20		
E13.3.93		Blanking Plugs	I	Each	20		
E13.3.94		**Box 2**	I	Each	6		
E13.3.95		Reducing Glands [32-20]	I	Each	12		
E13.3.96		Reducing Glands [32-25]	I	Each	12		
E13.3.97		Compression Kits	I	Each	12		
E13.3.98		Blanking Plugs	I	Each	12		
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.3.99		**Box 3**	I	Each	6		
E13.3.100		Reducing Glands [40-20]	I	Each	12		
E13.3.101		Reducing Glands [40-25]	I	Each	12		
E13.3.102		Reducing Glands [40-32]	I	Each	12		
E13.3.103		Compression Kits	I	Each	12		
E13.3.104		Blanking Plugs	I	Each	12		
E13.3.105		**Box 4**	I	Each	6		
E13.3.106		Reducing Glands [50-20]	I	Each	12		
E13.3.107		Reducing Glands [50-25]	I	Each	12		
E13.3.108		Reducing Glands [50-32]	I	Each	12		
E13.3.109		Reducing Glands [50-40]	I	Each	24		
E13.3.110		Compression Kits	I	Each	12		
E13.3.111		Blanking Plugs	I	Each	12		
	EMCA 18.3 (k)	Installation of all hot dipped galvanised with saddles, fasteners,surface mounted against brick or concrete every 500mm and all accessories					
E13.3.112		20mm Conduit	I	m	681		
E13.3.113		20mm conduit saddles	I	Each	350		
E13.3.114		Solid Coupling Female Threaded Adaptor	I	Each	350		
E13.3.115		Round Conduit box plus cover	I	Each	100		
E13.3.116	EMCA 18.3 (l)	Installation of all soil for the bedding of cables during excavations including cleaning of cable routes complete as per particular specification	I	m³	235		
	EMCA 18.3 (m)	Excavating, back filling, consolidation, importation of soil and dumping of all rock and stone removed during excavations including cleaning of cable routes all according to particular specifications (including hand excavations where necessary along existing cable routes)					
E13.3.117		a) Pickable soil	I	m³	295		
E13.3.118		b) Soft rock	I	m³	100		
E13.3.119		c) Hard rock	I	m³	135		
		Dumping and removing of all rock and stone removed during excavations including cleaning of cable routes complete as per particular specification.					
						Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Pay. Ref.	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E13.3.120		Dumping will at a registered dumping site within the border of Municipal Area. Contractor to allow dumping within a vacinity of 30km the site Contractor to allow all labour, truck hire and dumping site payments	I	m³	235		
E13.3.121		Sifting soil through a 4mm mesh size for the bedding of cables and the backfilling of trenches complete as per particular specification.	I	m³	295		
E13.3.122		Nett amount for core drilling 100mm diameter holes through 250mm concrete	I	Each	26		
E13.4	**EMCA 18.4**	**SCHEDULE E13.4 - COMMISSIONING**					
E13.4.1	EMCA 18.4 (a)	Testing and commissioning of all cables as above mentioned	I	Sum	-		
E13.4.2	EMCA 18.4 (b)	Updating, verifying and submission of Electronic Cable schedules with Tag numbers and final agreed lengths	I	Sum	-		
E13.4.3	EMCA 18.4 (c)	Surveyor to mark-up as-built cable route plans and all mark-up must be on made on the AutoCAD format	I	Sum	-		
		SCHEDULE NO. E13 **MULTICORE CABLES & EARTH WIRES** **CARRIED TO SUMMARY**					
						Total	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E14	**ESLS**	**SCHEDULE NO. E14** **SITE LIGHTING**					
E14.1	**GEN**	**SCHEDULE E14.1 - DESIGN, DRAWINGS AND GENERAL**					
E14.1.1	PSGEN B	Provide all design drawings and wiring diagrams	G	Sum	-		
E14.1.2	PSGEN B	Provide operating all maintenance manuals and "as-built" drawings	G	Sum	-		
E14.2	**ESLS**	**SCHEDULE E14.2 - SUPPLY AND DELIVERY TO SITE**					
E14.2.1	**5.1** ESLS 5.1 (a)	Supply and delivery to site of complete mast (refer to project specification PSESLS-2)	E	No.	10		
E14.3	**ESLS**	**SCHEDULE E14.3 - INSTALLATION**					
E14.3.1	**5.2** ESLS 5.2 (a)	Installation of complete mast (refer to project specification PSESLS-2)	I	No.	10		
E14.4	**ESLS**	**SCHEDULE E14.4 - COMMISSIONING**					
E14.4.1	**5.3** ESLS 5.3 (a)	Commissioning of complete mast (refer to project specification PSESLS-2)	I	No.	10		-
		SCHEDULE NO. E14 **SITE LIGHTING** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
E15	***ESGS***	**SCHEDULE NO.E15** **STANDBY GENERATOR SYSTEM**					
E15.1	**ESGS 17**	**SCHEDULE E15.1 - DESIGN, DRAWINGS AND GENERAL**					
E15.1.1	PSGEN B	Provide general layout drawings and wiring diagrams for approval [Refer to particular specification]	G	Sum	-		
E15.1.2	PSGEN B	Provide operating and maintenance manuals, data sheets of all equipment and "as built" drawings	G	Sum	-		
E15.2	**ESGS 17.1**	**SCHEDULE E15.2 - SUPPLY AND DELIVERY TO SITE**					
E15.2.1	ESGS 17.1 (a)	Supply and delivery to site of complete Standby generator set as specified with suitable alternator (refer to project specification PSESGS)	E	Sum	-		
E15.2.2	ESGS 17.1 (b)	Supply and delivery to site of complete automatic mains failure Start-up system as specified (refer to project specification PSESGS)	E	Sum	-		
E15.2.3	ESGS 17.1 (c)	Supply and delivery to site of complete automatic change over system as specified (refer to project specification PSESGS)	E	Sum	-		
E15.2.4	ESGS 17.1 (d)	Supply and delivery to site of complete container enclosure as specified (refer to project specification PSESGS)	E	Sum	-		
E15.2.5	ESGS 17.1 (e)	Supply and delivery to site of complete fuel tank complete with mounting frame (refer to project specification PSESGS)	E	Sum	-		
E15.3	**ESGS 17.2**	**SCHEDULE E15.3 - INSTALLATION**					
E15.3.1	ESGS 17.2 (a)	Installation of complete Standby generator set as specified suitable alternator (refer to project specification PSESGS)	I	Sum	-		
E15.3.2	ESGS 17.2 (b)	Installation of complete automatic mains failure Start-up system as specified (refer to project specification PSESGS)	I	Sum	-		
E15.3.3	ESGS 17.2 (c)	Installation of complete automatic change over system as specified (refer to project specification PSESGS)	I	Sum	-		
					Carried Forward		

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	CPA Code	Unit	Qty	Rate (R)	Amount (R)
						Brought Forward	
E15.3.4	ESGS 17.2 (d)	Installation of complete container enclosure as specified (refer to project specification PSESGS)	I	Sum	-		
E15.3.5	ESGS 17.2 (e)	Installation of complete fuel tank complete with mounting frame (refer to project specification PSESGS)	I	Sum	-		
E15.4	**ESGS 17.3**	**SCHEDULE E15.4 - COMMISSIONING**					
E15.4.1	ESGS 17.3 (a)	Commissioning of complete Standby generator set as specified with suitable alternator (refer to project specification PSESGS)	I	Sum	-		
E15.4.2	ESGS 17.3 (b)	Commissioning of complete automatic mains failure Start-up system as specified (refer to project specification PSESGS)	I	Sum	-		
E15.4.3	ESGS 17.3 (c)	Commissioning of complete automatic change over system as specified (refer to project specification PSESGS)	I	Sum	-		
E15.4.4	ESGS 17.3 (d)	Commissioning of complete container enclosure as specified (refer to project specification PSESGS)	I	Sum	-		
E15.4.5	ESGS 17.3 (e)	Commissioning of complete fuel tank complete with mounting frame (refer to project specification PSESGS)	I	Sum	-		
		SCHEDULE NO. E15 **STANDBY GENERATOR SYSTEM** **CARRIED TO SUMMARY**					
						Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
C3		**SCHEDULE C3: EARTHWORKS AND PIPELINES**				
C3,1	*SANS 1200 D*	**SCHEDULE C3.1 - EARTHWORKS**				
C3.1.1	8.3.1.2	Remove topsoil to nominal depth of 150 mm and stockpile				
		iv) Filtrate Sump	m²	45		
C3.1.2	8.3.2	Bulk excavation				
		a) Excavation in all materials and use for backfill or embankment or dispose, as ordered within a freehaul distance of 0,5 km				
		viii) Filtrate Sump	m³	212		
		b) Extra-over 8.3.2 a) for:				
		i) Hard rock excavation (Provisional Item)				
		.5 Filtrate Sump	m³	106		
C3.1.3	8.3.3	Restricted excavation				
		a) Excavate in all materials and use for backfill, embankments or dispose				
		i) Filtrate Sump	m³	5		
		ii) Chambers on Site	m³	280		
		b) Extra-over 8.3.3 a) for:				
		i) Hard rock excavation				
		.1 Chambers on Site	m³	140		
C3.1.4		Overbreak in rock foundation removal of loose material and building up area with class 15/19 mass concrete up to 200mm. Deeper 200mm to be at contractors cost				
		.3 Filtrate sump	m²	38		
C3.1.5		Soilcrete for backfill of excavation where ordered by Engineer or shown on the drawing with 5% cement (OPC) (PROVISIONAL ITEM)				
		i) Filtrate Sump	m³	20		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
C3.1.6	8.3.8	Existing services				
	8.3.8.1	c) Excavate by hand in soft material to expose existing services	m³	50		
C3.1.7	8.3.8.2.	Dealing with services that are at risk because of the construction of earthworks				
		a) Cables	no	4		
C3.1.8	8.3.9	Topsoiling				
		From stock, hauling and spreading over site				
		i) Horizontal areas	m²	900		
		Note: accurate position to be determined on site by Engineer.				
C3.1.9	8.3.10	Grassing with Kikuyu roots on horizontal or nearly horizontal surfaces				
		i) Kikuyu	m²	900		
C3.1.10		Allow for rejuvenation, fertilizer and planting of indigenous drought resistant plants	sum	1		
C3,2	*SANS 1200 DB PSDB*	**SCHEDULE 3.2 - EARTHWORKS (Pipe trenches)**				
C3.2.1	8.3.2	Excavate in all material for trenches, backfill, compact and dispose of surplus material				
		Pipe diameter 100 dia up to 500 nom dia with 300 mm side allowance each side including 500 nom dia. 600 nom dia and larger side allowance 500 mm each side.				
		i) 0,00 m - 1,00 m depth	m³	0		
		ii) 1,01 m - 1,50 m depth	m³	188		
		iii) 1,51 m - 2,00 m depth	m³	537		
		iv) 2,01 m - 2,50 m depth	m³	161		
		v) 2,51 m - 3,00 m depth	m³	107		
		vi) 3,01 m - 3,50 m depth	m³	54		
					Carried Forward	

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		vii) 3,51 m - 4,00 m depth	m³	0		
		viii) 4,01 m - 4,50 m depth	m³	0		
C3.2.2		Water network for 25 mm dia to 90 mm dia pipes, trench width 0,60 m and max depth 0,8 m				
		i) 0,00 m - 0,80 m depth	m³	54		
C3.2.3		Extra-over 3.2.1 & 3.2.2 for:				
		i) Hard rock excavation	m³	644		
C3.2.4	8.3.5	Existing services that intersect or adjoin a pipe trench				
C3.2.5	8.3.5.1	Services that intersect a trench				
		.1 Water pipes				
		.1 varying sizes	no	8		
C3,3	*SANS 1200 LB*	**SCHEDULE 3.3 - BEDDING (Pipes)**				
C3.3.1	8.2.1	Provision of bedding from trench excavation for flexible pipes				
		a) Selected granular material	m³	20		
		b) Selected fill material	m³	20		
C3.3.2	8.2.2	Supply of bedding by importation				
		a) Selected granular material	m³	304		
		b) Selected fill material	m³	135		
C3.3.3	8.2.4	Class 20/19 concrete for pipe thrust blocks				
		i) pipe thrust blocks	m³	12		
		ii) encasing of pipes	m³	10		
C3,4	*SANS 1200 L, PSL*	**SCHEDULE 3.4 - MEDIUM - PRESSURE PIPELINE**				
	8.2.1	Supply, lay and bed pipes complete with couplings				
C3.4.1		uPVC Pipelines, Class 9				
		i) 110 mm dia	m	35		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		ii) 160 mm dia	m	70		
		iii) 200 mm dia	m	45		
C3.4.2		uPVC pipeline, Class 6 for electric cable sleeves, including draw wires				
		i) 110 mm dia	m	40		
		ii) 160 mm dia	m	64		
C3.4.3		Hot dip galvanized steel pipes				
		i) 150mm dia medium class screwed and socketed steel pipes to SANS 62 (PROVISIONAL ITEM)	m	65		
		ii) 200mm dia medium class screwed and socketed steel pipes to SANS 62 (PROVISIONAL ITEM)	m	65		
C3.4.4		Type 4 HDPE, Class 12 pipes for water reticulation. Rate to include for all bends, cut lengths, couplings, tees reducers, etc.				
		i) 50 mm dia	m	130		
		ii) 40 mm dia	m	40		
		iii) 25 mm dia	m	50		
	8.2.2	Supply and bedding of specials complete with couplings				
C3.4.5		uPVC bends				
		i) 110 mm dia x 45° uPVC	no	1		
		ii) 160 mm dia x 90° uPVC	no	3		
		iii) 160 mm dia x 45° uPVC	no	6		
		iv) 160 mm dia x 22,5° uPVC	no	1		
		v) 200 mm dia x 90° uPVC	no	4		
		vi) 200 mm dia x 45° uPVC	no	1		
		vii) 200 mm dia x 22,5° uPVC	no	1		
					Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
C3.4.6		Galvanized steel bends				
		i) 150 mm dia x 45° galvanized steel	no	6		
		ii) 200 mm dia x 45° galvanized steel	no	6		
		iii) 200 mm dia x 90° galvanized steel	no	2		
C3.4.7		Saddles				
		i) 75 mm dia with 50 mm dia drilling on uPVC pipe	no	1		
C3.4.8		Couplings				
		i) Stepped coupling 150 mm dia GS to 160mm dia uPVC	no	2		
C3.4.9		Stand pipe with tap garden hose connection clamped to concrete or brick wall or fixed on to MS iron dropper, complete as shown on dwg. 1890.08.AA.14.D001	no	3		
C3.4.10		Stop cock chamber complete as shown on drawing 1890.08.AA.14.D001				
		i) for 40mm dia. Bronze globe valve	no	1		
C3.4.11		Hose reel installation				
		Approved fire hose reel from Centurion or similar and approved. Complete with union, isolating valve with hand wheel, 25 mm diam pipe from Dunlop, length 25 m mounted on panel against steel column, ref drg. 1890.08.AA.14.D001				
		i) RGS Filters	no	1		
		ii) Dewatering building	no	1		
	8.2.4	Extra over item 8.2.1 for the straight cutting of the pipe preparing ends and repairing of protection and the supplying and fixing of the extra coupling if required.				
C3.4.12		uPVC pipes, Class 9				
		i) 110 mm dia	no	1		
		ii) 160 mm dia	no	8		
					Carried Forward	

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		iii) 200 mm dia	no	7		
C3.4.13		Galvanized steel pipes				
		i) 150 mm dia medium class	no	6		
		ii) 200 mm dia medium class	no	8		
C3.4.14	8.2.11	Soilcrete backfill with 5% OPC for pipelines where vehicle traffic is expected. Top 500 mm of trench at positions to be determined by Engineer on site.	m³	20		
C3.4.15		**MISCELLANEOUS**				
		FILTRATE PIPE TO INLET WORKS				
		i) 150 mm dia screwed and socketed steel pipe in accordance to SANS 62, medium Class from uPVC Filtrate sump pipe, vertical against existing Inlet works concrete wall. Total length of vertical pipe ±5,0m. Rate to include for 3 NO 90° GS bends, cutting of pipe and 2 NO hot dip galvanized pipe clamps bolted to concrete wall.	no	1		
		GAC FILTERS				
		iii) Cut 600mm dia steel pipe after construction of chamber at both sides of chamber, remove cut length and repair protection. Ref. drg. 1890.08.FB.14.D006 and FB.14.X004	no	1		
		INTER CONNECTING PIPE WORK				
		iv) cut existing 400mm dia wash water steel pipe to suit T-piece measured under item SP1.9 and repair pipe ends	no	1		
		v) Cut existing galvanized 150mm dia steel air pipe to suit T-Piece measured under item SP 1.10 and repair pipe ends	no	1		
		note: earthworks measured elsewhere				
C3,5	*SANS 1200 LE*	**SCHEDULE 3.5 - STORMWATER DRAINAGE**				
C3.5.1	8.2.1	Supply, lay and bed concrete interlocking joint pipes in accordance to SANS 677 (spigot and socket)				
		i) 525 mm dia, Class 50 D	m	52		
					Carried Forward	

