

TENDER DOCUMENT GOODS AND SERVICES		 CITY OF CAPE TOWN ISIXEKO SASEKAPA STAD KAAPSTAD	
SUPPLY CHAIN MANAGEMENT			
SCM - 542	Approved by Branch Manager: 03/04/2020	Version: 9	Page 1 of 394

TENDER NO: 298S/2022/23:

TENDER DESCRIPTION: PROVISION OF MAINTENANCE AND PARTS FOR MOTOR CONTROL CENTRES AND ASSOCIATED ELECTRICAL CONTROL GEAR AT VARIOUS ENGINEERING AND ASSET MANAGEMENT (EAM) REGION 3 WATER AND SANITATION CITY OF CAPE TOWN SITES

CONTRACT PERIOD: FROM COMMENCEMENT DATE UNTIL 30 JUNE 2026

VOLUME 1: TENDERING PROCEDURES

CLOSING DATE: 03 May 2023

CLOSING TIME: 10:00 a.m.

**TENDER BOX
NUMBER:** 140

TENDER FEE: R 200.00

Non-refundable tender fee payable to City of Cape Town (CCT) for a hard copy of the tender document. This fee is not applicable to website downloads of the tender document.

TENDERER	
NAME of Company/Close Corporation or Partnership / Joint Venture/ Consortium or Sole Proprietor /Individual	
TRADING AS (if different from above)	

NATURE OF TENDER OFFER (please indicate below)	
Main Offer (see clause 2.2.11.1)	
Alternative Offer (see clause 2.2.11.1)	

TENDER SERIAL NO.:
SIGNATURES OF CITY OFFICIALS AT TENDER OPENING
1
2
3

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VOLUME 1: THE TENDER

(1) GENERAL TENDER INFORMATION

TENDER ADVERTISED	:	17 March 2023
SITE VISIT/CLARIFICATION MEETING	:	30 March 2023 (Not compulsory, but strongly recommended)
VENUE FOR SITE VISIT/CLARIFICATION MEETING	:	A non-compulsory virtual clarification meeting with representatives of the Employer will take place via Skype (Skype meeting invitation to be requested <u>prior to the day of the virtual clarification meeting date</u> from Mr Andre J Visser, e-mail (andrej.visser@capetown.gov.za) scheduled for 30 March 2023 starting at 09:00 am. OR type in the SKYPE meeting URL link below https://meet.capetown.gov.za/andrej.visser/L3YN4M9G?sl=1
TENDER BOX & ADDRESS	:	Tender Box as per front cover at the Tender &Quotation Boxes Office, 2nd Floor (Concourse Level), Civic Centre, 12 Hertzog Boulevard, Cape Town. The Tender Document (which includes the Form of Offer and Acceptance) completed in all respects, plus any additional supporting documents required, must be submitted in a sealed envelope with the name and address of the tenderer, the endorsement TENDER NO. 298S/2022/23: PROVISION OF MAINTENANCE OF MOTOR CONTROL CENTRES AT VARIOUS WATER AND SANITATION, CITY OF CAPE TOWN SITES IN ENGINEERING AND ASSET MANAGEMENT (EAM) REGION 3, the tender box No. and the closing date indicated on the envelope. The sealed envelope must be inserted into the appropriate official tender box before closing time. If the tender offer is too large to fit into the abovementioned box or the box is full, please enquire at the public counter (Tender Distribution Office) for alternative instructions. It remains the tenderer's responsibility to ensure that the tender is placed in either the original box or as alternatively instructed.
CCT TENDER REPRESENTATIVE		[Name: JA Visser Tel. No.: (021) 444 3964 Email: Andrej.visser@capetown.gov.za

TENDERERS MUST NOTE THAT WHEREVER THIS DOCUMENT REFERS TO ANY PARTICULAR TRADE MARK, NAME, PATENT, DESIGN, TYPE, SPECIFIC ORIGIN OR PRODUCER, SUCH REFERENCE SHALL BE DEEMED TO BE ACCOMPANIED BY THE WORDS 'OR EQUIVALENT'

(2) CONDITIONS OF TENDER

2.1 General

2.1.1 Actions

2.1.1.1 The City of Cape Town (CCT) and each tenderer submitting a tender offer shall comply with these Conditions of Tender. In their dealings with each other, they shall discharge their duties and obligations as set out in these Conditions of Tender, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations.