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		ii) 525 mm dia, Class 75 D	m	20		
C3.5.2	8.2.4	Extra over item 8.2.1 for cutting the end units for culverts on site				
		a) Straight cut				
		i) 525mm dia	no	6		
C3.5.3	8.2.8	Construct Stormwater Outlet structure complete as shown on drg. 1890.08.AA.14.D001	no	2		
C3,6		**SCHEDULE 3.6 - DEMOLITIONS AND ANCILLARY WORK**				
	SANS 1200 C	**SITE CLEARANCE WORK**				
	8.2.8	Demolish and remove reinforced structures and dismantle steel work, etc. and spoil debris at a spoil site established by the Contractor.				
C3.6.1		Screw Pump Station and O_3 shaft				
		.1 Chamber and pump base walls	m^3	8		
		.2 Screw shaft and stairs	m^3	32		
		.3 Handrail and cat ladder	m	20		
		.4 Grating above screw wall	sum	1		
		.5 Removal of screws, mortar and baseplate and handing over to client	sum	1		
C3.6.2		GAC Filters ref. drg. 1890.08.FB.14.A001, FB.14.D001 to FB.14.D004 and FB.14.X001				
C3.6.2.1		Break out openings in reinforced concrete structure (filters) and repair to nett opening with standard non shrink grout. Rate to include for removal of all debris to a spoil site established by the contractor				
		.1 450mm x 1250mm in 300mm thick reinforced concrete wall	no	1		
		.2 650mm x 650mm in 300mm thick reinforced concrete wall	no	6		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.3 600mm x 600mm in 300mm thick reinforced concrete wall	no	1		
C3.6.2.2		Existing brickwork				
		.2 Break out 2100 x 900 opening in existing 300mm cavity brickwall to suit new doors, including closing cavity in cavity brick wall with facebrick (Exterior) and plaster and paint (interior) to match existing and spoil debris at a spoil site established by the Contractor	No	1		
C3.6.3		**SLUDGE SUMP** ref. drg. 1890.08.QF.14.D001				
C3.6.3.1		Break out openings in reinforced concrete walls and repair to nett opening with standard non shrink grout.				
		.1 2,00m x 1,55m opening in 350mm thick reinforced concrete wall.	no	1		
		.2 Cut off 315 Ø uPVC pipe in 350m thick reinforced concrete wall and increase opening size to suit 525mm dia. concrete pipe	no	1		
C3.6.4		Clearwater Tank and Pump Station ref. drg. 1890.08.GA.14.D001				
		Break out openings in reinforced concrete structure and repair to nett opening with standard non shrink grout				
		.1 2900 x 1200mm opening in 300mm thick reinforced wall	no	2		
		SCHEDULE NO: C3 **EARTHWORKS AND PIPELINES**				
					Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
C4		**SCHEDULE C4: CONCRETE WORK**				
	1200 G PSG	**CONCRETE (STRUCTURAL)**				
C4,2		**SCHEDULE C4.2 - DAF TANKS**				
		GROUTING OF PIPES WITH NON SHRINK GROUT TO FORM A WATERTIGHT JOINT WITH STANDARD BEDDING GROUT				
C4.2.1		.01 300mm thick concrete wall				
		.01 450mm x 450mm opening	no	4		
		.02 500mm x 500mm opening	no	4		
C4.2.2		**STERILISATION AND TESTING**				
		Testing for watertightness				
		i) DAF tank	sum	1		
		ii) Flocculation channels	sum	1		
C4,3		**SCHEDULE C4.3 RAPID GRAVITY SAND FILTERS**				
	SANS 1200 G	**CONCRETE (STRUCTURAL)**				
		SUNDRY ITEMS				
C4.3.1	8.5.2	1:4 Cement riversand screeds to floors				
		.1 10mm Cement screed laid on concrete including steel floated surface finish	m²	380		
	SANS 1200 LC	**CABLE DUCTS**				
C4.3.2		**EXCAVATION AND BACKFILLING**				
	8.2.2	(a) Excavate in all materials, backfill and compact to 90% mod AASHTO density, and dispose of surplus and unsuitable materials within the freehaul distance for trenches				
	8.2.2	.1 Up to 1m wide				
		.2 Over 1m and up to 2m deep	m³	115		
	8.2.2	(b) Extra over items 8.2.2 (a) for				
		.2 Hard rock excavation	m³	46		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
	1200 LB	**BEDDING (PIPES)**				
		BEDDING FROM TRENCH EXCAVATIONS				
C4.3.3	8.2.1	Provision of bedding material from trench excavations				
		(b) Selected fill material	m³	20		
		BEDDING BY IMPORTATION				
C4.3.4	8.2.2	.1 Provision of bedding material by importation from other necessary excavations within the freehaul distance				
		(b) Selected fill material	m³	45		
C4.3.5		**GROUTING IN OF PIPES WITH NON SHRINK CROUT TO FORM A WATERTIGHT JOINT WITH STANDARD BEDDING GROUT**				
		.01 200mm thick concrete wall				
		.01 250 mm x 250 mm opening	no	8		
		.02 500 mm x 500 mm opening	no	8		
		.03 700 mm x 700 mm opeing	no	1		
		.02 250mm thick concrete wall				
		.01 500 mm x 500 mm opening	no	1		
		.03 300mm thick concrete wall				
		01 850mm x 850 mm opening	no	3		
		.04 400mm thick concete wall				
		.01 300mm x 300 mm opening	no	8		
		.02 700 mm x 700 mm opeing	no	4		
		.03 750 mm x 750 mm opeing	no	8		
C4.3.6		**STERILISATION AND TESTING**				
		Testing for watertightness				
		i) Filters	no	4		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
C4,4		**SCHEDULE C4.4 - OZONE CONTACT TANK AND LOW LIFT PUMP STATION**				
		ROUGH FORMWORK				
C4.4.1	8.2.1	(b) Plane vertical				
		.2 Sides of column base	m^2	4		
		.4 Column	m^2	10		
		REINFORCEMENT				
C4.4.2		Steel bars				
	8.3.1	(b) High tensile steel				
		.1 All sizes	ton	0.42		
		CONCRETE				
C4.4.3	8.4.3	(d) Strength concrete 35Mpa/19mm				
		.4 Plinth column	m^3	1.2		
		.5 Column Base	m^3	1.2		
		MISCELLANEOUS ITEMS				
C4.4.4		G7 Granular material compacted to 93% MOD AASHTO, within restricted areas	m^3	40		
C4.4.5		Soilcrete (5% OPC)	m^3	15		
		STERILIZATION AND TESTING				
C4.4.6		Testing for water tightness				
		i) Low lift pump station	sum	1		
		ii) Ozone contact tank	sum	1		
C4,5		**SCHEDULE C4.5 - GAC FILTERS**				
		CONCRETE				
C4.5.1	8.4.3	(b) Strength concrete 20Mpa/19mm				
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.1 Steel float benching to floors (Including finish)	m³	19		
C4.5.2	8.4.3	(c) Strength concrete 30Mpa/12mm				
		.1 Concrete infill around piping	m³	18		
		EXPANSION JOINTS				
C4.5.3	8.5	(d) Saw cut joints				
		1. Saw cut joints 100mm deep	m	10		
C4.5.4		**GROUTING OF PIPES WITH NON SHRINK GROUT TO FORM A WATERTIGHT JOINT WITH STANDARD BEDDING GROUT**				
		.1 200mm thick concrete wall				
		.1 50mm Diameter pipe	no	6		
		.2 200mm Diameter pipe	no	6		
		.2 300mm thick concrete wall				
		.1 200mm Diameter pipe	no	6		
		.2 400mm Diameter pipe	no	6		
		.3 450mm Diameter pipe	no	6		
		.4 600mm Diameter pipe	no	2		
		MISCELLANEOUS ITEMS				
C4.5.5		G7 Granular material compacted to 93% MOD AASHTO, within restricted areas	m^3	5		
		STERILIZATION AND TESTING				
C4.5.6		Testing for watertightness				
		i) GAC filters	no	6		
		SCREEDS				
C4.5.7	8.33.0	624/22 Quartz filled epoxy mortar flooring with pigment sealer (Manilla), or similar approved				
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.1 5mm Thick to floors	m²	21		
C4,6		**SCHEDULE C4.6 - CLEARWATER TANK**				
		PRECAST CONCRETE				
C4.6.1		Precast concrete units supplied and fixed complete including all reinforcing, etc Dwg 1890.08.GA.14.D002				
	8.6	(a) Strength concrete 35Mpa/19mm				
		.1 1300 x 1400 x 150mm thick cover slab complete, including placing on top of chamber, lifting hooks, casting in manhole covers, casting in of cast iron valve box, etc Manhole covers and valve boxes to be measured elsewhere.	no	2		
		Break out openings in reinforced concrete structure (clearwater tank) and repair to nett opening with standard non-shrink grout. Rate to include for removal of all debris to a spoil site established by the contractor				
		.1 1200mm x 2825mm in 300mm thick reinforced concrete wall	no	1		
		1200mm x 2975mm in 300mm thick reinforced concrete wall	no	1		
C4.6.2	*SANS*	**STERILIZATION AND TESTING**				
		Sterilisation of Structures				
		ii) Clearwater Tank	sum	1.00		
C4,7		**SCHEDULE C4.7 - SUMPS AND CHAMBERS**				
C4.7.1		**INLET WORKS (Emergency Overflow)**				
	SANS 1200G	**CONCRETE (STUCTURAL)**				
		ROUGH FORMWORK				
C4.7.1.1	8.2.1	(b) Plane vertical				
		.1 Sides of floor slabs	m^2	2		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
C4.7.1.2		**SMOOTH FORMWORK**				
	8.2.2	(b) Plane vertical				
		.1 Sides of floor slabs	m^2	2		
		.2 Walls	m^2	13		
C4.7.1.3	8.2.5	Smooth formwork to narrow widths				
		(a) Edges, risers, etc. not exceeding 300mm wide	m	5		
		BOXING IN FOR HOLES AND VOIDS				
C4.7.1.4		(a) Large, circular, up to 1.0m diameter with depth				
		.1 over 0m and up to 0.5m	no	1		
		REINFORCEMENT				
C4.7.1.5		Steel bars				
		(a) Mild steel				
		.1 All sizes	ton	0.1		
		(b) High tensile steel				
		.1 All sizes	ton	0.3		
		STRENGTH CONCRETE				
C4.7.1.6	8.4.2	Strength concrete 15Mpa / 19mm				
		(a) Blinding layer 50mm thick	m^3	0.25		
C4.7.1.7		(b) Strength concrete 35Mpa / 19mm				
		.1 Floor slabs	m^3	1.5		
		.2 Wall	m^3	1.5		
		SURACE FINISHES				
C4.7.1.8		Unformed surface finishes				
		(a) Wood floated finish				
				Carried Forward		

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		Brought Forward				
		.1 Floor slabs	m²	5		
		(b) Steel floated finish				
		.1 Top of walls, beams, etc.	m²	2		
		GROUTING OF PIPES WITH NON SHRINK GROUT TO FORM A WATER TIGHT JOINT WITH STANDARD BEDDING GROUT				
C4.7.1.9		.01 200mm thick concrete wall				
		.02 600mm diameter pipe	no	1		
C4.7.2		**OZONE DESTRUCTION CHAMBER**				
		SMOOTH FORMWORK				
C4.7.2.1	8.2.1	(b) Plane vertical				
		.1 Sides of roof slabs	m^2	3.4		
C4.7.2.2		**SMOOTH FORMWORK**				
	8.2.2	(a) Plane horizontal				
		.1 suspended slabs	m^2	17.5		
		REINFORCEMENT				
C4.7.2.3		Steel bars				
	8.3.1	(b) High tensile steel				
		.1 All sizes	ton	0.6		
		STRENGTH CONCRETE				
		.3 Suspended slabs	m³	3.5		
		SURFACE FINISHES				
C4.7.2.4		Unformed surface finishes				
C4.7.2.5	8.4.4	(b) Steel floated finish				
		.1 Roof slabs	m²	17.5		
		Carried Forward				

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		Brought Forward				
C4.7.2.6		**GROUTING OF PIPES WITH NON SHRINK GROUT TO FORM A WATERTIGHT JOINT WITH STANDARD BEDDING GROUT**				
		.01 250mm thick concrete wall				
		.02 600mm diameter pipe	no	2		
C4.7.3		**FILTRATE SUMP**				
		ROUGH FORMWORK				
C4.7.3.1	8.2.1	(b) Plane vertical				
		.1 Sides of floor slabs	m²	7		
		.2 Walls	m²	92		
C4.7.3.2	8.2.5	Rough formwork to narrow widths				
		(a) Edges, risers, etc. not exceeding 300mm wide	m	8		
C4.7.3.3		**SMOOTH FORMWORK**				
	8.2.2	(b) Plane vertical				
		.1 Sides of floor slabs	m^2	3.5		
		.2 Walls	m^2	79		
		.3 Pipe supports	m^2	2		
C4.7.3.4	8.2.5	Smooth formwork to narrow widths				
		(a) Edges, risers, etc. not exceeding 300mm wide	m	5		
		BOXING IN FOR HOLES AND VOIDS				
C4.7.3.5	8.2.6	(a) Small, circular, up to 0,35m diameter with depth				
		.1 over 0m and up to 0,5m	no	2		
		REINFORCEMENT				
C4.7.3.6		Steel bars				
	8.3.1	(a) Mild steel				
		.1 All sizes	ton	0.6		
				Carried Forward		

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
	8.3.1	(b) High tensile steel				
		.1 All sizes	ton	3.6		
C4.7.3.7	8.3.2	High tensile welded mesh				
		(d) Ref no.395	m²	8		
		STRENGTH CONCRETE				
C4.7.3.8	8.4.2	Strength concrete 15Mpa/19mm				
		(a) Blinding layer 50mm thick	m³	2		
C4.7.3.9	8.4.3	(a) Strength concrete 20Mpa/19mm				
		.1 Benching including steel floating	m³	9		
C4.7.3.10	8.4.3	(d) Strength concrete 35Mpa/19mm				
		.1 Floor slabs	m³	11		
		.2 Walls	m³	25		
		SURFACE FINISHES				
C4.7.3.11		Unformed surface finishes				
	8.4.4	(a) Wood floated finish				
		.1 Floor slabs	m²	11		
	8.4.4	(b) Steel floated finish				
		.1 Floor slabs	m²	5		
		.2 Top of walls, beams, etc.	m²	5.5		
C4.7.3.12		**GROUTING OF PIPES WITH NON SHRINK GROUT TO FORM A WATERTIGHT JOINT WITH STANDARD BEDDING GROUT**				
		.01 300mm thick concrete wall				
		.02 160mm diameter pipe	no	1		
		.03 250mm diameter pipe	no	1		
					Carried Forward	

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		SUNDRIES				
C4.7.3.13		Soilcrete (5% OPC)				
		(a) Backfilling behind walls	m^3	13		
C4.7.4		**CHAMBERS ON SITE**				
C4.7.4.1		**ROUGH FORMWORK**				
		(a) Plane vertical				
		.1 Sides of floor slabs	m^2	18		
		.2 Walls	m^2	135		
		SMOOTH FORMWORK				
C4.7.4.2		(a) Plane horizontal .1 suspended slabs	m^2	7		
		(b) Plane vertical				
		.1 Walls	m^2	175		
C4.7.4.3	8.1.1.2	Smooth formwork to chamfers, grooves, rebates, etc. exceeding 20x20mm in size				
		(a) Rebate size 60mm wide x 60mm deep	m	1		
		(b) 175 x 175 mm chamfer	m	2		
C4.7.4.4		**BOXING IN FOR HOLES AND VOIDS**				
	8.2.6	(a) Small, circular, up to 0,35m diameter with depth				
		.1 over 0m and up to 0,5m	no	9		
		(b) Large, circular up to 1m diameter with depth				
		.1 over 0,5m and up to 1,0m	no	13		
		REINFORCEMENT				
C4.7.4.5		Steel bars				
	8.3.1	(a) Mild steel				
		.1 All sizes	ton	0.4		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
	8.3.1	(b) High tensile steel				
		.1 All sizes	ton	3.7		
		STRENGTH CONCRETE				
C4.7.4.6	8.4.2	Strength concrete 15Mpa/19mm				
		(a) Blinding layer 50mm thick	m³	1.5		
C4.7.4.7	8.4.3	(c) Strength concrete 30Mpa/19mm				
		.1 Floor slabs	m³	16		
		.4 Walls	m³	21		
		.5 Thrust blocks	m³	0.1		
C4.7.4.8	8.4.3	(e) Strength concrete 20Mpa/13mm				
		.1 Benching including steel floated surface	m³	0.5		
		SURFACE FINISHES				
C4.7.4.9		Unformed surface finishes				
	8.4.4	(a) Wood floated finish				
		.2 Floor slabs	m²	21		
		(b) Steel floated finish				
		.1 Floor slabs	m²	4		
		.2 Top of walls, beams, etc.	m²	10		
C4.7.4.10		**EXPANSION JOINTS**				
	8.5	(a) Polyurethane joint sealer				
		.1 Remove 10 x 20mm tear off strip, prime with an approved primer and fill joint with polyurethane sealer	m	2.5		
C4.7.4.11		**GROUTING OF PIPES WITH NON SHRINK GROUT TO FORM A WATERTIGHT JOINT WITH STANDARD BEDDING GROUT**				
					Carried Forward	

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.01 250mm thick concrete wall				
		.02 150mm diameter pipe	no	3		
		.02 200m thick concrete wall				
		.01 450 mm diameter pipe	no	4		
		.02 200 m diameter pipe	no	2		
		.03 525 mm diameter pipe	no	4		
		.04 600 mm diameter pipe	no	1		
		.03 300 mm thick concrete wall				
		.01 160 mm diameter pipe	no	1		
		.02 250 mm diameter pipe	no	1		
	8.6	**PRECAST CONCRETE**				
C4.7.4.12		Precast concrete units supplied and fixed complete including all reinforcing etc.				
		a) Strength concrete 30MPa / 19mm				
		a) 1250 x 2500mm cover slabs placed on top of chambers, including fixing in place access cover and air vent (access cover and air vent measured elsewhere) roof slab	m³	0.5		
C4.7.5		**O_3 SHAFT** ref. drg. 1890.08.OB.14.D001				
C4.7.5.1		**SMOOTH FORMWORK**				
		(a) Plane horizontal				
		.1 suspended slabs	m²	3		
		(b) Planed vertical				
		.1 Walls	m²	8		
C4.7.5.2		**BOXING IN FOR HOLES AND VOIDS**				
		(a) Large, circular, over 0,35m and up to 0,7m diameter with depth				
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.1 Over 0m and up to 0,5m	no	1		
		REINFORCEMENT				
C4.7.5.3		Steel bars				
		(a) Mild steel				
		.1 All sizes	ton	0.05		
		(b) High tensile steel				
		.1 All sizes	ton	0.20		
		CONCRETE				
C4.7.5.4	8.4.3	(a) Strength concrete 35Mpa / 19mm				
		.1 Walls and slab	m³	2		
C4.7.5.5		**GROUTING OF PIPES WITH NON SHRINK GROUT TO FORM A WATERTIGHT JOINT WITH STANDARD BEDDING GROUT**				
		.01 300mm thick concrete wall				
		.1 850mm x 850mm opening	no	1		
		MISCELLANEOUS ITEMS				
C4.7.5.6		**POURING CONCRETE AGAINST EXISTING STRUCTURES**				
		Scrabble floor and walls 10mm deep to expose aggregates				
		.1 300 mm wide	m	6		
		.2 Drill 14mm dia holes 180mm deep in centre of floor or wall every 300mm, provide and insert 12mm dia, 800mm long high tensile steel rod with suitable epoxy	no	20		
C4.7.5.7		300 m cavity wall, outside face brick, inside stock brick with 12mm smooth plaster note: face brick texture and colour to suit existing. **SCHEDULE C4** **CONCRETE WORK**				
		Carried forward to Summary of Schedules				

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
C5		**SCHEDULE C5: ACCESS, PAVING, DRAINAGE AND FENCING**				
C5,1	*SANS 1200 DM PSDM*	**EARTHWORKS (ROAD SUBGRADE)**				
		Road bed preparation and compaction of material to a minimum of 93% modified AASHTO maximum density				
C5.1.1	8.3.4	Cut to fill, borrow to fill and compact to a minimum of 90% modified AASHTO maximum density (PROVISIONAL SUM)	m³	210		
C5.1.2	8.3.5	150 mm thick selected layer (subbase) compacted to 95% modified AASHTO density with natural gravel (G6) material from commercial source.	m³	210		
C5.1.3	8.3.7	Cut to spoil or stockpile from: (provisional)				
		a) Soft excavation	m³	40		
		b) Hard Excavation	m³	50		
C5,2	*SANS 1200 MF*	**SUBBASE**				
C5.2.1	8.3.3	Construct 150 mm thick base with natural gravel (G5) material from commercial source and compact to 97% modified AASHTO maximum density	m³	210		
C5.2.2	8.3.5	d) Process natural gravel by stabilisation	m³	210		
C5.2.3	8.3.8	Stabilising Agent				
		a) Road Lime	ton	8.4		
		b) Portland cement	ton	8.4		
C5,3	*SANS 1200 MJ PSMJ*	**SEGMENTED PAVING**				
C5.3.1	8.2.2	Construction of paving complete with 80 mm grey interlocking precast paving blocks				
		i) used block paving from stock pile	m²	0		
		ii) new paving delivered to site	m²	1400		
C5.3.2	8.2.3	Cutting units to fit edge restraints	m	420		
C5.3.3	8.2.4	Rolling to locked up condition	m²	1400		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
C5,4	*SANS 1200 MK PSMK*	**KERBING, CHANNELLING WALKWAYS AND EDGE BEAMS**				
		PRECAST KERBING				
C5.4.1		Supply and install precast mountable kerbing complete with haunching and apron				
		a) Straight sections				
		.1 Used sections from stockpile	m	0		
		.2 New sections delivered to site	m	210		
		b) Curved sections, radius over 4m, but up to and including 20m				
		.1 Used sections from stockpile	m	0		
		.2 New sections delivered to site	m	150		
		c) Curved sections, radius over 1 m, but up to and including 4 m	m	10		
		CAST IN-SITU EDGE BEAMS				
	8.2.1	Supply and install cast in-situ concrete elements				
C5.4.2		Class 25/13 cast in-situ concrete, 300 mm wide edge beam, wood floated on top, angle rounded edges and 10 mm thick expansion joints at 3 m centres				
		a) Straight sections	m	35		
C5,5		**SCHEDULE 5.7 - PAVING**				
C5.5.1		85mm thick class 20/13 concrete apron with 40mm min fall over width, in wood float finish, 12mm thick vertical expansion joints flexcell or similar and approved with bond breaker and 12 x 10 mm polyurethane sealer at min 2,50m distance. All edges receive 5mm corner trim.				
		a) 1,0 m wide	m	45		
C5,6		**SCHEDULE 5.8 - DRAINAGE**				
C5.6.1		Dished stormwater trench with handraked trimming above sludge dams. (PROVISIONAL ITEM)	m	50		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
C5.6.2		3m wide grass side drain with instant lawn lining (Kikuyu) (PROVISIONAL ITEM)	m	50		
		SCHEDULE C5 **ACCESS, PAVING, DRAINAGE AND FENCING**				
					Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
C6	*PU PUA*	**SCHEDULE C6: BUILDING WORK**				
C6,1		**SCHEDULE: C6.1 - RGS FILTERS (BY SUBCONTRACTOR)**				
		Ref. drg. 1890.08.SUB.16.D001 & SUB.16.E001				
		ONE COAT PLASTER				
C6.1.1	*PU 3.1.5*	One coat 1:6 cement plaster				
	8.34.1	.2 Steel float finish to				
		.1 Walls	m²	39		
	PU 3.3.1 PU 5.3	**PAINTING**				
		Note: All paint to be Plascon or other approved and applied in accordance with the manufacturers instructions				
C6.1.2	8.39.2	Undercoat and two coats interior washable acrylic paint to				
		.1 Plastered walls	m²	18		
C6.1.3	8.39.3	Undercoat and two coats exterior washable acrylic paint to				
		.1 Plastered walls	m²	18		
C6,2		**SCHEDULE: C6.2 - OZONE BUILDING (BY SUBCONTRACTOR)**				
		ref. drg. 1890.08.SUC.16.D004 and E001				
C6.2.1	*SANS 1200 GB*	**CONCRETE (ORDINARY BUILDINGS)**				
		REINFORCEMENT				
C6.2.1.1		Steel bars				
	8.2.4	(c) High tensile welded mesh				
		.4 Ref no.395	m²	110		
		CONCRETE				
C6.2.1.2	8.2.5.1	(a) Strength concrete				
	8.2.5.1	(b) .1 Strength concrete 20Mpa/19mm				
		.8 Apron	m³	9		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.9 Ramps	m³	1		
	8.2.5.1	(c) .3 Strength concrete 30Mpa/19mm				
		.1 Floor slabs	m³	20		
		.2 Wall, cable duct	m³	1		
		.3 Plinth	m³	0.5		
	8.2.5.1	(d) Blinding layers				
		.1 Strength concrete 15Mpa/19mm				
		.1 50mm Thick	m³	0.3		
C6.2.1.3	8.2.5.1	(f) Epoxy Floor Finish				
		.1 Self levelling Ucrete MF epoxy finish applied to manufacturers instructions to				
		.1 Floors, etc.	m²	148		
		SURFACE FINISHES				
C6.2.1.4		Unformed surface finishes				
	8.2.6	(a) Wood floated finish				
		.1 Floor slabs	m²	210		
	8.2.6	(b) Steel floated finish				
		.1 Plinths	m²	2		
C6.2.1.5		**JOINTS**				
	8.2.8	(a) 12mm Thick Flexcell placed vertically between concrete surface and brick wall				
		.1 Vertical Expansion joint between concrete floor and brick walls	m²	27		
	8.2.8	(b) Polyurethane joint sealer				
		.1 Remove 12 x 10mm tear off strip, prime with an approved primer and fill joint with polyurethane sealer	m	132		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
	8.2.9	(c) 3 x 30mm Saw Cut Joint	m	16		
C6.2.2	*PU*	**BUILDING WORK**				
	PU 3.1.8	**DAMPPROOFING**				
C6.2.2.1	8.11.1	Polyethylene sheeting				
		.1 250 Micron USB green under floors	m²	161		
	PU 3.4.3	**PRESSED METAL DOORS AND FRAMES**				
		Collect free issue from Client & install:				
		Steel doors and frames				
C6.2.2.2	8.25.2	2,0mm Pressed steel transformer doors and frames				
		.1 Combination door and frame with double door size 1511 x 2032mm and frame for 230mm thick wall, including vermin proof louvres size 600 x 600mm in bottom of each door leaf, including locking mechanism, barrel bolts, etc. (D2)	no	2		
C6.2.3	*PU 3.3.1 PU 5.3*	**PAINTING**				
		Note: All paint to be Plascon or other approved and applied in accordance with the manufacturers instructions				
C6.2.3.1	8.39.1	Prime Coat, one undercoat and two coats exterior quality gloss enamel paint to				
		.1 Steel door frames	m²	5		
		.2 Steel doors	m²	19		
		.4 Timber doors	m²	19		
C6.2.3.2	8.39.2	Undercoat and two coats interior washable acrylic paint to				
		.1 Plasterboard or asbestos ceilings	m²	148		
		.2 Plastered walls	m²	234		
C6.2.3.3		Expoxy paint (yellow)				
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.1 100mm Wide to concrete slab (PROVISIONAL ITEM)	m	23		
C6.2.4		**SUNDRIES**				
		.01 Provisional Sum for Signage	Prov Sum	1		
		.02 Profit on Above	%	0		
C6,3		**SCHEDULE: C6.2 - OZONE DESTRUCTOR CHAMBER**				
		ref. drg. 1890.08.SUC.16.E002				
C6.3.1	*PU*	**BUILDING BRICKWORK**				
		BRICKWORK				
		REINFORCED BRICKWORK				
C6.3.1.1	8.2.0	Reinforced stock brickwork in 1:3 cement mortar				
		.1 230mm Thick wall	m²	16.8		
	PU 5.1.2	**FACE BRICKWORK**				
C6.3.1.2	8.4.0	Extra over items 805.01.01 and 805.01.02 for face brickwork (Allow R4600.00/1000 for purchasing and delivery of bricks to site excluding VAT)				
		.1 Stretcher course bond	m²	16.8		
		BRICK REINFORCING				
C6.3.1.3	8.5.0	Brick reinforcing				
		.2 150mm Wide brickforce	m	37		
		.3 Rod reinforcing (all sizes)	kg	2		
		LINTOLS				
C6.3.1.4	8.6.0	Precast pre-stressed concrete lintols built into brickwork				
		.1 75 x 110mm Lintol	m	1.5		
		IRONMONGERY				
C6.3.1.5	8.24.0	Locksets				
					Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.1 Union C2, two lever lockset including satin chrome furniture	no	1		
	PU 3.4.3	**PRESSED METAL DOORS AND FRAMES**				
C6.3.1.6		Steel door frames Dwg 1890.08.AA.16.D001				
	8.25.0	.1 1,6mm Pressed steel door frames				
		.2 Door size 813 x 2032mm and 230mm thick wall (D4)	no	2		
C6.3.1.7	8.24.2	Door stops				
		.1 30mm Diameter rubber door stop	no	1		
		ONE COAT PLASTER				
C6.3.1.8	*PU 3.1.5*	One coat 1:6 cement plaster				
	8.34.1	.2 Steel float finish to				
		.1 Walls	m²	40		
C6.3.1.9	*PU 3.3.1* *PU 5.3*	**PAINTING**				
		Note: All paint to be Plascon or other approved and applied in accordance with the manufacturers instructions				
C6.3.1.10	8.39.1	Prime Coat, one undercoat and two coats exterior quality gloss enamel paint to				
		.1 Steel door frames	m²	1.5		
		.2 Steel doors	m²	3.5		
C6.3.1.11	8.39.2	Undercoat and two coats interior washable acrylic paint to				
		.2 Plastered walls	m²	40		
C6,4		**SCHEDULE C6.4 - SLUDGE DEWATERING BUILDING (BY SUBCONTRACTOR)**				
		ref. drg. 1890.08.SUD.15.D001, 16.D001, 16.E001 & AA.16.D001				
C6.4.1	*SANS 1200 GB*	**CONCRETE (ORDINARY BUILDINGS)**				
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
	8.2.1	**ROUGH FORMWORK**				
C6.4.1.1		a) .2 Plane vertical				
		.3 Sides of floor slabs	m²	23		
		NORMAL FORMWORK				
C6.4.1.2	8.2.1	(b) .1 Plane horizontal				
		.1 Permanent formwork for soffit for drain channel	m²	2		
	8.2.1	(b) .2 Plane vertical				
		.1 Walls	m²	30		
		(b) .3 Plane circular				
		.1 Walls circular on plan to 3.965m radius	m²	24		
C6.4.1.3	8.2.2	Normal formwork to narrow widths				
		(a) Edges, risers, etc. not exceeding 300mm wide	m	30		
		(b) Circular edges, risers, etc. not exceeding 300mm wide	m	15		
		REINFORCEMENT				
	8.2.4	(b) High tensile steel .1 All sizes	ton	2		
	8.2.4	(c) High tensile welded mesh, reference 395 .1 Ref 193 .2 Ref 395	 m² m²	 42 495		
		CONCRETE				
C6.4.1.4	8.2.5.1	(b) Strength concrete 25Mpa/19mm				
		.2 Apron around building	m³	3		
C6.4.1.5	8.2.5.1	(c) Strength concrete 35Mpa/19mm				
		.3 Floor and ramps	m³	74		
		.4 Channel Floors	m³	4		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.5 Walls	m³	13		
		SURFACE FINISHES				
C6.4.1.6		Unformed surface finishes				
	8.2.6	(a) Wood floated finish				
		.1 Floor slabs including ramps	m²	303		
	8.2.6	(b) Steel floated finish				
		.1 Floor slabs	m²	204		
C6.4.1.7		**JOINTS**				
	8.2.8	(a) 12mm Thick flexcell or similar approved placed vertically between brick and concrete surfaces				
		.1 Depths of 150mm	m	42		
	8.2.8	(b) 12mm Thick flexcell or similar approved placed vertically between concrete surfaces				
		.1 Depths of 85mm	m	23		
		.2 Depths of 150mm	m	80		
	8.2.8	(c) Polyurethane joint sealer				
		.1 Remove 12 x 10mm tear off strip, prime with an approved primer and fill joint with polyurethane sealer	m	145		
	8.2.8	(d) 3 x 40 mm deep saw cut joint	m	110		
C6.4.1.8	8.8.0	Hoop iron ties between concrete and brickwork .1 1 x 30mm Galvanised hoop iron tie, 600mm long with one end fixed to steel column and other end built into brickwork	no	50		
		DAMPPROOFING				
C6.4.1.9	8.11.1	Polyethylene sheeting .1 250 Micron USB green under floors	m²	507		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		PURPOSE MADE DOORS AND FRAMES				
		Collect free issue from Client & install:				
C6.4.1.10	8.26.0	Purpose made doors and frames Dwg 1890.10.LA.16.E001				
		1. Supply and install complete 1829 x 3000mm high solid meranti horizontal sliding double door, including connected to top and bottom wall mounted steel frame with rollers, cut out for I-beam and sealed with neoprene flap, door handles, locking mechanism, etc.	no	1		
		.2 900x2090mm high single anodised aluminium door and frame (Natural finish), including glazing according to SABS approved special safety glass, hinges, etc. (D1)	no	1		
		ROLLER SHUTTER DOORS				
C6.4.1.11	8.26.2	1,6mm Hot dipped galvanised industrial type roller shutter door complete with locking mechanism, etc. Dwg 1890.10.LA.16.E001				
		.1 Size 3000 x 3000mm high roller shutter door complete, including chain operation, etc. (D8)	no	2		
		ONE COAT PLASTER				
		One coat 1:6 cement plaster				
C6.4.1.12	8.34.1	.2 Steel float finish to				
		.1 Walls	m²	100		
		PAINTING				
		Note: All paint to be Plascon or other approved and applied in accordance with the manufacturers instructions				
C6.4.1.13	8.39.2	One coat primer and two coats interior washable acrylic paint to				
		.1 Plastered walls	m²	100		
C6.4.1.14	8.39.6	Three coats Woodcoat polyurethane coating suede				
					Carried Forward	

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.1 Wooden doors	m²	12		
C6.4.2		**MISCELLANEOUS ITEMS**				
		1. G7 Granular material compacted to 93% MOD AASHTO, within restricted areas	m^3	390		
		2. 76mm diam halved uPVC sleeves for drainage	m	3		
		3. 200mm diam uPVC sleeves for drainage	m	20		
		4. Soilcrete (5% OPC), backfilling in restricted areas (Between concrete walls)	m^3	280		
C6,5		**SCHEDULE: C6.5 - PRE-OZONATION INSTALLATION (BY SUBCONTRACTOR)**				
		ref. drg. 1890.08.SUF.16.D001 and 16.D002				
C6.5.1	*SANS 1200 GB*	**CONCRETE (ORDINARY BUILDINGS)**				
		REINFORCEMENT				
C6.5.1.1		Steel bars				
	8.2.4	(c) High tensile welded mesh				
		.5 Ref no.617	m²	55		
		CONCRETE				
C6.5.1.2	8.2.5.1	(b) Strength concrete				
	8.2.5.1	(b) .1 Strength concrete 20Mpa/19mm				
		.9 Aprons	m³	2		
		.10 Steps & Ramps	m³	0.6		
	8.2.5.1	(c) .4 Strength concrete 35Mpa/19mm				
		.7 Surfacebed	m³	4.5		
		SURFACE FINISHES				
C6.5.1.3		Unformed surface finishes				
	8.2.6	(a) Wood floated finish				
		.1 Floor slabs	m²	15		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
	8.2.6	(b) Steel floated finish				
		.1 Floor slabs	m²	40		
C6.5.1.4		**JOINTS**				
	8.2.8	(a) 12mm Thick flexcell placed vertically between concrete surface and brick walls Dwg 1890.08SUF.16.D001 and D002				
		.1 Expansion joint	m	31		
	8.2.8	(b) Polyurethane joint sealer				
		.1 Remove 10 x 12mm tear off strip, prime with an approved primer and fill joint with polyurethane sealer	m	31		
	8.2.10	(d) 4 x 60mm Saw Cut Joint	m	15		
C6.5.2	*SANS 1200 H*	**STRUCTURAL STEELWORK**				
		SUPPLY AND FABRICATION OF STEELWORK				
		SINGLE SECTION STEELWORK				
		Single section steelwork				
C6.5.2.1	8.3.1	.2 .1 .1 Single section beam with connection plates, stiffeners, splice material, stop ends,etc				
		.1 203 x 133 x 25kg/m universal beam	ton	0.2		
		FASTENERS				
C6.5.2.2	8.3.1	.2 .8 Fasteners				
		.3 Four x 16mm Diameter anchor bolts 550mm long, including two 200x200x 10mm flat plate as per Dwg 1890.08.SUF.16.D002	no	5		
		TRANSPORT TO SITE				
C6.5.2.3	8.3.2	.1 Normal transport				
		.1 Structural steelwork	ton	0.2		
					Carried Forward	

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		OFF LOADING, SITE STORAGE & ERECTION ON SITE				
C6.5.2.4	8.3.4	.02 Erection bolts				
		.3 Four x 16mm Diameter anchor bolts 550mm long, including two 200x200x 10mm flat plate	no	5		
C6.5.3	*SANS 1200HC*	**CORROSION PROTECTION**				
	8.3.13	Extra over items 8.3.1 to 8.3.9 for corrosion protection				
		At workshop				
C6.5.3.1	8.3.13	.1 .1 Mechanical wire brush or light blast to remove all mill scale and hot dip galvanise				
		.1 General surfaces of structural steel	tons	0.2		
		On site after erection				
C6.5.3.2	8.3.13	.2 .1 Repair damaged primer coat and apply one coat of intermediate Multi-Purpose Undercoat (30 micron DFT) and two coats Alkyd based enamel (30 micron DFT each)				
		.1 General surfaces of structural steel	ton	0.2		
C6.5.4	*PU PU 3.1.8*	**BUILDING WORK DAMPPROOFING**				
C6.5.4.1	8.11.1	Polyethylene sheeting				
		.1 250 Micron USB green under floors	m²	55		
		PURPOSE MADE DOORS AND FRAMES				
		Collect free issue from Client & install:				
C6.5.4.2	8.26.0	Purpose made doors and frames				
		.1 1524 x 2975 mm thick mild steel double door and frame complete, including hinges, door stop, handle, locking device, etc. (D10)	no	1		
		SCREEDS				
C6.5.4.3	8.33.0	1:3 Cement screed steel floated				
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.2 50mm Average thick to floors to falls	m²	40		
		ONE COAT PLASTER				
C6.5.4.4	*PU 3.1.5*	One coat 1:6 cement plaster				
	8.34.1	.2 Steel float finish to				
		.1 Walls	m²	83		
C6.5.6	*PU 3.3.1 PU 5.3*	**PAINTING**				
		Note: All paint to be Plascon or other approved and applied in accordance with the manufacturers instructions				
C6.5.6.1	8.39.1	Prime Coat, one undercoat and two coats exterior quality gloss enamel paint to				
		.1 Steel door and frames	m²	9		
C6.5.6.2	8.39.2	Undercoat and two coats interior washable acrylic paint to				
		.2 Plastered walls	m²	83		
6.6		**SCHEDULE: 6.6 - HYDROGEN PEROXIDE STORE AND DOSING ROOM**				
		Ref. drg. 1890.08.SUG.16.D001				
C6.6.1	*SANS 1200 GB*	**CONCRETE (ORDINARY BUILDINGS)**				
		ROUGH FORMWORK				
		a) .1 Plane vertical				
		.1 Sides of floor slabs	m²	2.5		
C6.6.2		**REINFORCEMENT**				
	8.2.4	(a) High tensile welded mesh, reference 395 .1 Ref 395	m²	25		
C6.6.3		**SURFACE FINISHES**				
		Unformed surface finishes				
	8.2.6	(a) Wood floated finish				
		.1 Floor slabs including ramps	m²	25		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
C6.6.4		**JOINTS**				
	8.2.8	(a) 12mm Thick flexcell or similar approved placed vertically between brick and concrete surfaces				
		.1 Depths of 100mm	m	6		
	8.2.8	(b) Polyurethane joint sealer				
		.1 Remove 12 x 10mm tear off strip, prime with an approved primer and fill joint with polyurethane sealer	m	6		
C6.6.5		**CONCRETE**				
	8.2.5.1	(a) Strength concrete				
	8.2.5.1	(b) .1 Strength concrete 20Mpa/19mm				
		.1 Steps, aprons & Ramps	m³	2.5		
		SCREEDS				
C6.6.6	8.33.0	1:3 Cement screed steel floated				
		.1 50mm Average thick to floors	m²	8		
C6.6.7	*PU 3.3.1 PU 5.3*	**PAINTING**				
		Note: All paint to be Plascon or other approved and applied in accordance with the manufacturers instructions				
C6.6.7.1	8.39.1	Prime Coat, one undercoat and two coats exterior quality gloss enamel paint to				
		.1 Steel door and frames	m²	4		
C6.6.7.2	8.39.2	Undercoat and two coats interior washable acrylic paint to				
		.1 Plastered walls	m²	37		
C6,7		**SCHEDULE: C6.7 - MISCELLANEOUS**				
		.1 ~~Dismantle and~~ re-positioning of light pole between Access road and DAF Tank 3 prior to excavation for new DAF Tank 3	no	1		
					Carried Forward	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
					Brought Forward	
		.2 Repositioning of electrical MCC in front of sludge sump complete with new class 20/19 concrete support base and re-laying of all cables. note: Rate to include for commissioning of electrical installation	no	1		
		SCHEDULE C6 **BUILDING WORK**				
					Total	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
C7		**SCHEDULE C7: STEEL AND METALWORK**				
	SANS 120 HA	**STRUCTURAL STEELWORK (SMALL WORKS)** Rate to include for supply of material, erection, welding, bolts, nuts, protection etc.				
C7,1	8.3.1	**SCHEDULE 7.1 - STRUCTURAL STEEL**				
C7.1.1		**Rapid Gravity Sand fillter**				
		i) Stainless steel (316L) inlet weir plate with neoprene packing, bolted to concrete wall. Complete as shown on drg 1890.08.FA.14.D003	no	4		
C7.1.2		**Ozone Contact Tank and low lift PS**				
		i) Hot dip galvanized vermin proof air vent complete as shown on drg. 1890.08.AA.13.D002	no	2		
C7.1.3		**SCREW PUMP STATION AND O_3 SHAFT**				
		i) Vastrap steel stairs with landing, handrails, platform and supports bolted to concrete plinths, complete as shown on drg. 1890.08.OB.14.D001 and detail drg. 1890.08.AA.15.D001	no	1		
C7.1.4		**GAC FILTERS**				
		i) Stainless steel (316L) weir plate 920 X 250 mm with neoprene packing bolted to concrete wall, complete as shown on drg. 1890.08.FB.14.D007	no	6		
		ii) Stainless steel (316L) washwater weir plate 5220 x 125 mm with neoprene packing bolted to concrete wall, complete as shown on drg. 1890.08.FB.14.X003	no	12		
		iii) Stainless steel (316L) baffle plate bolted to concrete wall. Complete as shown on drg. 1890.08.FB.14.D007	no	6		
C7.1.5		**Chambers**				
		i) Hot dip galvanized vermin proof air vent complete as shown on drg 1890.08.AA.13.D002	no	1		
C7,2	8.3.2	**SCHEDULE: 7.2 - HANDRAILS**				
				Carried Forward		

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		Brought Forward				
C7.2.1		Hot dip galvanized standard ball type approved (1000 mm high) handrail, horizontal, side or top mounted.				
		a) Top mounted				
		i) Filtrate sump	m	17		
		ii) GAC filters	m	25		
C7.2.2		Hot dip galvanized standard ball type approved (1000 mm high) handrail, inclined, side or top mounted				
		b) Top mounted				
C7.2.3		Removable handrail at filtrate sump, between A-frame	m	2		
C7,3	8.3.3	**SCHEDULE 7.3 - LADDERS, COMPLETE AND INSTALLED**				
C7.3.1		Hot dip galvanized cat ladder complete as shown on drg. 1890.08.AA.13.D001				
		RGS Filters ref. drg. 1890.08.FA.14.D006				
		a) X = 66.70 m				
		Y = 65,30 m	no	8		
		GAC Filters				
		b) X = 69,49 m				
		Y = 67,70 m	no	3		
		c) X = 69,49 m				
		Y = 66,65 m	no	3		
C7,4	8.3.4	**SCHEDULE 7.4 - FLOORING**				
		Complete and installed with angle iron frames cast into concrete and or MS channel supports bolted to concrete and all required cut outs, all edges banded.				
		Hot dip galvanized banded RS40 grating with 30 x 4.5mm bearer bar, minimum of 25 bearer bars per metre forgrating details refer to drawing 1890.08.AA.13.D002				
		Carried Forward				

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		Brought Forward				
C7.4.1		Chambers				
		i) 1060 x 1060 mm (span 1000 mm)	no	2		
C7.4.2		Angle iron frame cast into concrete wall with fish tail anchor complete as shown on drg 1890.08.AA.13.D002				
		i) Chambers	m	22		
		Hot dip galvanized banded RS 40 grating with 40 x 4,5mm bearer bar, minimum of 25 bearer bars per metre of grating for details refer drg 1890.08.AA.13.D002				
C7.4.3		Chambers				
		i) 1560 x 1500 mm (span 1500mm)	no	1		
		ii) 1560 x 800 taper x 1250 mm long (span 1500 mm)	no	1		
C7.4.4		Angle iron frame cast into concrete wall with fish anchor complete as shown on drg 1890.08.AA.413.D002				
		i) Chambers	m	8		
C7,5		**SCHEDULE 7.5 - MISCELLANEOUS**				
C7.5.1		Polypropylene coated step irons with high tensile steel bar				
		i) GAC Filters	no	19		
		ii) Clearwater Tank chambers	no	6		
		iii) Chambers	no	9		
C7.5.2		Cast Iron Valve Box to SANS 558, Fig. 13, Type 7 with square base.				
		i) Chambers	no	3		
C7.5.3		Fire Hose installation bolted to concrete columns, complete as shown on drg. 1890.08.FB.14.D007				
		i) GAC Filters	no	2		
C7.5.4		Heavy duty Cast Iron circular cover and square base frame in accordance to SANS 558, Fig. 3, Type 2A				
		Carried Forward				

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		Brought Forward				
		i) Chambers	no	2		
C7.5.5		**CLAMPS AND BRACKETS** Hot dip galvanized clamp for valve extension spindle bolted to concrete wall with 2 NO 12 mm dia ss bolts.				
		i) for 150 mm dia valve	no	2		
		SCHEDULE C7 **STEEL AND METALWORK**				
		Carried forward to Summary of Schedules				

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
C8	*PLK, PLKA, PLN PLQ*	**SCHEDULE C8: STEEL, PIPE FITTINGS AND VALVES**				
C8,1	Pipe Item Schedule	The rate for all items to include for the supply, delivery factory applied corrosion protection and off-loading on site.				
C8.1.1		**Inlet structure** ref. drg. 1890.08.CA.13.M001				
C8.1.1.1		BA 1.1	no	1		
C8.1.1.2		BA 2.2	no	1		
C8.1.1.3		BA 2.4	no	1		
C8.1.1.4		BA 4.1	no	1		
C8.1.1.5		BA 5.1	no	1		
C8.1.1.6		BA 5.2	no	3		
C8.1.2		**Flocculation Channels**				
C8.1.2.1		CA 2.1	no	1		
C8.1.2.2		CA 2.2	no	1		
C8.1.2.3		CA 5.1	no	2		
C8.1.3		**Ozone contact tank and low lift pump station** ref. drg. 1890.08.OA.13.M001				
C8.1.3.1		OA 5.2	no	1		
C8.1.3.2		OA 9.1	no	1		
C8.1.3.3		OA 9.3	no	1		
C8.1.4		**Clearwater tank** ref. drg. 1890.08.GA.13.M001				
C8.1.4.1		GA 1.1	no	1		
C8.1.4.2		GA 1.2	no	1		
C8.1.4.3		GA 1.3	no	1		
C8.1.4.4		GA 1.5	no	3		
				Carried Forward		

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		Brought Forward				
C8.1.4.5		GA 4.1	no	1		
C8.1.4.6		GA 5.1	no	1		
C8.1.4.7		GA 5.2	no	1		
C8.1.4.8		GA 7.1	no	4		
C8.1.4.9		GA 7.2	no	4		
C8.1.5		**Site pipework (Inter connecting pipes between structures)** ref. drg. 1890.08.AA.10.M001				
C8.1.5.1		SP 1.10	no	1		
C8.1.5.2		SP 2.2	no	1		
C8.1.5.3		SP 2.4	no	1		
C8.1.5.4		QC 5.1	no	1		
C8.1.6		**Site pipework (Chambers)** ref. drg. 1890.08.QD.13.M001				
C8.1.6.1		QC 1.1	no	1		
C8.1.6.2		QC 1.2	no	1		
C8.1.6.3		QC 5.1	no	1		
C8.1.6.4		QD 1.1	no	1		
C8.1.6.5		QD 1.2	no	1		
C8.1.6.6		QD 1.3	no	1		
C8.1.6.7		QD 3.1	no	1		
C8.1.6.8		QD 4.1	no	2		
C8.1.6.9		QD 6.1	no	3		
C8.1.6.10		QD 9.1	no	2		
C8.1.6.11		QE 1.1	no	1		
C8.1.6.12		QE 9.1	no	1		
		Carried Forward				

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		Brought Forward				
C8,2	**Pipe Item Schedule**	**The rate for items supplied by the Contractor to include for the handling, installation, testing, site corrosion protection, painting and building into walls** **The remaining items to be collected free issue from the Client, to include handling, installation testing, site corrosion protection, painting and building into walls**				
C8.2.1		**Inlet structure** ref. drg. 1890.08.CA.13.M001				
C8.2.1.1		BA 1.1	no	1		
C8.2.1.2		BA 1.2	no	1		
C8.2.1.3		BA 1.3	no	1		
C8.2.1.4		BA 2.1	no	1		
C8.2.1.5		BA 2.2	no	1		
C8.2.1.6		BA 2.3	no	1		
C8.2.1.7		BA 2.4	no	1		
C8.2.1.8		BA 4.1	no	1		
C8.2.1.9		BA 5.1	no	1		
C8.2.1.10		BA 5.2	no	3		
C8.2.1.11		BA 8.1	no	1		
C8.2.2		**Flocculation Channels**				
C8.2.2.1		CA 2.1	no	1		
C8.2.2.2		CA 2.2	no	1		
C8.2.2.3		CA 5.1	no	2		
C8.2.3		**DAF Tanks** ref drg. 1890.08.CA.13.M001				
C8.2.3.1		DA 1.1	no	1		
C8.2.4		**Rapid Gravity Sand Filters** ref. drg. 1890.08.FA.13.M001				
		Carried Forward				

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		Brought Forward				
C8.2.4.1		FA 1.1	no	1		
C8.2.4.2		FA 1.2	no	1		
C8.2.4.3		FA 2.1	no	1		
C8.2.4.4		FA 2.2	no	1		
C8.2.4.5		FA 5.1	no	2		
C8.2.4.6		FA 5.2	no	1		
C8.2.5		**Ozone contact tank and low lift pump station** ref. drg. 1890.08.OA.13.M001				
C8.2.5.1		OA 1.1	no	1		
C8.2.5.2		OA 1.11	no	1		
C8.2.5.3		OA 5.1	no	1		
C8.2.5.4		OA 5.2	no	1		
C8.2.5.5		OA 9.1	no	1		
C8.2.5.6		OA 9.3	no	1		
C8.2.5.7		OA 12.1	no	1		
C8.2.5.8		OA 12.2	no	1		
C8.2.6		**Screw pump station and O_3 shaft** ref. drg. 1890.08.OB.13.M001				
C8.2.6.1		OB 1.1	no	1		
C8.2.6.2		OB 2.1	no	1		
C8.2.6.3		OB 2.2	no	1		
C8.2.6.4		OB 2.3	no	1		
C8.2.7		**Clearwater tank** ref. drg. 1890.08.GA.13.M001				
C8.2.7.1		GA 1.2	no	1		
C8.2.7.2		GA 1.3	no	1		
		Carried Forward				

Contractor | Witness 1 | Witness 2 | Employer | Witness 1 | Witness 2

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		Brought Forward				
C8.2.7.3		GA 1.5	no	3		
C8.2.7.4		GA 2.1	no	1		
C8.2.7.5		GA 2.2	no	1		
C8.2.7.6		GA 4.1	no	1		
C8.2.7.7		GA 5.1	no	1		
C8.2.7.8		GA 5.2	no	1		
C8.2.7.9		GA 7.1	no	4		
C8.2.7.10		GA 7.2	no	4		
C8.2.7.11		GA 9.1	no	1		
C8.2.7.12		GA 12.1	no	1		
C8.2.8		**Site pipework (Inter connecting pipes between structures)** ref. drg. 1890.08.AA.10.M001				
C8.2.8.1		SP 1.1	no	1		
C8.2.8.2		SP 1.2	no	1		
C8.2.8.3		SP 1.3	no	1		
C8.2.8.4		SP 1.4	no	1		
C8.2.8.5		SP 1.5	no	1		
C8.2.8.6		SP 1.6	no	1		
C8.2.8.7		SP 1.7	no	1		
C8.2.8.8		SP 1.8	no	1		
C8.2.8.9		SP 1.9	no	1		
C8.2.8.10		SP 1.10	no	1		
C8.2.8.11		SP 1.11	no	1		
C8.2.8.12		SP 1.13	no	1		
C8.2.8.13		SP 1.14	no	1		
		Carried Forward				

Item	Payment Reference	Description	Unit	Qty	Rate (R)	Amount (R)
		Brought Forward				
C8.2.8.14		SP 1.15	no	1		
C8.2.8.15		SP 2.1	no	1		
C8.2.8.16		SP 2.2	no	1		
C8.2.8.17		SP 2.3	no	1		
C8.2.8.18		SP 2.4	no	1		
C8.2.8.19		SP 5.1	no	1		
C8.2.9		**Site pipework (Chambers)** ref. drg. 1890.08.QD.13.M001				
C8.2.9.1		QC 1.1	no	1		
C8.2.9.2		QC 1.2	no	1		
C8.2.9.3		QC 5.1	no	1		
C8.2.9.4		QD 1.1	no	1		
C8.2.9.5		QD 1.2	no	1		
C8.2.9.6		QD 1.3	no	1		
C8.2.9.7		QD 3.1	no	1		
C8.2.9.8		QD 4.1	no	2		
C8.2.9.9		QD 6.1	no	3		
C8.2.9.10		QD 9.1	no	2		
C8.2.9.11		QE 1.1	no	1		
C8.2.9.12		QE 9.1	no	1		
		SCHEDULE C8 **STEEL, PIPE FITTINGS AND VALVES**				
		Carried forward to Summary of Schedules				

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

RUSTENBURG WATER SERVICES TRUST

BID No RLM/RWST/OMM/0103/2024/25

RE-ADVERT: UPGRADE AND EXTENSION OF BOSPOORT WATER TREATMENT WORKS – MECHANICAL AND ELECTRICAL WORKS

C2.3 SUMMARY OF SCHEDULES

Rustenburg Water Services Trust

Upgrade and Extension of the Bospoort Water Treatment Works to 24 Mℓ/d
Civil, Mechanical & Electrical combined

Summary of Schedules

Schedule No.		Description	Amount (R)
1	MECHANICAL	PRELIMINARY AND GENERAL	
2		PROVINSIONAL SUMS, ADDITIONAL WORK & DAYWORKS	
3		STEEL, PIPE FITTINGS AND VALVES	
4		STEEL AND METALWORK	
5		DISSOLVED AIR FLOTATION (DAF)	
6		RGS FILTRATION SYSTEM	
7		OZONE EQUIPMENT	
8		GAC FILTRATION SYSTEM	
9		GAC MEDIA	
10		PUMPS	
11		DEWATERING EQUIPMENT	
12		CHEMICAL DOSING	
13		HOISTING EQUIPMENT	
E1	ELECTRICAL	MEDIUM VOLTAGE SWITCHGEAR	
E2		RING MAIN UNITS	
E3		POWER TRANSFORMERS	
E4		MINIATURE SUBSTATIONS	
E5		MOTOR CONTROL CENTRES AND DISTRIBUTION BOARDS	
E6		PROGRAMMABLE LOGIC CONTROLLERS	
E7		SCADA SYSTEMS	
E8		CONTROL AND INSTRUMENTATION SYSTEM	
E9		GENERAL AND MISCELLANEOUS	
E10		TELEMETRY SYSTEM	
E11		EARTHING AND LIGHTNING PROTECTION	
E12		SMALL POWER AND LIGHTING INSTALLATIONS	
E13		MULTICORE CABLES AND EARTH WIRES	
E14		SITE LIGHTING	
E15		STANDBY GENERATOR SYSTEM	
C3	CIVIL	EARTHWORKS AND PIPELINES	
C4		CONCRETE (STRUCTURAL)	
C5		ACCESS, PAVING, DRAINAGE AND FENCING	
C6		BUILDING WORK	
C7		STRUCTURAL STEELWORK (SMALL WORKS)	
C8		STEEL, PIPE FITTINGS AND VALVES	
		Sub-Total A	
		Minimum Contract Skills Development Goal Sum = EP&ME (0,25%) × Sub-Total A [In accordance with the Standard for Developing Skills through Infrastructre Contract]	
		Sub-Total B	
		Provisional sum: Allowance for Contingencies (10% of Sub-Total B)	
		Sub-Total C	
		Provisional sum: Allowance for Contract Price Adjustment (10% of Sub-Total C)	
		Total Construction Cost	
		Value Added Tax at 15%	
		Total Amount of Tender Carried Forward to Form of Bid	

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

Upgrade and Extension of the Bospoort Water Treatment Works to 24 Mℓ/d
Civil, Mechanical & Electrical combined

Summary of Schedules

Bankers Details :

Contractor's Name: _____

Name reflected on bank statement: _____

Bank: _____

Branch: _____

Account Number: _____

Cheque Account ☐ or Savings Account ☐

Signature :

By Tenderer : _____

Company Name : _____

Date : _____

Contractor	Witness 1	Witness 2	Employer	Witness 1	Witness 2

RUSTENBURG WATER SERVICES TRUST

BID No RLM/RWST/OMM/0103/2024/25

RE-ADVERT: UPGRADE AND EXTENSION OF BOSPOORT WATER TREATMENT WORKS – MECHANICAL AND ELECTRICAL WORKS

T2.3 TECHNICAL SCHEDULES

T2.3.1 Mechanical

T2.3.1 MECHANICAL TECHNICAL SCHEDULES

1. GAC FILTER EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
1. GAC FILTER EQUIPMENT			
1.1	**Filter Floor**		
	Nozzle slot size	mm	
	Nozzle spacing	mm	
	Nozzle head loss at specified backwash rate	m	Head loss curves to be included
1.2	**Backwash Pumps**		
	Type		
	Manufacturer		
	Model		
	Motor speed	rpm	
	Motor size	kW	
	Duty Point	l/s @ kPa	
		(attached H-Q, ɲ–Q, kW-Q, NPSH-Q curves)	
		0% and 3% NPSH required at duty point	
	Material of pump components	Attach list	
	Pump bearing type		
	Bearing lubrication mechanism		
	Suitable for potable water application		
	Pump and motor dimensions	Attach brochure	
1.3	**Air Blowers**		
	Manufacturer		
	Capacity	ℓ/s	
	Pressure	m	
	Silencer type		
1.4	**Valves, Penstocks and Actuators**		
	Butterfly valve manufacturer		
	Penstock manufacturer		
	Butterfly valve actuator manufacturer		

1. GAC FILTER EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
	Penstock actuator manufacturer		
1.5	**Piping**		
	Manufacturer (Steel Pipes)		
	Material detail		
	Manufacturer (HDPE, PVC Pipes)		
	Material detail		
1.6	**Gac Media**		
1.6.1	**GAC - Supplier 1**		
	Name of GAC Manufacturer		
	Size of GAC (US sieve size) __ x __		Attach sieve analysis
	GAC type (coal, wood, etc.)		
	Iodine number	mg/g	
	Methylene blue	mg/g	
	Surface area	m^2/g	
	Total pore unit volume	cm^3/g	
	Apparent- and particle density	kg/m^3	
	Bed density, backwashed and drained	kg/m^3	
	Wetability	%	
	Moisture content	%	
	Water soluble matter	%	
	Total ash content	%	
	Ph	%	
	Ball-pan hardness number	%	
1.6.2	**GAC - Supplier 2**		
	Name of GAC Manufacturer		
	Size of GAC (US sieve size) __ x __		Attach sieve analysis
	GAC type (coal, wood, etc.)		
	Iodine number	mg/g	
	Methylene blue	mg/g	

1. GAC FILTER EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
	Surface area	m^2/g	
	Total pore unit volume	cm^3/g	
	Apparent- and particle density	kg/m^3	
	Bed density, backwashed and drained	kg/m^3	
	Wetability	%	
	Moisture content	%	
	Water soluble matter	%	
	Total ash content	%	
	Ph	%	
	Ball-pan hardness number	%	
1.6.3	**GAC - Supplier 3**		
	Name of GAC Manufacturer		
	Size of GAC (US sieve size) __ x __		Attach sieve analysis
	GAC type (coal, wood, etc.)		
	Iodine number	mg/g	
	Methylene blue	mg/g	
	Surface area	m^2/g	
	Total pore unit volume	cm^3/g	
	Apparent- and particle density	kg/m^3	
	Bed density, backwashed and drained	kg/m^3	
	Wetability	%	
	Moisture content	%	
	Water soluble matter	%	
	Total ash content	%	
	pH	%	
	Ball-pan hardness number	%	
1.6.4	**GAC - Supplier 4**		
	Name of GAC Manufacturer		
	Size of GAC (US sieve size) __ x __		Attach sieve analysis
	GAC type (coal, wood, etc.)		

1. GAC FILTER EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
	Iodine number	mg/g	
	Methylene blue	mg/g	
	Surface area	m^2/g	
	Total pore unit volume	cm^3/g	
	Apparent- and particle density	kg/m^3	
	Bed density, backwashed and drained	kg/m^3	
	Wetability	%	
	Moisture content	%	
	Water soluble matter	%	
	Total ash content	%	
	pH	%	
	Ball-pan hardness number	%	

2. OZONE GENERATOR EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
2.	**OZONE GENERATOR EQUIPMENT (SUPPLIER 1)**		
2.1	**AMBIENT REQUIREMENTS**		
2.1.1	Maximum operating altitude	MAMSL	
2.1.2	Safe ambient operating temperature		
	Min	°C	
	Max	°C	
2.1.3	Safe ambient operating humidity		
	Average	%	
	Occasional	%	
2.1.4	Heat dissipation to environment (per ozone generator)		
	Min	kW	
	Max	kW	
2.2	**FEED GAS**		
2.2.1	Oxygen feed rate required (per ozone generator)	Include brochure	
	Min	m³/hr @ STP	
	Max	m³/hr @ STP	
2.2.2	Nitrogen concentration for optimal ozone generation		
	Min	%	
	Max	%	
2.2.3	Maximum dewpoint	^{O}C	
2.2.4	Temperature		
	Min	^{O}C	
	Max	^{O}C	
2.2.5	Pressure		
	Min	kPa	
	Max	kPa	
2.3	**COOLING WATER**		
2.3.1	Cooling medium		
2.3.2	Cooling medium inlet temperature		
	Min		

2. OZONE GENERATOR EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
	Max		
2.3.3	Cooling water pressure		
	Min		
	Max		
2.3.4	Temperature rise (ΔT)		
2.3.5	Cooling water quality	Attach requirements	
2.3.6	Cooling water flow rate (per generator) Vessel PSU	 l/s l/s	

Item no.	Description	Units	Technical Particulars
2.	**OZONE GENERATION EQUIPMENT (SUPPLIER 2)**		
2.1	**AMBIENT REQUIREMENTS**		
2.1.1	Maximum operating altitude	MAMSL	
2.1.2	Safe ambient operating temperature		
	Min	°C	
	Max	°C	
2.1.3	Safe ambient operating humidity		
	Average	%	
	Occasional	%	
2.1.4	Heat dissipation to environment (per ozone generator)		
	Min	kW	
	Max	kW	
2.2	**FEED GAS**		
2.2.1	Oxygen feed rate required (per ozone generator)	Include brochure	
	Min	m³/hr @ STP	
	Max	m³/hr @ STP	
2.2.2	Nitrogen concentration for optimal ozone generation		
	Min	%	
	Max	%	
2.2.3	Maximum dewpoint	^{O}C	
2.2.4	Temperature		
	Min	^{O}C	

	Max	^{O}C	
2.2.5	Pressure		
	Min	kPa	
	Max	kPa	
2.3	**COOLING WATER**		
2.3.1	Cooling medium		
2.3.2	Cooling medium inlet temperature		
	Min		
	Max		
2.3.3	Cooling water pressure		
	Min		
	Max		
2.3.4	Temperature rise (ΔT)		
2.3.5	Cooling water quality	Attach requirements	
2.3.6	Cooling water flow rate (per generator) Vessel PSU	 l/s l/s	

3. OZONE GENERATOR			
Item no.	**Description**	**Units**	**Technical Particulars**
3.	**OZONE GENERATOR (SUPPLIER 1)**		
3.1	Maximum ozone production rate per generator at 6%wt ozone at 8%wt ozone at 10%wt ozone at 12%wt ozone (20^{O}C cooling water temperature and 5^{O}C ΔT)	 kg/hr kg/hr kg/hr kg/hr	Attach technical brochure
3.2	Maximum ozone production rate per generator at 6%wt ozone at 8%wt ozone at 10%wt ozone at 12%wt ozone (25^{O}C cooling water temperature and 5^{O}C ΔT)	 kg/hr kg/hr kg/hr kg/hr	Attach technical brochure
3.3	Maximum oxygen consumption per generator at maximum ozone production at 6%wt ozone at 8%wt ozone at 10%wt ozone at 12%wt ozone (20^{O}C cooling water temperature and 5^{O}C ΔT)	 Nm^3/hr Nm^3/hr Nm^3/hr Nm^3/hr	Attach technical brochure
3.4	Maximum oxygen consumption per generator at maximum ozone production at 6%wt ozone at 8%wt ozone at 10%wt ozone at 12%wt ozone (25^{O}C cooling water temperature and 5^{O}C ΔT)	 Nm^3/hr Nm^3/hr Nm^3/hr Nm^3/hr	Attach technical brochure
3.5	Power consumption per generator at 10%wt, 100% ozone production at 10%wt, 75% ozone production at 10%wt, 50% ozone production (20^{O}C cooling water temperature and 5^{O}C ΔT)	 kW kW kW	Attach technical brochure
3.6	Power consumption per generator at 10%wt, 100% ozone production at 10%wt, 75% ozone production at 10%wt, 50% ozone production (25^{O}C cooling water temperature and 5^{O}C ΔT)	 kW kW kW	Attach technical brochure
3.7	Maximum gas regulation turn down range	Ratio	1:_____
3.8	Operating pressure (min – max)	kPa	_____kPa to ____ kPa
3.9	Outlet gas pressure	kPa	_____kPa to ____ kPa
3.10	No of tubes in generator	No	
3.11	Maximum operating voltage	V	

3.12	Power requirements		
	Maximum current	A	
	Voltage	V	
3.13	Power factor at duty point		
3.14	Noise level at maximum gas flow rate	dBA	
3.15	Dimensions (attach brochure)	m	____ m(l)x___m(h)x____m(w)
3.16	Pipe connections (attach brochure) Gas Inlet dia Gas Outlet dia Cooling water inlet dia Cooling water outlet dia	 mm mm mm mm	
3.17	Supply cable voltage	V and A	_____ V and _____ A
3.18	Piping material and size		
	Air pipes	Attach list of pipe sizes and material	
	Oxygen pipes	Attach list of pipe sizes and material	
	Ozone pipes	Attach list of pipe sizes and material	
	Cooling water pipes	Attach list of pipe sizes and material	
3.19	Valve material and types	Attach list of valve types, manufacturer, supplier, material of manufacture	
3.20	Actuator details	Attach list of actuator type, manufacturer, supplier, material of manufacture	
3.21	Corrosion guarantee	No of Years	
	Input/Output list (attach brochure)		

Item no.	Description	Units	Technical Particulars
3.	**OZONE GENERATOR (SUPPLIER 2)**		
3.1	Maximum ozone production rate per generator at 6%wt ozone at 8%wt ozone at 10%wt ozone at 12%wt ozone (20^{O}C cooling water temperature and 5^{O}C ΔT)	 kg/hr kg/hr kg/hr kg/hr	Attach technical brochure
3.2	Maximum ozone production rate per generator at 6%wt ozone at 8%wt ozone at 10%wt ozone at 12%wt ozone (25^{O}C cooling water temperature and 5^{O}C	 kg/hr kg/hr kg/hr kg/hr	Attach technical brochure

Item no.	Description	Units	Technical Particulars
	ΔT)		
3.3	Maximum oxygen consumption per generator at maximum ozone production at 6%wt ozone at 8%wt ozone at 10%wt ozone at 12%wt ozone (20^{O}C cooling water temperature and 5^{O}C ΔT)	 Nm^3/hr Nm^3/hr Nm^3/hr Nm^3/hr	Attach technical brochure
3.4	Maximum oxygen consumption per generator at maximum ozone production at 6%wt ozone at 8%wt ozone at 10%wt ozone at 12%wt ozone (25^{O}C cooling water temperature and 5^{O}C ΔT)	 Nm^3/hr Nm^3/hr Nm^3/hr Nm^3/hr	Attach technical brochure
3.5	Power consumption per generator at 10%wt, 100% ozone production at 10%wt, 75% ozone production at 10%wt, 50% ozone production (20^{O}C cooling water temperature and 5^{O}C ΔT)	 kW kW kW	Attach technical brochure
3.6	Power consumption per generator at 10%wt, 100% ozone production at 10%wt, 75% ozone production at 10%wt, 50% ozone production (25^{O}C cooling water temperature and 5^{O}C ΔT)	 kW kW kW	Attach technical brochure
3.7	Maximum gas regulation turn down range	Ratio	1:_____
3.8	Operating pressure(min – max)	kPa	_____kPa to ____ kPa
3.9	Outlet gas pressure	kPa	_____kPa to ____ kPa
3.10	No of tubes in generator	No	
3.11	Maximum operating voltage	V	
3.12	Power requirements		
	Maximum current	A	
	Voltage	V	
3.13	Power factor at duty point		
3.14	Noise level at maximum gas flow rate	dBA	
3.15	Dimensions (attach brochure)	m	____ m(l)x___m(h)x____m(w)
3.16	Pipe connections (attach brochure) Gas Inlet dia Gas Outlet dia Cooling water inlet dia Cooling water outlet dia	 mm mm mm mm	
3.17	Supply cable voltage	V and A	_____ V and _____ A
3.18	Piping material and size		

Item no.	Description	Units	Technical Particulars
	Air pipes	Attach list of pipe sizes and material	
	Oxygen pipes	Attach list of pipe sizes and material	
	Ozone pipes	Attach list of pipe sizes and material	
	Cooling water pipes	Attach list of pipe sizes and material	
3.19	Valve material and types	Attach list of valve types, manufacturer, supplier, material of manufacture	
3.20	Actuator details	Attach list of actuator type, manufacturer, supplier, material of manufacture	
3.21	Corrosion guarantee	No of Years	
	Input/Output list (attach brochure)		

4. OZONE CONTACTING			
Item no.	**Description**	**Units**	**Technical Particulars**
4. OZONE CONTACTING			
4.1	Diffuser type (main ozone)		
	Size	mm	
	Spacing	mm	
	Gas flow rate	Nm^3/hr	
4.2	Piping material and size	Attach list of pipe sizes and material	
4.3	Valve material and type	Attach list of valve types, manufacture, supplier, materials of manufacture	
4.4	Thermal mass flow meter	Attach detail	
4.5	Ozone contacting instrumentation	Attach detail	
4.6	Recycle pumps (pre-ozone)		
	Type		
	Manufacturer		
	Model		
	Motor speed	rpm	
	Motor size	kW	
	Duty point	l/s @ kPa (attach H-Q, ת-Q, kW-Q, NPSH-Q curves)	
		Add 0% and 3% NPSH required at duty point	
	Material of pump components	Attach list	
	Piping material and size	Attach list of pipe size signs and material	
	Valve material and type	Attach list of valve types, manufacturer, supplier, material of manufacture	
4.7	Thermal mass flow meter	Attach detail	
4.8	Ozone contacting instrumentation	Attach detail	
4.9	Ozone injectors (pre-ozone)		

4. OZONE CONTACTING			
Item no.	**Description**	**Units**	**Technical Particulars**
	Type		
	Manufacturer		
	Maximum O_3 transfer capacity	Nm^3/hr	Attach performance curve
	Maximum hydraulic capacity	m^3/hr	
4.10	Static mixer (pre-ozone)		
	Type		
	Manufacturer		
	Capacity	Nm^3/hr	Attach performance curve
4.11	Recycle pumps (pre-RGSF ozone)		
	Type		
	Manufacturer		
	Model		
	Motor speed	rpm	
	Motor size	kW	
	Duty point	l/s @ kPa (attach H-Q, ת-Q, kW-Q, NPSH-Q curves)	
		Add 0% and 3% NPSH required at duty point	
	Material of pump components	Attach list	
	Piping material and size		
	Valve material and type		
4.12	Thermal mass flow meter	Attach detail	
4.13	Ozone contacting instrumentation	Attach detail	
4.14	Ozone injectors (pre-RGSF ozone)		
	Type		
	Manufacturer		
	Maximum O_3 transfer capacity	Nm^3/hr	Attach performance curves
	Maximum hydraulic capacity	m^3/hr	
4.15	Static mixer		
	Type		
	Manufacturer		
	Capacity	Nm^3/hr	Attach performance curve

4. OZONE CONTACTING			
Item no.	**Description**	**Units**	**Technical Particulars**
4.12	**OZONE MIXING AND DEGASSING (PRE-OZONE)**		
	Manufacturer		
	Size	m	_____m(h)x_____m(diameter)
	Degassing degassing capacity	Nm^3/hr	
	Material		
	Instrumentation	Attach list	
4.13	**OZONE DESTRUCTION**		
	Catalytic converter and heater	Attach Brochure	
	Manufacturer		
	Capacity	Nm^3/hr	
	Fan		
	Manufacturer		
	Capacity	Nm^3/hr	
	Pipework material and size		
	Material size		
	Valves		
	Instrumentation	Attach list	
4.14	**NITROGEN BLEED SYSTEM**		
	Compressor manufacturer		
	Compressor capacity	Nm^3/hr	
	Motor size	kW	
	Drier manufacturer		
	Air Drier type		
	Air Drier capacity	Nm^3/hr	
	Power requirements	kW	
	Instrumentation	Attach list	
4.15	**COOLING WATER PUMPS**		
	Type		
	Manufacturer		
	Model		
	Motor speed	rpm	

4. OZONE CONTACTING			
Item no.	**Description**	**Units**	**Technical Particulars**
	Motor size	kW	
	Duty point	l/s @ kPa (Attach H-Q, ת-Q, kW-Q, NPSH-Q curves)	
		0% and 3% NPSH required at duty point	
	Material of pump components	Attach list	
4.16	**PROCESS PIPING AND PIPE FITTINGS**	Attach list with details of pipe size, material, class, manufacturer	
4.17	**VALVES AND ACTUATORS**		
	Valves	Attach list with details of valve size, type, material, manufacturer and supplier	
	Actuators	Attach list with details of actuator size, type, material, manufacturer and supplier	
4.18	**INSTRUMENT AND CONTROL**		
	Ozone generation control system	Attach brochure and list of instrumentation and equipment detail	
	Ozone dosing control system		
4.19	**OZONE SYSTEM CRITICAL SPARES**	Attach list of recommended critical spares	

5. GAC REMOVAL EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
5.	**GAC REMOVAL EQUIPMENT**		
5.1	**SELF PRIMING GAC SLURRY PUMP**		
	Duty point	l/s @ kPa (attach H-Q, ת-Q, kW-Q, NPSH-Q curves)	
		0% and 3% NPSH required at duty point	
	Power requirements	kW	
5.2	**PIPING**		
	Manufacturer		
	Material		
5.3	**VALVES MANUFACTURER MATERIAL**		

6. WATER QUALITY AND OTHER OZONE RELATED PROCESS INSTRUMENTATION			
Item no.	**Description**	**Units**	**Technical Particulars**
6. WATER QUALITY AND OTHER OZONE RELATED PROCESS INSTRUMENTATION			
6.1	**OXYGEN SUPPLY**		
6.1.1	Dew point analyser	Attach brochure	
6.1.2	Oxygen concentration analyser		
6.2	**NITROGEN BLEED SYSTEM**		
6.2.1	Dew point analyser	Attach brochure	
6.3	**OZONE GENERATION**		
6.3.1	Gas (thermal mass) flow meter	Attach brochure	
6.3.2	Ozone gas concentration analyser (high concentration)		
6.3.3	Ambient ozone gas concentration analyser (low concentration)		
6.4	**OZONE CONTACTING AND MIXING**		
6.4.1	Residual ozone concentration analyser	Attach brochure	
6.4.2	Ozone off-gas concentration analyser (pre destructor)		
6.4.3	Ozone off-gas concentration analyser (post destructor)		
6.4.4	Gas mass flow meter		
6.4.5	UV254 Analyser		
6.5	**HANDHELD INSTRUMENTS**		
6.5.1	Ozone gas concentration analyser	Attach brochure	
6.5.2	Oxygen gas concentration analyser		
6.5.3	Ozone residual concentration analyser		
6.6	**OTHER**		
6.6.1	pH Probes	Attach brochure	
6.6.2	Turbidity Meters		
6.6.3	Residual Chlorine		

7. PUMP EQUIPMENT

Item no.	Description	Units	Technical Particulars
7.	**PUMP EQUIPMENT**		
7.1	**LOW LIFT PUMPS**		
	Type		
	Manufacturer		
	Model		
	Motor speed	rpm	
	Motor size	kW	
	Duty point	l/s @ kPa (attach H-Q, ת-Q, kW-Q, NPSH-Q curves)	
		0% and 3% NPSH required at duty point	
	Material of pump components	Attach list	
	Pump bearing type		
	Bearing lubrication mechanism		
	Suitable for potable water application		
	Pump and motor dimensions	Attach brochure	
7.2	**DAF RECYCLE PUMPS**		
	Type		
	Manufacturer		
	Model		
	Motor speed	rpm	
	Motor size	kW	
	Duty point	l/s @ kPa (attach H-Q, ת-Q, kW-Q, NPSH-Q curves)	
		0% and 3% NPSH required at duty point	
	Material of pump components	Attach list	
	Pump bearing type		
	Bearing lubrication mechanism		
	Suitable for potable water application		
	Pump and motor dimensions	Attach brochure	

7. PUMP EQUIPMENT

Item no.	Description	Units	Technical Particulars
	HIGH LIFT PUMPS		
	Type		
	Manufacturer		
	Model		
	Motor speed	rpm	
	Motor size	kW	
	Duty point	l/s @ kPa (attach H-Q, ת-Q, kW-Q, NPSH-Q curves)	
		0% and 3% NPSH required at duty point	
	Material of pump components	Attach list	
	Pump bearing type		
	Bearing lubrication mechanism		
	Suitable for potable water application		
	Pump and motor dimensions	Attach brochure	

8. SATURATOR			
Item no.	**Description**	**Units**	**Technical Particulars**
8. SATURATOR			
8.1	Manufacturer		
8.2	Supplier		
1.3	Material		
8.4	Ultimate tensile stress	MPa	
8.5	Minimum yield stress	MPa	
8.6	Maximum working stress	MPa	
8.7	Installation contractor		

9. DAF COMPRESSOR			
Item no.	**Description**	**Units**	**Technical Particulars**
9. DAF COMPRESSOR			
9.1	Manufacturer		
9.2	Place of manufacture		
9.3	Supplier		
9.4	Type		
9.5	Model		
9.6	Free air delivery	l/s	
9.7	Air receiver capacity	l	
9.8	Maximum pressure	kPa	
9.9	Speed of rotation	rpm	
9.10	Power absorption at maximum duty	kW	
9.11	Inlet pipe diameter	mm	
9.12	Outlet pipe diameter	mm	
9.13	Electric motors		
9.13.1	Name of manufacture		
9.13.2	Place of manufacturer		
9.13.3	Type of motor		
9.13.4	Type of frame		
9.13.5	Class of insulation		
9.13.6	Speed of rotation	rpm	
9.13.7	Rated output	kW	
9.13.8	Efficiency at:		
(i)	Full load		

9. DAF COMPRESSOR			
Item no.	**Description**	**Units**	**Technical Particulars**
(ii)	¾ load		
9.13.9	Power factor at:		
(i)	Full load		
(ii)	¾ load		
9.14	Installation contractor		

10. RGS FILTER EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
10.	**RGS FILTER EQUIPMENT**		
10.1	**FILTER FLOOR**		
	Nozzle slot size	mm	
	Nozzle spacing	mm	
	Nozzle head loss at specified backwash rate	m	Head loss curves to be included
10.2	**BACKWASH PUMPS**		
	Type		
	Manufacturer		
	Model		
	Motor speed	rpm	
	Motor size	kW	
	Duty Point	l/s @ kPa	
		(attached H-Q, ɲ–Q, kW-Q, NPSH-Q curves)	
		0% and 3% NPSH required at duty point	
	Material of pump components	Attach list	
	Pump bearing type		
	Bearing lubrication mechanism		
	Suitable for potable water application		
	Pump and motor dimensions	Attach brochure	
10.3	**AIR BLOWERS**		
	Manufacturer		
	Capacity	ℓ/s	
	Pressure	m	
	Silencer type		
10.4	**VALVES, PENSTOCKS AND ACTUATORS**		
	Butterfly valve manufacturer		
	Penstock manufacturer		
	Butterfly valve actuator manufacturer		

10. RGS FILTER EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
	Penstock actuator manufacturer		
10.5	**PIPING**		
	Manufacturer (Steel Pipes)		
	Material detail		
	Manufacturer (HDPE, PVC Pipes)		
	Material detail		
10.6	**RGS FILTER MEDIA**		
	Name of RGS Manufacturer		
	Size of RGS (US sieve size) __ x __		Attach sieve analysis
	RGS type (coal, wood, etc.)		
	Iodine number	mg/g	
	Methylene blue	mg/g	
	Surface area	m^2/g	
	Total pore unit volume	cm^3/g	
	Apparent- and particle density	kg/m^3	
	Bed density, backwashed and drained	kg/m^3	
	Wetability	%	
	Moisture content	%	
	Water soluble matter	%	
	Total ash content	%	
	Ph	%	
	Ball-pan hardness number	%	

11. DEATERING EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
11. SLUDGE DEWATERING EQUIPMENT			
11.1	**DEWATERING UNIT – OFFER 1**		
11.1.1	**Manufacturer**		
11.1.1.1	Name		
11.1.1.2	Place of manufacture		
11.1.2	**Design loads**		
11.1.2.1	Design solids loading	kg/h	
11.1.2.2	Design hydraulic loading	m³/h	
11.1.2.3	Maximum solids loading rate	kg/h	
11.1.2.4	Maximum hydraulic loading rate	m³/h	
11.1.3	**Performance (guaranteed)**		
11.1.3.1	Dewatered solids concentration at design load	%	
11.1.3.2	Dewatered solids concentration at maximum solids load	%	
11.1.3.3	Solids capture at design load		
(i)	At min feed concentration	%	
(ii)	At max feed concentration	%	
11.1.3.4	Polymer consumption at design load	g/kgDS	
11.1.3.5	Polymer consumption at maximum solids load	g/kgDS	
11.1.4	**Wash water**		
11.1.4.1	Wash water flow rate	m³/h	
11.1.4.2	Wash water pressure	kPa	
11.1.4.3	Maximum size solids allowed in wash water	mm	
11.1.4.4	Suspended solids in wash water at design load	mg/ℓ	

11. DEATERING EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
11.1.4.5	Suspended solids in filtrate at design load	mg/ℓ	
11.1.5	**Drive unit**		
11.1.5.1	Maximum power absorbed	kW	
11.1.5.2	Drive unit manufacturer		
11.1.5.3	Place of manufacture		
11.1.5.4	Drive unit model No		
11.1.5.5	Drive unit motor size	kW	
11.1.5.11	Ratio installed to absorbed power		
11.1.6	**Bearings**		
11.1.6.1	Bearing type		
11.1.6.2	Bearing life	hrs	
11.1.6.3	Bearing seal		
11.1.6.4	Bearing mounting (internal or external)		
11.1.7	**Motorised lubrication (for units with internally mounted bearings)**		
11.1.7.1	Make and model		
11.1.7.2	Delivery range	mℓ/hr	
11.1.7.3	Total number of grease points served		
11.1.7.4	Make, model and number of distributor units		
11.1.7.5	Operating speed	rpm	
11.2	**DEWATERING UNIT – OFFER 2**		
11.2.1	**Manufacturer**		
11.2.1.1	Name		
11.2.1.2	Place of manufacture		

11. DEATERING EQUIPMENT

Item no.	Description	Units	Technical Particulars
11.2.2	**Design loads**		
11.2.2.1	Design solids loading	kg/h	
11.2.2.2	Design hydraulic loading	m³/h	
11.2.2.3	Maximum solids loading rate	kg/h	
11.2.2.4	Maximum hydraulic loading rate	m³/h	
11.2.3	**Performance (guaranteed)**		
11.2.3.1	Thickened solids concentration at design load	%	
11.2.3.2	Thickened solids concentration at maximum solids load	%	
11.2.3.3	Solids capture at design load	%	
(i)	At min feed concentration	%	
(ii)	At max feed concentration	%	
11.2.3.4	Polymer consumption at design load	g/kgDS	
11.2.3.5	Polymer consumption at maximum solids load	g/kgDS	
11.2.4	**Wash water**		
11.2.4.1	Wash water flow rate	m³/h	
11.2.4.2	Wash water pressure	kPa	
11.2.4.3	Maximum size solids allowed in wash water	mm	
11.2.4.4	Suspended solids in wash water at design load	mg/ℓ	
11.2.4.5	Suspended solids in filtrate at design load	mg/ℓ	
11.2.5	**Drive unit**		
11.2.5.1	Maximum power absorbed	kW	
11.2.5.2	Drive unit manufacturer		
11.2.5.3	Place of manufacture		

11. DEATERING EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
11.2.5.4	Drive unit model No		
11.2.5.5	Drive unit motor size	kW	
11.2.5.6	Ratio installed to absorbed power		
11.2.6	**Bearings**		
11.2.6.1	Bearing type		
11.2.6.2	Bearing life	hrs	
11.2.6.3	Bearing seal		
11.2.6.4	Bearing mounting (internal or external)		
11.2.7	**Motorised lubrication (for units with internally mounted bearings)**		
11.2.7.1	Make and model		
11.2.7.2	Delivery range	mℓ/hr	
11.2.7.3	Total number of grease points served		
11.2.7.4	Make, model and number of distributor units		
11.2.7.5	Operating speed	rpm	
11.3	**DEWATERING UNIT – OFFER 3**		
11.3.1	**Manufacturer**		
11.3.1.1	Name		
11.3.1.2	Place of manufacture		
11.3.2	**Design loads**		
11.3.2.1	Design solids loading	kg/h	
11.3.2.2	Design hydraulic loading	m³/h	
11.3.2.3	Maximum solids loading rate	kg/h	
11.3.2.4	Maximum hydraulic loading rate	m³/h	

11. DEATERING EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
11.3.3	**Performance (guaranteed)**		
11.3.3.1	Thickened solids concentration at design load	%	
11.3.3.2	Thickened solids concentration at maximum solids load	%	
11.3.3.3	Solids capture at design load	%	
(i)	At min feed concentration	%	
(ii)	At max feed concentration	%	
11.3.3.4	Polymer consumption at design load	g/kgDS	
11.3.3.5	Polymer consumption at maximum solids load	g/kgDS	
11.3.4	**Wash water**		
11.3.4.1	Wash water flow rate	m^3/h	
11.3.4.2	Wash water pressure	kPa	
11.3.4.3	Maximum size solids allowed in wash water	mm	
11.3.4.4	Suspended solids in wash water at design load	mg/ℓ	
11.3.4.5	Suspended solids in filtrate at design load	mg/ℓ	
11.3.5	**Drive unit**		
11.3.5.1	Maximum power absorbed	kW	
11.3.5.2	Drive unit manufacturer		
11.3.5.3	Place of manufacture		
11.3.5.4	Drive unit model No		
11.3.5.5	Drive unit motor size	kW	
11.3.5.6	Ratio installed to absorbed power		
11.3.6	**Bearings**		
11.3.6.1	Bearing type		

11. DEATERING EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
11.3.6.2	Bearing life	hrs	
11.3.6.3	Bearing seal		
11.3.6.4	Bearing mounting (internal or external)		
11.3.7	**Motorised lubrication (for units with internally mounted bearings)**		
11.3.7.1	Make and model		
11.3.7.2	Delivery range	mℓ/hr	
11.3.7.3	Total number of grease points served		
11.3.7.4	Make, model and number of distributor units		
11.3.7.5	Operating speed	rpm	
11.4	**POLYELECTOLYTE MAKE-UP SYSTEM**		
11.4.1	**Dosing tank**		
11.4.1.1	Capacity	m^3	
11.4.1.2	Dimensions		
11.4.1.3	Materials & corrosion protection		
11.4.2	**Transfer pumps**		
11.4.2.1	Number		
11.4.2.2	Type		
11.4.2.3	Manufacturer		
11.4.2.4	Country of manufacture		
11.4.2.5	Model		
11.4.2.6	Speed of rotation	rpm	
11.4.2.7	Delivery	m^3/h	
11.4.2.8	Head	m	

11. DEATERING EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
11.4.2.9	Type of over pressure sensor		
11.4.2.10	Power absorbed	kW	
11.4.2.11	Material		
(i)	Stator		
(ii)	Rotor		
11.4.2.11	Motor		
(i)	Manufacturer		
(ii)	Place of manufacture		
(iii)	Power	kW	
(iV)	Speed	rpm	
11.4.2.13	Overall mass of complete pumps unit	kg	
11.4.3	**Make-up water**		
11.4.3.1	Diameter	mm	
11.4.3.2	Material		
11.4.3.3	Coupling		
11.4.3.4	Valve type		
11.4.3.5	Valve make		
11.4.3.6	Valve material		
11.5	**GUARANTEED PERFORMANCE (OFFER 1)**		
11.5.1	Dewatering press/screens	No	
11.5.2	Guaranteed polyelectrolyte consumption	g/kgDS	
11.5.4	Guaranteed solids capture	%	
11.5.5	Guaranteed thickened sludge concentration	%	

11. DEATERING EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
11.6	**FEED PUMPS**		
	Type		
	Manufacturer		
	Model		
	Motor speed	rpm	
	Motor size	kW	
	Duty point (attach H-Q, ת-Q, kW-Q, NPSH-Q curves) 0% and 3% NPSH required at duty point	l/s @ kPa	
	Material of pump components	Attach list	
	Pump bearing type		
	Bearing lubrication mechanism		
	Suitable for potable water application		
	Pump and motor dimensions	Attach brochure	

12. CHEMICAL DOSING EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
12. CHEMICAL DOSING EQUIPMENT			
12.1	**Ferric chloride Dosing Pumps**		
12.1.1	Manufacturer		
12.1.2	Supplier		
12.1.3	Type		
12.1.4	Operating Range	ℓ/s	
12.2	**Bulk Storage Tanks - ferric**		
12.2.1	Manufacturer		
12.2.2	Supplier		
12.2.3	Type		
12.2.4	Design SG		
12.2.5	Installation Contractor		

13. ELECTRICAL ACTUATORS			
Item no.	**Description**	**Units**	**Technical Particulars**
13. ELECTRICAL ACTUATORS			
13.1	**General Data**		
13.1.1	Manufacturer		
13.1.2	Supplier		
13.1.3	Model		
13.1.4	Type		
13.1.5	Country of Origin		
13.1.6	Duration of open/close cycle	min	
13.1.7	Corrosion protection gearbox		
(i)	Inner		
(ii)	Outer		
(iii)	Finishing		
13.1.8	Max torque required by valve		
13.1.9	Available torque transmitted by actuator		
13.1.10	Unbalanced pressure at max torque		
13.1.11	Enclosure rating		
13.1.12	Voltage rating		
13.1.13	Starting current		

14. GENERAL PROCESS EQUIPMENT			
Item no.	**Description**	**Units**	**Technical Particulars**
14. GENERAL PROCESS INSTRUMENTATION			
14.1	PRESSURE GAUGES	Attach brochure	
14.2	PRESSURE TRANSMITTERS		
14.3	GAS FLOW METERS (THERMAL MASS)		
14.4	FLOW METERS (LIQUID)		
14.5	TEMPERATURE TRANSMITTERS		
14.6	LEVEL TRANSMITTERS		

15. SPARE PARTS			
Item no.	**Description**	**No of units**	**Technical Particulars**
15. CRITICAL SPARE PARTS			
15.1			
15.2			
15.3			
15.4			
15.4			
15.5			
15.6			
15.7			
15.8			
15.9			
15.10			

TENDERER

Signature : .....

Name : .....

Duly authorised to sign on behalf of:

.....

Telephone : .....

Fax : ..... Date : .....

RUSTENBURG WATER SERVICES TRUST

BID No RLM/RWST/OMM/0103/2024/25

RE-ADVERT: UPGRADE AND EXTENSION OF BOSPOORT WATER TREATMENT WORKS – MECHANICAL AND ELECTRICAL WORKS

T2.3 TECHNICAL SCHEDULES

T2.3.2 Electrical

T2.3.2 ELECTRICAL TECHNICAL SCHEDULES

Section **Description** **Page**

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MINIATURE SUBSTATIONS				
Item no.	**Description**	**Units**	**Specified**	**Proposed**
1 GENERAL				
1.1	Manufacturer			
1.2	Country of Origin			
1.3	**Mini Sub Rating**			
1.3.1	Power Rating	*kVA*	1000	
1.3.2	Number of Phases		3	
1.3.3	Frequency - As per System Electrical			
	Conditions	*Hz*	50	
1.4	**Voltages**			
1.4.1	Primary Voltage	*kV*	22000	
1.4.2	Secondary Voltage	*kV*	420	
1.5	**Insulation Level**			
1.5.1	Primary Voltage	*kV*	128	
1.5.2	Secondary Voltage	*kV*	SABS Rating	
1.6	Electrical System Operating Parameters		See Project Specs	
1.7	Physical and Climatic Site Conditions		Outdoors and	
			Non corrosive conditions	
2 CONSTRUCTION AND FITTINGS				
2.1	Minisub Type	*A/B*	B	
2.2	Minisub Design (Modular/Unitary)		Unitary	
2.3	Enclosure Material		2mm 3CR12	
2.4	**Base**			
2.4.1	Base type			
2.4.2	Is a base with removable section required	*Yes/No*	Yes	
2.4.3	Black epoxy tar paint required	*Yes/No*	Yes	
2.5	Are roof lifting lugs required	*Yes/No*	Yes	

MINIATURE SUBSTATIONS				
Item no.	**Description**	**Units**	**Specified**	**Proposed**
2.6	Padlock protection facility	*Yes/No*	Yes	
2.7	10mm Allen cap screw for doors	*Yes/No*	Yes	
3 MV COMPARTMENT				
3.1	Earth fault indicators	*Yes/No*	Yes	
3.2	**Cables to be Teminated**			
3.2.1	Three Core or Single Core		Three core	
3.2.2	Type of cable (PILC/XLPE)		XLPE	
3.2.3	Cable size	*mm^2*	As specified	
3.2.4	Cable Support (Gland plate / cable clamps)			
3.3	**Switchgear**			
3.3.1	Manufacturer		Refer to Project	
			Specification [PS]	
3.3.2	Country of Origin			
3.3.3	Configuration			
3.3.4	Voltage present indication system on all			
	switching devices	*Yes/No*	Yes	
3.3.5	Insulating Medium	*SF6 /*	SF6	
		Vacuum		
3.3.6	Auxiliary contacts required	*Yes/No*	Yes	
3.3.7	**Local feeder (T-off) protection**			
3.3.7.1	Circuit breaker or fuse-switch-disconnector		Circuit Breaker	
3.3.7.2	Rating	*A*	200	
3.3.7.3	CB type	*SF6 /*		
		Vacuum	SF6	
3.3.8	**Ring Switching Device**			
3.3.8.1	Circuit breaker or fuse-switch-disconnector		Fuse-Switch-	
			Disconnector	

MINIATURE SUBSTATIONS				
Item no.	**Description**	**Units**	**Specified**	**Proposed**
3.3.8.2	Rating	*A*	630	
3.3.8.3	Fuse-switch-disconnector type	*SF6 /*		
		Vacuum	SF6	
4	**TRANSFORMER COMPARTMENT**			
4.1	Manufacturer			
4.2	Country of Origin			
4.3	Transformer Type	*Oil-type/*	Oil Type	
		Dry-type		
4.4	Oil-level gauge	*Yes/No*	Yes	
4.5	Indicating Thermometer	*Yes/No*	No	
4.6	**Transformer Rating**			
4.6.1	Continuous Overload Capacity	*%*	10	
4.6.2	Impedance	*%*	Maximum 5.1%	
4.6.3	Vector Group		Dyn 11	
4.6.4	Cooling method	*ONAN /*		
		ONAF	ONAN	
4.6.4	**Losses**			
4.6.4.1	No-load Losses	*W*		
4.6.4.2	Full load Losses	*W*		
4.7	**Tapping Method**			
4.7.1	Number of Taps	*No*	5	
4.7.2	Tapping Range	*%*	0±2.5; ±5	
4.7.3	Switch or Bolted Links	*Off-load*	Switch	
4.8	**Terminations**			
4.8.1	**Medium Voltage Bushings**			
4.8.1.1	Material			
4.8.1.2	Creepage Distance	*mm*		

MINIATURE SUBSTATIONS				
Item no.	**Description**	**Units**	**Specified**	**Proposed**
4.8.1.3	Basic Insulation Level (BIL)	*kV*	128	
4.8.1.4	Type		C	
4.8.2	**Low Voltage Bushings**			
4.8.2.1	Material			
4.8.2.2	Creepage Distance	*mm*		
4.8.2.3	Basic Insulation Level (BIL)	*kV*	SABS Rating	
5	**LV COMPARTMENT**			
5.1	Separate LV earth bar required	*Yes/No*	Yes	
5.2	Main LV circuit breaker	*Yes/No*	Yes	
5.3	Main LV switch disconnector	*Yes/No*	No	
5.4	Number of LV feeders		Refer to PS	
5.5	**LV feeder protection**			
5.5.1	MCCBs or fuses to be used		Refer to PS	
5.5.2	Rating of protection for each feeder	*A*	Refer to PS	
5.6	**LV Metering**			
5.6.1	Main LV Meter required	*Yes/No*	Refer to PS	
5.6.2	Manufacturer and model Number		Refer to PS	
5.6.3	Metering on each feeder required	*Yes/No*	Refer to PS	
5.6.4	Manufacturer and model Number		Refer to PS	
5.6.5	Equipment Specification		Refer to PS	
6	**CONFIRMATION OF MINI SUB TESTS CONDUCTED**			
6.1	Minisub routine test certificate	*Yes/No*	Yes	
6.2	Minisub type test certificate	*Yes/No*	Yes	
6.3	**Transformer Type Tested to IEC 60076-11**			
a	Temperature-rise Test (IEC 60076-2)	*Yes / No*	Yes	
b	Dielectric Type Test (IEC 60076-3)	*Yes / No*	Yes	

MINIATURE SUBSTATIONS				
Item no.	**Description**	**Units**	**Specified**	**Proposed**
c	Determination of Sound Level (IEC 60076-10) for each method of cooling for which a guaranteed sound level is specified	*Yes / No*	Yes	
6.4	**Transformer Routine Test to be Conducted**			
a	Measurement of winding resistance	*Yes / No*	Yes	
b	Measurement of voltage ratio and check of phase displacement	*Yes / No*	Yes	
c	Measurement of short-circuit impedance and load loss	*Yes / No*	Yes	
d	Measurement of no-load loss and current	*Yes / No*	Yes	
e	Dielectric routine test (IEC 60076-3)	*Yes / No*	Yes	
f	Test on on-load tap-changers, where appropriate	*Yes / No*	Yes	
g	Leak testing with pressure for liquid-immersed transformers (tightness test)	*Yes / No*	Yes	
h	Tightness tests and pressure tests for tanks for gas-filled transformers (refer to 60076-15)	*Yes / No*	Yes	
i	Check for the ratio and polarity of built-in current transformers	*Yes / No*	Yes	
j	Check of core and frame insulation for liquid immersed transformers with core or frame insulation	*Yes / No*	Yes	
7	**LABELLING AND MARKING TO SANS 1029**	*Yes/No*	Yes	
8	**RATING PLATES**			
8.1	Rating plates to SANS 1029	*Yes/No*	Yes	
9	**OVERALL DIMENSIONS**		***1000kVA***	**800kVA**
9.1	Length	*mm*		
9.2	Width	*mm*		
9.3	Height	*mm*		
9.4	Total mass	*kg*		
10	**FINISHING**			
10.1	Colour of Minisub to SANS 1091		C12 - Avocado Green	
10.2	Paintwork finish		Matt	

MINIATURE SUBSTATIONS				
Item no.	**Description**	**Units**	**Specified**	**Proposed**
11	**DATA SHEET**	*Yes/No*	Yes	

MV CABLES AND CABLE SYSTEMS				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1	**MEDIUM VOLTAGE CABLES**			
1.1	Manufacturer		SABS Approved	
1.2	Country of Origin		RSA	
1.3	Operating Voltage	*kV*	22	
1.4	Number of Cores	*No*	3	
1.5	Size	*mm^2*	Various	
1.6	Conductor Type	*Cu/Al*	Cu	
1.7	Insulation	*PILC/ XLPE*	XLPE	
1.8	Armouring		SWA	
1.9	Serving		PVC	
1.12	Bear SANS Mark	*Yes/No*	Yes	
2	**MEDIUM VOLTAGE CABLE TERMINATION KIT**			
2.1	Manufacturer		SABS Approved	
2.2	Country of Origin		RSA	
2.3	Operating Voltage	*kV*	22	
2.4	Size	*mm^2*	As Specified	
2.5	Cable Conductors	*Cu/Al*	Cu	
2.6	Type of Lugs		Shear-off	
2.7	Full Earth Kit required	*Yes/No*	Yes	
2.8	Heat Shrink Type required	*Yes/No*	Yes	
2.9	Complete Kit by one Manufacturer	*Yes/No*	Yes	
2.10	Type Test Certificate	*Yes/No*	Yes	
2.11	Bear SANS Mark	*Yes/No*	Yes	

MV CABLES AND CABLE SYSTEMS				
Item no.	**Description**	**Units**	**Specified**	**Offered**
3	**MEDIUM VOLTAGE CABLE JOINT KIT**			
3.1	Manufacturer		SABS Approved	
3.2	Country of Origin		RSA	
3.3	Operating Voltage	*kV*	22	
3.4	Size	*mm²*	As Specified	
3.5	Cable Conductors	*Cu/Al*	Cu	
3.6	Type of Ferrules		Shear-off	
3.7	Full Earth Kit required	*Yes/No*	Yes	
3.8	Type required (Heatshrink / Cast Iron)		Heatshrink	
3.9	Complete Kit by one Manufacturer	*Yes/No*	Yes	
3.10	Type Test Certificate	*Yes/No*	Yes	
3.11	Bear SANS Mark	*Yes/No*	Yes	
4	**INSTALLATION**			
4.1	Depth	*mm*	1000	
4.2	Outdoor Cable Markers [Refer to Particular Specification]	*Yes/No*	Yes	
4.3	Cable Concrete Slabs [Refer to Particular Specification]	*Yes/No*	Yes	
5	**DATA SHEET OF ALL CABLES**	*Yes/No*	Yes	

LV CABLE SYSTEMS FOR MOTOR AND EQUIPMENT				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1	**LOW VOLTAGE CABLES**			
1.1	Manufacturer		SABS Approved	
1.2	Country of Origin		RSA	
1.3	Operating Voltage	*V*	600/1000	
1.4	Number of Cores	*No*	Refer to Project Specs and BOQ	
1.5	Size	*mm²*		

LV CABLE SYSTEMS FOR MOTOR AND EQUIPMENT				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1.6	Conductor Type	*Cu/Al*		
1.7	Cable Type			
1.8	Full Load Current	*A*		
1.9	Armouring	*Yes/No*	Yes, SWA	
2	**CABLE LADDER**			
2.1	Manufacturer		SABS Approved	
2.2	Country of Origin		RSA	
2.3	Type			
2.4	Material		Galvanised	
2.5	Duty	Heavy / Medium	Heavy	
2.6	Application		LV cables	
3	**WIRED MESH**			
3.1	Manufacturer		SABS Approved	
3.2	Country of Origin		RSA	
3.3	Type			
3.4	Material		Galvanised	
3.5	Duty	Heavy / Medium	Heavy	
3.6	Application		LV cables	
4	**INSTALLATION**			
4.1	Depth	*mm*	750	
4.2	Outdoor Cable Markers [Refer to Particular Specification]	*Yes/No*	Yes	
4.3	Cable Concrete Slabs [Refer to Particular Specification]	*Yes/No*	Yes	
5	**DATA SHEET OF ALL CABLES**	*Yes/No*	Yes	

LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES - MCCs and Distribution Boards				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1 ASSEMBLY CONSTRUCTION				
1.1	Manufacturer			
1.2	Access	*Back/Front/ Side*	Refer to PS	
			Various	
1.3	Doors / Removable Panels		Doors	
1.4	Hinges	*Yes / No*	Yes	
1.5	Hinges - Type		Refer to project and particular specification [PS - Project specification]	
1.6	Hinges - Material			
1.7	Stays at 95˚ opening	*Yes / No*		
1.8	Door Locks	*Yes / No*		
1.9	Door Locks - Type			
1.10	Door Locks - Material			
1.11	Door Interlock per compartment	*Yes / No*	Yes	
1.12	Cable Entry	*Top / Bottom*	Bottom	
1.13	Size of Panel:			
1.13.1	*Height*	*mm*	Max 2100	
1.13.2	*Length*	*mm*		
1.13.3	*Width*	*mm*		
1.14	Spare Space Required	*%*	>=	
1.15	Estimated Weight	*kg*		
1.16	Type Tested with Stated Deviations to SANS 1973-1, 3 & 8	*Yes/No*	Yes	
1.17	Deviations from original Type Tested Assembly:	*Specify*		
1.18	Type Test Certificate Required	*Yes / No*	Yes	
1.19	Motor Starter Circuits	*Withdrawable / Fixed*	Fixed	
1.20	Ingress Protection (doors closed)	*IP*	Refer to PS	
1.21	Form of Internal Separation		Refer to PS	

LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES - MCCs and Distribution Boards				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1.22	Method of Installation: *Floor standing / Wall mounted / Flush / Pedestal Mounted / Kiosk / Architrave / Surface Mounted*		Floor Standing	
1.23	Material of Construction: 2*mm Mild Steel* / 2.0mm Mild Steel / Electro Galvanized / Stainless Steel / 3CR12 / Fibre Glass		3CR12	
1.24	Epoxy Powder Coated	*Yes / No*	Yes	
1.25	Incomer Section Required	*Yes / No*	Yes	
1.26	Essential Section Required	*Yes / No*	Yes	
1.27	UPS Section Required	*Yes / No*	Yes	
1.28	Colour of Assembly:			
1.28.1	*Doors*		electric orange	
1.28.2	*Normal Section*		electric orange	
1.28.3	*Essential Section*		Purple	
1.28.4	*UPS Section*		Purple	
2 COMPONENTS				
2.1	**Busbars**			
2.1.1	Material		Copper	
2.1.2	Tinned	*Yes / No*	Yes	
2.1.3	Current Density	*A/mm²*	As type test require	
2.2	**Air Circuit Breakers**	-	-	
2.2.1	Manufacturer			
2.2.2	Type		Fixed	
2.2.3	Model			
2.2.4	Rated Current	*A*		
2.2.5	Service short-circuit breaking capacity (Ics)	*kA*		
2.2.6	Overload release		Electronic	
2.2.7	Short-circuit release		Electronic	
2.2.8	Motorised	*Yes/No*	Refer to PS	

LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES - MCCs and Distribution Boards				
Item no.	**Description**	**Units**	**Specified**	**Offered**
2.3	**Moulded Case Circuit Breakers**	-	-	
2.3.1	Manufacturer			
2.3.2	Type		Fixed	
2.3.3	Model			
2.3.4	Rated Current	*A*		
2.3.5	Service short-circuit breaking capacity (Ics)	*kA*		
2.3.6	Overload release		Refer to PS	
2.3.7	Short-circuit release		Refer to PS	
2.4	**Miniature Circuit Breakers**	-	-	
2.4.1	Manufacturer			
2.4.2	Type			
2.4.3	Model			
2.4.4	Rated Current	*A*	Refer to PS	
2.4.5	Service short-circuit breaking capacity (Ics)	*kA*	Refer to PS	
2.4.6	Tripping Curve		Refer to PS	
2.5	**Fuse-Switch-Disconnector**	-	-	
2.5.1	Manufacturer			
2.5.2	Model			
2.6	**High Rupture Capacity (HRC) Fuse Links**	-	-	
2.6.1	Manufacturer			
2.6.2	Model			
2.7	**Contactors**	-	-	
2.7.1	Manufacturer			
2.7.2	Model			

LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES - MCCs and Distribution Boards				
Item no.	**Description**	**Units**	**Specified**	**Offered**
2.7.3	Contactor rating		Refer to PS	
2.7.4	Coordination		Type 2	
2.8	**Overload Relays**	-	-	
2.8.1	Manufacturer			
2.8.2	Type			
2.8.3	Model			
2.8.4	Rated Current	*A*	Refer to PS	
2.8.5	Resettable from front of Panel	*Yes / No*	Refer to PS	
2.9	**Miniature Relays**	-	-	
2.9.1	Manufacturer			
2.9.2	Model			
2.10	**Pushbutton and Selector Switches**	-	-	
2.10.1	Manufacturer			
2.10.2	Model			
2.11	**Indicator Lamps**	-	-	
2.11.1	Manufacturer			
2.11.2	Model			
2.12	**Surge Arrestors**	-	-	
2.12.1	Power Circuits - Manufacturer			
2.12.2	Power Circuits - Model			
2.12.3	Power Circuits - Rating	*kA*	Refer to PS	
2.12.4	Remote Indication to PLC	*Yes / No*	No	
2.12.5	Control Circuits - Manufacturer		Refer to PS	
2.12.6	Control Circuits - Model		Refer to PS	

LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES - MCCs and Distribution Boards				
Item no.	**Description**	**Units**	**Specified**	**Offered**
2.12.7	Remote Indication to PLC	*Yes / No*	No	
3	**POWER FACTOR CORRECTION**			
3.1	Controller			
3.1.1	Manufacturer			
3.1.2	Model			
3.2	Capacitors		Refer to PS	
3.2.1	Manufacturer		Refer to PS	
4	**ACTIVE HARMONIC FILTER (if applicable)**			
4.1	Manufacturer			
4.2	Model			
4.3	Type			
5	**SOFT STARTERS**			
5.1	Manufacturer			
5.2	Model			
5.3	Integrated bypass contactor	*Yes / No*	Yes	
6	**FIELD E-STOP/START LOCAL CONTROL STATIONS**			
6.1	Method of Installation: Wall mounted / Flush / Pedestal Mounted		Pedestal	
6.2	Manufacturer			
6.3	Model			
6.4	Height above final ground level	*mm*	See Project Specs	
6.5	Keyswitch Required	*Yes / No*	No	
6.6	Canopy required	*Yes / No*	Yes	
6.7	Material		304 S/S	

LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES - MCCs and Distribution Boards				
Item no.	**Description**	**Units**	**Specified**	**Offered**
6.8	IP rating	*IP*	Refer to Particular specification	
7	**AIR CONDITIONING MCC'S ROOM**			
7.1	Manufacturer			
7.2	Model			
7.3	Rating			
7.4	Type			
7.5	Number of units			
8	**DATA SHEET**	*Yes/No*		

LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES - LOCAL CONTROL PANELS				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1	**GENERAL**			
1.1	Distribution Board Manufacturer			
1.2	Control Voltage	230V/ 24VDC	Refer to PS	
2	**CONSTRUCTION REQUIREMENTS**			
2.1	Steel Work Manufacturer			
2.2	Form of Internal Separation		1	
2.3	Material of Construction		3CR12	
2.4	Ingress Protection (doors closed)	*IP*	54	
2.5	Method of Installation		Floor	
2.6	Epoxy Powder Coated	*Yes / No*	Yes	
2.7	Colour of Assembly			
2.8	Size of Panel	*HxWxD*		
2.9	Spare Space Required	*%*	5	
2.10	Access	*Back / Front / Side*	Front	
2.11	Cable Entry	*Top / Bottom*	Top	
2.12	Doors / Removable Panels		Doors	
2.13	Door Locks	*Yes / No*	Yes	
2.14	Door Locks - Type			
2.15	Door Locks - Material		Refer to PS	
2.16	Incomer Section Required	*Yes / No*	Yes	
2.17	Corrosion protection		Yes	
2.18	Gland Plates		3CR12, Not painted	
3	**ELECTRICAL COMPONENTS**			
3.1	**Moulded Case Circuit Breakers**	-	-	
3.1.1	Manufacturer		Refer to PS	
3.1.2	Type		Refer to PS	

LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES - LOCAL CONTROL PANELS				
Item no.	**Description**	**Units**	**Specified**	**Offered**
3.1.3	Model		Refer to PS	
3.1.4	Rated Current	*A*	Refer to PS	
3.1.5	Service short-circuit breaking capacity (Ics)	*kA*	Refer to PS	
3.1.6	Overload release		Refer to PS	
3.1.7	Short-circuit release		Refer to PS	
3.2	**Miniature Circuit Breakers**	-	-	
3.2.1	Manufacturer		Refer to PS	
3.2.2	Type		Refer to PS	
3.2.3	Model		Refer to PS	
3.2.4	Rated Current	*A*	Refer to PS	
3.2.5	Service short-circuit breaking capacity (Ics)	*kA*	Refer to PS	
3.2.6	Tripping Curve		Refer to PS	
3.3	**Fuse-Switch-Disconnector**	-	-	
3.3.1	Manufacturer	Refer to PS	Refer to PS	
3.3.2	Model	Refer to PS	Refer to PS	
3.4	**High Rupture Capacity (HRC) Fuse Links**	-	-	
3.4.1	Manufacturer		Refer to PS	
3.4.2	Model		Refer to PS	
3.5	**Surge Arrestors**	-	-	
3.5.1	Power Circuits - Manufacturer	Refer to PS	Refer to PS	
3.5.2	Power Circuits - Model	Refer to PS	Refer to PS	
3.5.3	Power Circuits - Rating	*kA*	Refer to PS	
3.5.4	Remote Indication	*Yes / No*	Refer to PS	
3.5.5	Control Circuits - Manufacturer		Refer to PS	

LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES - LOCAL CONTROL PANELS				
Item no.	**Description**	**Units**	**Specified**	**Offered**
3.5.6	Control Circuits - Model		Refer to PS	
3.5.7	Remote Indication	*Yes / No*	Refer to PS	
3.6	**Contactors**	-	-	
3.6.1	Manufacturer		Refer to PS	
3.6.2	Model		Refer to PS	
3.6.3	Contactor rating		Refer to PS	
3.6.4	Coordination		Type 2	
3.7	**Overload Relays**	-	-	
3.7.1	Manufacturer		Refer to PS	
3.7.2	Type		Refer to PS	
3.7.3	Model		Refer to PS	
3.7.4	Rated Current	*A*	Refer to PS	
3.7.5	Resetable from front of Panel	*Yes / No*	Yes	
3.8	**Miniature Relays**	-	-	
3.8.1	Manufacturer		Refer to PS	
3.8.2	Model		Refer to PS	
3.9	**Control switches and pushbuttons**	-	-	
3.9.1	Manufacturer			
3.9.2	Model			
3.10	**Indicating Lamps**	-	-	
3.10.1	Manufacturer		Refer to PS	
3.10.2	Model		Refer to PS	
3.10.3	Type		LED	

LV SWITCHGEAR AND CONTROLGEAR ASSEMBLIES - LOCAL CONTROL PANELS				
Item no.	**Description**	**Units**	**Specified**	**Offered**
3.11	**Control-Circuit and auxiliary supply transformer**			
3.11.1	Manufacturer		Refer to PS	
4	**FIELD E-STOP/START LOCAL CONTROL STATIONS**			
4.1	Method of Installation		Refer to PS	
4.2	Material of Construction		Refer to PS	
4.3	Manufacturer		Refer to PS	
4.4	Keyswitch Required	*Yes / No*	No	
4.5	IP rating	*IP*	refer to the particular	
			specification	
5	**DATA SHEET**	*Yes/No*	Yes	

VARIABLE FREQUENCY DRIVES : <100kW				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1	**GENERAL**			
1.1	Manufacturer			
1.2	Model			
1.3	Place of manufacture			
1.4	Expected life (for spares availability)	*Years*		
2	**ELECTRICAL SERVICE CONDITIONS**			
2.1	Normal service conditions varied in Project Specification	*Yes/No*	*Refer to conditions of Contract*	
2.2	Unusual electrical service conditions specified	*Yes/No*	*No*	
2.3	Supply network characteristics			
2.3.1	Voltage (nominal)	*V*	400	
2.3.2	Frequency	*Hz*	*50*	
3	**ENVIRONMENTAL SERVICE CONDITIONS**			
3.1	Standard climatic conditions varied in Project Specification	*Yes/No*	*No*	
3.2	Forced ventilation or air conditioning in VFC room	*FV/AC*	*AC*	
3.3	Unusual mechanical installation conditions specified	*Yes/No*	*No*	
3.4	Unusual environmental service conditions specified	*Yes/No*	*No*	
3.5	Airflow required per VFC	*m^3/s*		
3.6	Heatload per VFC	*kW*		
4	**LOAD DETAILS**			
4.1	Type of motor-driven load		*Various*	
4.2	Load torque characteristic			
4.3	Number of operation quadrants			
4.4	Dynamic braking required			
4.5	Operating speed range		*As per mechanical specification*	

VARIABLE FREQUENCY DRIVES : <100kW				
Item no.	**Description**	**Units**	**Specified**	**Offered**
5	**CONVERTER TRANSFORMER**			N/A
5.1	Type (oil-filled or dry)			
5.2	Number of secondary windings			
5.3	Primary rated voltage	*V*		
5.4	Secondary rated voltage	*V*		
5.5	Rated power	*kVA*		
5.6	Free-standing (FS) or integral (I) to VFC	*FS/I*		
5.7	No-load losses	*W*		
5.8	Load losses	*W*		
6	**CONVERTER CONFIGURATION**			
6.1	Form of converter (package/chassis/ cabinet unit)		*Package*	
6.2	Rectifier type: diode- or active front end (DFE/AFE)		*DFE*	
6.3	Rectifier pulse number		*12*	
6.4	Bypass/redundancy arrangement specified	*Yes/No*	*No*	
6.5	Input air circuit-breaker	*Yes/No*	*No*	
6.6	Input switch-disconnector	*Yes/No*	*No*	
6.7	Input semi-conductor fuses	*Yes/No*	*Yes*	
6.8	Input contactor	*Yes/No*	*Yes*	
6.9	Input earthing switch	*Yes/No*	*No*	
7	**CONVERTER FILTERS**			
7.1	Line-side reactor	*Yes/No*	*Yes for >20kW*	
7.2	Line-side reactor relative short-circuit voltage	*%*		
7.3	Line harmonic filters (LHF)	*Yes/No*	Yes	
7.4	LHF free-standing (FS) or integral to VFC (I)	*FS/I*		
7.5	Motor-side reactor	*Yes/No*	Yes	
7.6	Motor-side dv/dt filter	*Yes/No*	Yes	

VARIABLE FREQUENCY DRIVES : <100kW				
Item no.	**Description**	**Units**	**Specified**	**Offered**
7.7	Motor-side sine filter	*Yes/No*		
7.8	Motor-side common-mode filter	*Yes/No*	Yes	
8	**CONVERTER PROTECTION**			
8.1	Overcurrent and overload	*Yes/No*	*Yes*	
8.2	Undervoltage and overvoltage	*Yes/No*	*Yes*	
8.3	Phase loss and unbalance	*Yes/No*	*Yes*	
8.4	Earth fault	*Yes/No*	*Yes*	
8.5	Over-temperature	*Yes/No*	*Yes*	
8.6	DC link overvoltage and overcurrent	*Yes/No*	*Yes*	
8.7	Over-temperature of DC link reactor (if installed)	*Yes/No*	*Yes*	
9	**MOTOR PROTECTION**			N/A
9.1	Short-circuit	*Yes/No*	*Yes*	
9.2	Start (max starting time)/Stall	*Yes/No*	*Yes*	
9.3	Earth fault	*Yes/No*	*Yes*	
9.4	Overload	*Yes/No*	*Yes*	
9.5	Number of starts	*Yes/No*	*Yes*	
9.6	Loss of phase	*Yes/No*	*Yes*	
9.7	Unbalance	*Yes/No*	*Yes*	
9.8	Loss of load/undercurrent	*Yes/No*	*Yes*	
9.9	Thermal by means of motor thermistors/RTDs	*Yes/No*	*Yes*	
10	**CONVERTER RATINGS**			
10.1	Rated system voltage	*V*	*400*	
10.2	Line-side rated current	*A*		
10.3	Input total power factor	*pu*		
10.4	Line-side displacement power factor	*pu*		

VARIABLE FREQUENCY DRIVES : <100kW				
Item no.	**Description**	**Units**	**Specified**	**Offered**
10.5	Rated continuous output current	*A*		
10.6	Overload capability and time	*A & s*		
10.7	Efficiency of complete drive module	*%*		
10.8	Total losses of complete drive module	*W*		
11	**CONTROL PERFORMANCE REQUIREMENTS**			
11.1	Open loop speed control	*Yes/No*	*Yes*	
11.2	Steady state deviation band	*%*	*±1 to ±2*	
11.3	Closed loop speed control with indirect feedback	*Yes/No*	*No*	
11.4	Steady state deviation band	*%*		
11.5	Closed loop speed control with direct feedback	*Yes/No*	*No*	
11.6	Steady state deviation band	*%*		
12	**PROCESS CONTROL INTERFACE**			
12.1	Compliant with SANS 61800-7	*No/Yes*	*Yes*	
12.2	Communications Interface Quantity	*No.*		
12.3	Communications Interface Type(s) and Connector(s)	*No.*		
12.4	Communications Interface Protocol(s)	*No.*		
12.5	Communications Interface Power Drive System Profile	*Process / Drive / Motion Control*	*Process*	
12.6	Communications Interface Message Structure to SANS 61800-7		*Yes*	
13	**SPECIAL CONTROL FEATURES**			
13.1	Automatic restart facility	*Yes/No*	*Yes*	
13.2	Flying restart facility	*Yes/No*	*Yes*	
13.3	Adjustable ramp times (acceleration/deceleration)	*Yes/No*	*Yes*	
13.4	Dip ride-through using load kinetic energy	*Yes/No*	*Yes*	

VARIABLE FREQUENCY DRIVES : <100kW				
Item no.	**Description**	**Units**	**Specified**	**Offered**
14 TESTING				
	Where indicated the following tests shall be carried out in addition to the specified mandatory tests.			
14.1	Special Tests for Converter			
14.1.1	Overcurrent capability	*Yes/No*	*No*	
14.1.2	Measurement of ripple voltage and current	*Yes/No*	*No*	
14.1.3	Power factor measurement	*Yes/No*	*No*	
14.1.4	Measurement of inherent voltage regulation	*Yes/No*	*No*	
14.1.5	Audible noise	*Yes/No*	*No*	
14.1.6	Additional tests	*Yes/No*	*No*	
14.2	Drive System Site Tests			
14.2.1	Load duty	*Yes/No*	*No*	
14.2.2	Allowable full load current versus speed	*Yes/No*	*No*	
14.2.3	Temperature rise	*Yes/No*	*No*	
14.2.4	Efficiency	*Yes/No*	*No*	
14.2.5	Current sharing	*Yes/No*	*No*	
14.2.6	Voltage division	*Yes/No*	*No*	
14.2.7	Shaft current - bearing insulation	*Yes/No*	*No*	
14.2.8	Audible noise	*Yes/No*	*No*	
14.2.9	Motor vibration	*Yes/No*	*No*	
14.2.10	EMC tests	*Yes/No*	*No*	
14.2.11	Harmonic content of CDM output	*Yes/No*	*No*	
14.2.12	Current limit and current loop	*Yes/No*	*No*	
14.2.13	Speed loop	*Yes/No*	*No*	
14.2.14	Torque pulsation	*Yes/No*	*No*	
14.2.15	Automatic restart	*Yes/No*	*No*	
14.2.16	System full load test	*Yes/No*	*No*	

VARIABLE FREQUENCY DRIVES : <100kW				
Item no.	**Description**	**Units**	**Specified**	**Offered**
14.2.17	Overall drive system efficiency	*Yes/No*	*No*	
14.3	Witnessed factory acceptance test	*Yes/No*	*Yes*	

STREETLIGHTS				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1	**STREETLIGHTING KIOSKS**			
1.1	Manufacturer			-
1.2	Type			
1.3	Details		See Project Specs	
1.4	Surge Arrestors	*Yes/No*	Yes	
1.5	SANS compliant	*Yes/No*	Yes	
2	**STREETLIGHTS**			
2.1	Manufacturer		Beka or similar and approved	
2.2	Type			
2.3	Power	*W*	45	
2.4	Lamp Type	*LED*	LED	
2.5	Switching		Timer	
3	**POLES**			
3.1	Material	*GRP / Steel*	Refer to PS	
3.2	Manufacturer /Supplier		BEKA or similar and approved	
3.3	Height		8.5m	
4	**HIGH MAST**			
4.1	Manufacturer		Beka or similar and approved	
4.2	Type			
4.3	Power	*W*	135	
4.4	Lamp Type	*LED*	LED	
4.5	Switching		Timer	
5	**HIGH MAST**			
5.1	Material	*GRP / Steel*	Refer to PS	

STREETLIGHTS				
Item no.	**Description**	**Units**	**Specified**	**Offered**
5.2	Manufacturer /Supplier		BEKA or similar and approved	
5.3	Height		15m	
6 DATA SHEET		*Yes/No*	Yes	

CONTROL, INSTRUMENTATION AND DATA CABLES				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1	**CONTROL CABLES**			
1.1	Manufacturer			
1.2	Size (minimum size)	*mm²*	Refer to BOQ	
1.3	Rated Voltage	*V*	24VDC/230VAC	
1.4	Number of Cores	*No*	See Project Specs and BOQ	
1.5	Size	*mm²*		
1.6	Conductor Type	*Cu/Al*		
1.7	Cable Type			
1.8	Full Load Current	*A*		
1.9	Armouring	*Yes/No*	Yes, SWA	
2	**INSTRUMENTATION CABLES**			
2.1	Manufacturer			
2.2	Rated Voltage	*V*	24VDC/230VAC	
2.3	Size (minimum size)	*mm²*	Refer to BOQ	
2.4	Cable Type		Twisted Pair	
2.5	Screened		Individually and Overall	
			(Aluminium)	
2.6	Armouring	*Yes/No*	Yes / SWA	
3	**WIRE MESH CABLE TRAY**			
3.1	Manufacturer			
3.2	Type			
3.3	Material		(outdoors) / Galvanised	
			(outdoors) / Galvanised	
			Steel (indoors)	
3.4	Duty	Heavy / Medium	Medium	
3.5	Application		Instrumentation Cables	

CONTROL, INSTRUMENTATION AND DATA CABLES				
Item no.	**Description**	**Units**	**Specified**	**Offered**
4	**FIBRE OPTIC**			
4.1	Manufacturer			
4.2	Type		Single Mode	
4.3	Armouring	Yes/No	Yes, for all outdoor and	
			exposed cables	
4.3	Cores	No.	Refer to BOQ	
4.4	Termination Type		ST / Industrial LC	
4.7	Cable Category		min OM 2	
4.8	Modal Bandwidth	*MHz.km*	min 500 / 500	
5	**ETHERNET COPPER CABLES**			
5.1	Manufacturer			
5.2	Type		CAT6	
5.3	Armouring	Yes/No	Yes	
5.4	Termination Type		Industrial Earthed RJ45	
6	**FIELDBUS CABLING**			
6.1	Fieldbus Protocol			
6.2	Manufacturer			

PROGRAMMABLE LOGIC CONTROLLER				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1	**PROGRAMMABLE LOGIC CONTROLLERS**			
1.1	Manufacturer		Refer to PS	
1.2	Model		Refer to PS	
1.3	Digital Inputs	No.		
1.4	Digital Outputs	No.		
1.5	Analogue Inputs	No.		
1.6	Analogue Outputs	No.		
1.7	Fieldbus interface	Yes/No	Yes	
1.8	Fieldbus protocol	E.g. Profibus,		
		Modbus		
1.9	ASI Bus interface	Yes/No	No	
1.7	Spare I/O	%	10%	
1.8	Ports			
1.8.1	Ethernet	No.		
1.8.2	Serial	No.		
1.8.3	Other	No.		
1.9	Software			
1.10	All engineering software included with PLC	*Yes / No*	Yes	
1.11	Annual Software License renewal required	*Yes / No*	No, should be once	
			off fee	
1.12	Programming Language		Refer to PS	
1.13	Backplate		Refer to PS	
			I/O module	
1.14	**Datasheets included with tender**	***Yes / No***	Yes	
		-		
2	**PLC PANEL**			
2.1	Enclosure Material		inside MCC	
2.2	Enclosure Colour		Orange	

PROGRAMMABLE LOGIC CONTROLLER				
Item no.	**Description**	**Units**	**Specified**	**Offered**
2.3	Enclosure Rating	*IP*	Refer to PS	
2.4	Enclosure Mounting	*Floor Standing / wall mounted*	Floor Standing	
2.5	Supply and Control Circuit Voltages	*V*	230V AC	
2.6	Wire Colours			
2.7	Termination Preferences		Phoenix screw terminals	
			(or approved equivalent)	
2.8	Glanding preferences		Pratley (or approved equivalent)	
2.9	Power Supply Unit vendor preferences		Phoenix (or approved equivalent)	
2.10	Panel light required	*Yes / No*	Yes, LED	
2.11	Socket outlet required	*Yes / No*	Yes	
2.12	Physical spare space	*%*	Refer to PS	-
		-		-
3 HUMAN MACHINE INTERFACE (HMI)				
3.1	Manufacturer		Refer to PS	
3.2	Model		Refer to PS	
3.3	Screen Size	*Inches*	Refer to PS	
3.1	Screen Type	Colour/		
		Monochrome	Refer to PS	
3.2	Resolution	Pixels	Refer to PS	
3.5	Touch Screen	*Yes / No*	Yes	
3.6	Type of Touch Screen	*Capacitive/*		
		Resistive	Refer to PS	
3.7	Touch Screen grid size		Refer to PS	
3.3	Backlight		Refer to PS	
3.5	Memory (Flash EPROM)		Refer to PS	
3.6	Data Backup (SRAM)		Refer to PS	
3.7	Interfaces Protocol		Refer to PS	

PROGRAMMABLE LOGIC CONTROLLER				
Item no.	**Description**	**Units**	**Specified**	**Offered**
3.8	Interface Port		Refer to PS	
3.9	Sound (for Alarm)		Refer to PS	
3.10	Data Transfer		Refer to PS	
3.11	Printer Port		Refer to PS	
3.12	Enclosure Rating	*IP*	Refer to PS	
3.13	Position of Installation	*Inside Panel /*		
		Flush Fronted /		
		Front Access	Flush Fronted	
3.14	Software			
3.15	**Datasheets included with tender**	***Yes / No***	**Yes**	
4 UPS				
4.1	Manufacturer			
4.2	Model			
4.3	Place of manufacture			
4.4	Type		Industrial inline double	
			conversion with full	
			static bypass; floor	
			standing box type	
4.5	Power	W	Refer to PS	
4.6	Backup Time	min	Refer to PS	
4.7	Output Voltage	V	230V +-5%	
4.8	Nominal Frequency	Hz	50	
4.9	Output Waveform		Pure sine wave	
4.9	Number of Phases	1 or 3	Refer to PS	
4.10	Communication		Serial/Ethernet	
4.11	Battery Life	Years		
4.12	Battery Type		Refer to PS	

PROGRAMMABLE LOGIC CONTROLLER				
Item no.	**Description**	**Units**	**Specified**	**Offered**
4.13	**Datasheets included with tender**	***Yes / No***	**Yes**	
5	**NETWORK SWITCHES**			
5.1	Manufacturer			
5.2	Model			
5.3	Type		Industrial	
5.4	Ports - RJ45	*No.*		
5.5	Fibre ports - SFP	*No.*	Refer to PS	
5.6	Rack mounted	*Yes/No*	DIN rail box type	
5.7	Power Supply	*VAC*	230V	
5.8	Speed	*Mbit*	1000	
5.9	**Datasheet included with tender**	***Yes / No***	**Yes**	
6	**FIELDBUS GATEWAYS (if applicable)**			
6.1	Manufacturer			
6.2	Model			
6.3	Type			

SCADA				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1	**DESKTOP COMPUTER**			
1.1	Manufacturer			-
1.2	Model			-
1.3	CPU			
1.3.1	Type		Refer to PS	
1.3.2	Speed	*GHz*	Refer to PS	
1.4	Memory	*MB*	Refer to PS	
1.5	Hard Drive Storage	*GB*	Refer to PS	
1.6	Operating System		Refer to PS	

PROGRAMMABLE LOGIC CONTROLLER				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1.8	Optical Storage		Refer to PS	
1.9	Network Card		Refer to PS	
1.10	Graphics Card		Refer to PS	
1.11	Keyboard		Refer to PS	
1.12	Mouse		Refer to PS	
1.13	Form Factor			
2	**HOT-STANDBY SERVER**			
2.1	Manufacturer			-
2.2	Model			-
2.3	CPU			
2.3.1	Type		Refer to PS	
2.3.2	Speed	*GHz*	Refer to PS	
2.4	Memory	*MB*	Refer to PS	
2.5	Hard Drive Storage	*GB*	Refer to PS	
2.6	Motherboard		Industrial motherboard,	
			conformal coating	
2.7	Hard drives		Raid hot swappable	
2.8	Power supplies		Hot swappabe	
2.9	Operating System		Refer to PS	
2.10	Optical Storage		Refer to PS	
2.11	Network Card		Refer to PS	
2.12	Graphics Card		Refer to PS	
2.13	Keyboard		Refer to PS	
2.14	Mouse		Refer to PS	
2.15	KVM Switch		Refer to PS	
2.15.1	Class		Refer to PS	
2.15.2	Manufacturer		Refer to PS	

PROGRAMMABLE LOGIC CONTROLLER				
Item no.	**Description**	**Units**	**Specified**	**Offered**
2.15.3	Type		Refer to PS	
2.15.4	USB	*Yes/No*	Yes	
2.15.5	HDMI	*Yes/No*	Yes	
	VGA	*Yes/No*	Yes	
3	**DISPLAY**			
3.1	Manufacturer		Refer to PS	
3.2	Model		Refer to PS	
3.3	Type		Refer to PS	
3.4	Size No. 1		Refer to PS	
3.5	Size No. 2		Refer to PS	
4	**SOFTWARE**			
4.1	SCADA software		Refer to PS	
4.2	Amount of Tags	*No.*	Refer to PS	
4.3	Clients	*No.*	Refer to PS	
4.4	Anti-Virus Software		Yes	
4.5	Additional Reporting and Business			
	Intelligence		Yes	
4.6	Alarm Management Package		Yes	
5	**PRINTER**			
5.1	Manufacturer		Refer to PS	
5.2	Model		Refer to PS	
5.3	Type		Refer to PS	
5.4	Feeding Paper Size		Refer to PS	

PROGRAMMABLE LOGIC CONTROLLER				
Item no.	**Description**	**Units**	**Specified**	**Offered**
6 UPS				
6.1	Manufacturer		Refer to PS	
6.2	Model		Refer to PS	
6.3	UPS Type		Inline floor standing,	
			dual type	
6.4	Load type		SCADA server, operator	
			computers and screens	
6.5	Nominal input voltage	V	230V ± 15%	
6.6	Number of phases	Num	Single	
6.7	Nominal input frequency	Hz	50 Hz ± 5%	
6.8	Place of manufacture			
6.9	Rated output power		To suit load plus 30%	
			(minimum 1 kVA)	
7	Configuration		bypass	
7.1	Power	W	Refer to PS	
7.2	Backup Time	min	Refer to PS	
7.3	Communication		Serial / Ethernet interface	
7.4	Battery life	Years	Refer to PS	
7.5	Battery type		Refer to PS	
7.6	Output Waveform		Pure sine wave	
7.7	**Datasheets included with tender**	***Yes / No***	**Yes**	
8 SCADA ETHERNET SWITCH				
8.1	Manufacturer		Refer to PS	
8.2	Model		Refer to PS	
8.3	Ports	*No.*	Refer to PS	
8.4	Fibre ports	*No.*	Refer to PS	

PROGRAMMABLE LOGIC CONTROLLER				
Item no.	**Description**	**Units**	**Specified**	**Offered**
8.5	Rack mounted	*Yes/No*	Refer to PS	
8.6	Power Supply	*VAC*	230V	
8.7	Speed	*Mbit*	Refer to PS	
8.8	**Datasheet included with tender**	***Yes / No***	**Yes**	
9.3	**Sketch/Drawing included with tender**	***Yes / No***	**Yes**	

INSTRUMENTATION				
Item no.	**Description**	**Units**	**Specified**	**Offered**
1	**ABSOLUTE PRESSURE TRANSMITTERS**			
1.1	Manufacturer			
1.2	Sensor Model			
1.3	Transmitter Model			
1.4	Detection Range	kPa		
1.5	Number of Relay outputs	*No.*		
1.6	Process Connection		Refer to PS	
1.7	Seal type		Refer to PS	
1.8	Industrial Ethernet Enabled	*Yes / No*	Yes	
1.9	Surge Protection Required	*Yes / No*	Yes	
1.10	Local Indication Required	*Yes / No*	No	
1.11	**Additional datasheet from manufacturer included with tender**	***Yes / No***	**Yes**	
2	**TURBINE FLOW METER**			
2.1	Manufacturer			
2.2.	Model			
2.3	Pipe Diameter	*mm / DN*	Refer to mechanical spec	
2.4.	Flow range	m^3/hr	Refer to PS	
2.5	Process Connection		Refer to PS	
2.6.	Number of Relay outputs	*No.*		
2.7	Industrial Ethernet Enabled	*Yes / No*	No	
2.8.	Local Indication Required	*Yes / No*	Yes	
2.9	Surge Protection Required	*Yes / No*	Yes	
2.10	**Additional datasheet from manufacturer included with tender for each flow meter type**	***Yes / No***	**Yes**	
3	**MAGNETIC FLOW METER**			
3.1	Manufacturer		Refer to mechanical spec	

INSTRUMENTATION				
Item no.	**Description**	**Units**	**Specified**	**Offered**
3.2	Model		Refer to mechanical spec	
3.3	Flange Size	*mm / DN*	Refer to mechanical spec	
3.4	Flow Rate	m³/hr	Refer to mechanical spec	
3.5	PN Rating		As indicated on PID	
3.6	Number of Relay outputs	*No.*	Refer to mechanical spec	
3.7	Industrial Ethernet Enabled	*Yes / No*	Yes	
3.8	Local Indication Required	*Yes / No*	Yes	
3.9	Surge Protection Required	*Yes / No*	Yes	
3.10	**Additional datasheet from manufacturer included with tender**	***Yes / No***	**Yes**	
4	**ULTRASONIC FLOW METER**			
4.1	Manufacturer			
4.2	Model			
4.3	Flow Rate	m³/hr	As indicated on PID	
4.4	PN Rating		As indicated on PID	
4.5	Number of Relay outputs	*No.*	As indicated on PID	
4.6	Industrial Ethernet Enabled	*Yes / No*	Yes	
4.7	Local Indication Required	*Yes / No*	Yes	
4.8	Surge Protection Required	*Yes / No*	Yes	
4.9	**Additional datasheet from manufacturer**			
	included with tender	***Yes / No***	**Yes**	
5	**CLAMP ON FLOW FLOW METER**			
5.1	Manufacturer			
5.2	Model			
5.3	Flange Size	*mm / DN*	As indicated on PID	
5.4	Flow Rate	m³/hr	As indicated on PID	

INSTRUMENTATION				
Item no.	**Description**	**Units**	**Specified**	**Offered**
5.5	Process Connection		As indicated on PID	
5.6	Number of Relay outputs	*No.*		
5.7	Industrial Ethernet Enabled	*Yes / No*	Yes	
5.8	Local Indication Required	*Yes / No*	Yes	
5.9	Surge Protection Required	*Yes / No*	Yes	
5.10	**Additional datasheet from manufacturer**			
	included with tender	***Yes / No***	**Yes**	
6	**THERMAL MASS MASS FLOW METER**			
6.1	Manufacturer		As indicated on PID	
6.2	Model		As indicated on PID	
6.3	Flange Size	*mm / DN*	Refer to mechanical spec	
6.4	Flow Rate	m^3/hr	Refer to mechanical spec	
6.5	PN Rating		Refer to PS	
6.6	Number of Relay outputs	*No.*	Refer to PS	
6.7	Industrial Ethernet Enabled	*Yes / No*	Yes	
6.8	Local Indication Required	*Yes / No*	Yes	
6.9	Surge Protection Required	*Yes / No*	Yes	
6.10	**Additional datasheet from manufacturer**			
	included with tender	***Yes / No***	**Yes**	
7	**POINT LEVEL SWITCH**			
7.1	Manufacturer			
7.2	Sensor Model			
7.3	Transmitter Model			
7.4	Number of Relay outputs	*No.*	Refer to PS	
7.5	Detection Range	m	Refer to PS	
7.6	Industrial Ethernet Enabled	*Yes / No*	No	

INSTRUMENTATION				
Item no.	**Description**	**Units**	**Specified**	**Offered**
7.7	Surge Protection Required	*Yes / No*	No	
7.8	Local Indication Required	*Yes / No*	No	
7.9	**Additional datasheet from manufacturer**			
	included with tender	***Yes / No***	**Yes**	
8	**LEVEL METER : ULTRASONIC TYPE**			
8.1	Manufacturer		Endress Hausser,	
			similar or equivalent	
8.2	Sensor Model		Refer to PS	
8.3	Transmitter Model		Refer to PS	
8.4	Number of Relay outputs	*No.*	Refer to PS	
8.5	Level Range	m	Refer to PS	
8.6	Accuracy	%	Refer to PS	
8.7	Resolution	%/mm	Refer to PS	
8.8	Repeatability	%	Refer to PS	
8.9	Dead band	%	Refer to PS	
8.10	Ambient temperature fluctuation	%/span/10℃	Refer to PS	
8.11	Industrial Ethernet Enabled	*Yes / No*	No	
8.12	Surge Protection Required	*Yes / No*	No	
8.13	Local Indication Required	*Yes / No*	No	
8.14	**Additional datasheet from manufacturer**			
	included with tender for each ultrasonic level			
	meter type	***Yes / No***	**Yes**	
9	**LEVEL METER: ULTRASONIC TYPE WITH CONTROLLER**			
9.1	Manufacturer		Endress Hausser,	
			similar or equivalent	
9.2	Sensor Model			

INSTRUMENTATION				
Item no.	**Description**	**Units**	**Specified**	**Offered**
9.3	Transmitter Model			
9.4	Number of Relay outputs	*No.*	Refer to PS	
9.5	Level Range	m	Refer to PS	
9.6	Accuracy	%	Refer to PS	
9.7	Resolution	%/mm	Refer to PS	
			Refer to PS	
9.8	Repeatability	%	Refer to PS	
9.9	Dead band	%	Refer to PS	
9.10	Ambient temperature fluctuation	%/span/10°C	Refer to PS	
9.11	Industrial Ethernet Enabled	*Yes / No*	Yes	
9.12	Surge Protection Required	*Yes / No*	Yes	
9.13	Local Indication Required	*Yes / No*	Yes	
9.14	**Additional datasheet from manufacturer**			
	included with tender for each hydrostatic level			
	meter type	***Yes / No***	**Yes**	
10	**BALL TYPE LEVEL SWITCHES**			
10.1	Manufacturer		Refer to PS	
10.2	Sensor Model		Refer to PS	
10.3	Transmitter Model		Refer to PS	
10.4	Number of Relay outputs	*No.*	Refer to PS	
10.5	Industrial Ethernet Enabled	*Yes / No*	No	
10.6	Surge Protection Required	*Yes / No*	No	
10.7	Local Indication Required	*Yes / No*	No	
10.8	**Additional datasheet from manufacturer**			
	included with tender	***Yes / No***	**Yes**	

INSTRUMENTATION				
Item no.	**Description**	**Units**	**Specified**	**Offered**
11	**NO-FLOW SENSORS**			
11.1	Manufacturer		Refer to PS	
11.2.	Model		Refer to PS	
11.3	Flow range	m^3/hr		
11.4	Process Connection		Refer to PS	
11.5	Number of Relay outputs	*No.*	Refer to PS	
11.6	Industrial Ethernet Enabled	*Yes / No*	No	
11.7	Local Indication Required	*Yes / No*	No	
11.8	Surge Protection Required	*Yes / No*	No	
11.9	**Additional datasheet from manufacturer**			
	included with tender for each flow meter type	***Yes / No***	**Yes**	
12	**pH ANYLYZER**			
12.1	Manufacturer		Refer to PS	
12.2	Sensor Model		Refer to PS	
12.3	Transmitter Model		Refer to PS	
12.4	Number of Relay outputs	*No.*	Refer to PS	
12.5	Detection Range	pH	Refer to PS	
12.6	Process Connection		Refer to PS	
12.7	Industrial Ethernet Enabled	*Yes / No*	Yes	
12.8	Surge Protection Required	*Yes / No*	Yes	
12.9	Local Indication Required	*Yes / No*	Yes	
12.10	**Additional datasheet from manufacturer**			
	included with tender	***Yes / No***	**Yes**	
13	**TURBIDITY METER**			
13.1	Manufacturer		Refer to PS	
13.2	Sensor Model		Refer to PS	

INSTRUMENTATION				
Item no.	**Description**	**Units**	**Specified**	**Offered**
13.3	Transmitter Model		Refer to PS	
13.4	Detection Range	NTU	Refer to PS	
13.5	Number of Relay outputs	*No.*	Refer to PS	
13.6	Process Connection		Refer to PS	
13.7	Industrial Ethernet Enabled	*Yes / No*	Yes	
13.8	Surge Protection Required	*Yes / No*	Yes	
13.9	Local Indication Required	*Yes / No*	Yes	
13.10	**Additional datasheet from manufacturer**			
	included with tender	***Yes / No***	**Yes**	
14	**LEVEL SWITCHES: FLOAT**			
14.1	Manufacturer			
14.2	Model			
14.3	Type			
15	**LIMIT SWITCHES**			
15.1	Manufacturer			
15.2	Model			
15.3	Type		Inductive Proxy	
16	**SURGE PROTECTION**			
16.1	Instrument Power Supply Circuits - Manufacturer			
16.2	Instrument Power Supply Circuits - Model			
16.3	Instrument Signal Loop - Manufacturer			
16.4	Instrument Signal Loop Circuits - Model			
16.5	Instrument Transducer Loop - Manufacturer			
16.6	Instrument Transducer Loop Circuits - Model			

INSTRUMENTATION				
Item no.	**Description**	**Units**	**Specified**	**Offered**
17	**INSTRUMENT CONTROLLER KIOSKS**			
17.1	Manufacturer			
17.2	Material of Construction: 1.6mm Mild Steel /		1.6mm 3CR12 minimum	
	2.0mm Mild Steel / Electro Galvanized /			
	Stainless Steel / 3CR12 / Fibre Glass			
17.3	Epoxy Powder Coated	*Yes / No*	Yes	
17.4	Colour		Electric Orange	
17.5	IP Rating (Indoor)	*IP*	54	
17.6	IP Rating (Outdoor)	*IP*	54	
17.6	Vent Plug	*Yes/No*	Yes	

1.1 TENDERER

Signature : .....

Name : .....

Duly authorised to sign on behalf of : .....

Telephone : .....

Fax : .....

Date : .....

RUSTENBURG WATER SERVICES TRUST

BID No RLM/RWST/OMM/0103/2024/25

RE-ADVERT: UPGRADE AND EXTENSION OF BOSPOORT WATER TREATMENT WORKS – MECHANICAL AND ELECTRICAL WORKS

T2.3 TECHNICAL SCHEDULES

T2.3.3 Civil

T2.3.3 CIVIL TECHNICAL SCHEDULES

Section **Description** **Page**

IMPORTANT NOTE:

Refer to the Particular Specifications

No.	Item	Technical Particulars
1.	**RESILIENT SEAL GATE VALVE**	
1.1	**General Data**	
1.1.1	Country of origin	
1.1.2	Manufacturer (name & country)	
1.1.3	Supplier	
1.1.4	Product name	
1.2	**Materials**	
1.2.1	Valve body	
1.2.2	Spindle	
1.2.3	Disc	
1.2.4	Valve seat	
2.	**WEDGE GATE VALVE**	
2.1	**General data**	
2.1.1	Country of origin	
2.1.2	Manufacturer (name & country)	
2.1.3	Supplier	
2.1.4	Product name	
2.2	**Materials**	
2.2.1	Valve body	
2.2.2	Spindle	
2.2.3	Disc	
2.2.4	Valve seat	
3.	**BUTTERFLY VALVES**	
3.1	**General Data**	
3.1.1	Country of origin	
3.1.2	Manufacturer (name & country)	

No.	Item	Technical Particulars
3.1.3	Supplier	
3.1.4	Product name	
3.2	**Materials**	
3.2.1	Valve body	
3.2.2	Sub-shaft	
3.2.3	Disc	
3.2.4	Valve seat	
4. CHECK/NON-RETURN VALVES		
4.1	**General data**	
4.1.1	Country of origin	
4.1.2	Manufacturer (name & country)	
4.1.3	Supplier	
4.1.4	Product name	
4.2	**Materials**	
4.2.1	Valve body	
4.2.2	Spindle	
4.2.3	Disc	
4.2.4	Valve seat	
5. AIR VALVES		
5.1	**General data**	
5.1.1	Country of origin	
5.1.2	Manufacturer (name & country)	
5.1.3	Supplier	
5.1.4	Model number	
5.1.5	Product name	
5.2	**Materials**	
5.2.1	Valve body	

No.	Item	Technical Particulars
5.2.2	Float	
6.	**HYDRAULIC CONTROL VALVES**	
6.1	**General Data**	
6.1.1	Country of origin	
6.1.2	Manufacturer (name & country)	
6.1.3	Product name	
6.2	**Materials**	
6.2.1	Valve body	
6.2.2	Spindle	
6.2.3	Disc	
6.2.4	Valve seat	
6.2.5	Others (Tenderer to specify)	
7.	**ULTRASONIC FLOW METERS**	
7.1	Manufacturer (name & country)	
7.2	Supplier	
7.3	Type	
7.4	Model	
7.5	Country of manufacturer	
7.6	Installation contractor	
8.	**TURBINE FLOW METERS**	
8.1	Manufacturer (name & country)	
.2	Supplier	
8.3	Type	
8.4	Model	
8.5	Country of manufacturer	
8.6	Installation contractor	

No.	Item	Technical Particulars
9.	**MAGNETIC FLOW METERS**	
9.1	Manufacturer (name & country)	
9.2	Supplier	
9.3	Type	
9.4	Model	
9.5	Country of manufacturer	
9.6	Installation contractor	
10.	**PIPE FITTINGS AND SPECIALS**	
10.1	**Steel**	
10.1.1	Country of origin	
10.1.2	Manufacturer (name & country)	
10.1.3	Place of manufacture	
10.1.4	Supplier	
10.1.5	Material grade	
10.2	**Stainless Steel**	
10.2.1	Country of origin	
10.2.2	Manufacturer (name & country)	
10.2.3	Place of manufacture	
10.2.4	Supplier	
10.2.5	Material grade	
10.3	**Coating and Lining**	
10.3.1	Application factory name	
10.3.2	Location of factory	
10.3.3	Epoxy lining product name	
10.3.4	Epoxy coating product name	
10.3.5	UV-Resistant multi-purpose epoxy product name	
10.3.6	Aliphatic polyurethane product name	
10.3.7	Polymer modified bitumen (Bituguard or Densotherm) product name	

No.	Item	Technical Particulars
10.3.8	Rigid polyurethane product name	
11. STEEL PIPE LENGTHS		
11.1	**General Data**	
11.1.1	Country of origin	
11.1.2	Manufacturer (name & country)	
11.1.3	Place of manufacture	
11.1.4	Supplier	
11.1.5	Material grade	
11.2	**Coating**	
11.2.1	Polymer modified bitumen (Bituguard)	
	Application factory	
	Name of product	
11.2.2	3 Layer high density polyethylene	
	Application factory	
	Names of products	
11.2.3	Fusion bonded medium density polyethylene (Sintakote)	
	Application factory	
	Name of product	
11.2.4	Rigid Polyurethane	
	Application factory	
	Name of product	
11.3	**Lining**	
11.3.1	Epoxy (product name)	
11.3.2	Epoxy application factory	
11.3.3	Cement mortar application factory	

TENDERER

....
Name Date

....
Position Signature

Duly authorised to sign on behalf of: .....

Telephone : .....