The parties agree that this tender, its evaluation and acceptance and any resulting contract shall also be subject to the Employer's Supply Chain Management Policy ('SCM Policy') that was applicable on the date the bid was advertised, save that if the Employer adopts a new SCM Policy which contemplates that any clause therein would apply to the contract emanating from this tender, such clause shall also be applicable to that contract. Please refer to this document contained on the Employer's website.

Abuse of the supply chain management system is not permitted and may result in the tender being rejected, cancellation of the contract, restriction of the supplier, and/or the exercise by the City of any other remedies available to it as described in the SCM Policy.

2.1.1.2 The CCT, the tenderer and their agents and employees involved in the tender process shall avoid conflicts of interest and where a conflict of interest is perceived or known, declare any such conflict of interest, indicating the nature of such conflict. Tenderers shall declare any potential conflict of interest in their tender submissions. Employees, agents and advisors of the CCT shall declare any conflict of interest to the CCT at the start of any deliberations relating to the procurement process or as soon as they become aware of such conflict, and abstain from any decisions where such conflict exists or recuse themselves from the procurement process, as appropriate.

2.1.1.3 The CCT shall not seek, and a tenderer shall not submit a tender, without having a firm intention and capacity to proceed with the contract.

2.1.2 Interpretation

2.1.2.1 The additional requirements contained in the returnable documents are part of these Conditions of Tender.

2.1.2.2 These Conditions of Tender and returnable schedules which are required for tender evaluation purposes, shall form part of the contract arising from the invitation to tender.

2.1.3 Communication during tender process

Verbal or any other form of communication, from the CCT, its employees, agents or advisors during site visits/clarification meetings or at any other time prior to the award of the Contract, will not be regarded as binding on the CCT, unless communicated by the CCT in writing to suppliers by its Director: Supply Chain Management or his nominee.

2.1.4 The CCT's right to accept or reject any tender offer

2.1.4.1 The CCT may accept or reject any tender offer and may cancel the tender process or reject all tender offers at any time before the formation of a contract. The CCT may, prior to the award of the tender, cancel a tender if:

- (a) due to changed circumstances, there is no longer a need for the services, works or goods requested;
or
- (b) funds are no longer available to cover the total envisaged expenditure; or
- (c) no acceptable tenders are received;
- (d) there is a material irregularity in the tender process; or
- (e) the parties are unable to negotiate market related pricing.

The CCT shall not accept or incur any liability to a tenderer for such cancellation or rejection, but will give written reasons for such action upon receiving a written request to do so.

2.1.5 Procurement procedures

2.1.5.1 General

Unless otherwise stated in the tender conditions, a contract will be concluded with the tenderer who scores the highest number of tender adjudication points.

The CCT intends to appoint a single tenderer for the allocation of work. If insufficient responsive bids are received, the CCT reserves the right not to appoint a tenderer at all.

The contract period shall be for a period of **three years** from the commencement date of the contract until 30 June 2026.

Engineering and Asset Management (ENGINEERING AND ASSET MANAGEMENT (EAM)) operate in three Water and Sanitation, Cape Metropolitan operational regions namely Schaapkraal Region 1, Blomtuin Region 2 and Killarney Region 3. In each of the three operational regions, there are a number of Bulk water, Wastewater treatment facilities and Reticulation pumping stations. **This tender however is only required for the works to be done in ENGINEERING AND ASSET MANAGEMENT (EAM) Region 3.**

The City of Cape Town intends to **open a section of this tender and contract for work in the entire City of Cape Town Metropolitan geographical area to the awarded contractor/s.** This Goods and Services works packages will may only comprise of **Uninterruptable Power Supplies (UPS) and Solar PV Components and power supply systems and associated alternative back-up power equipment.**

The City of Cape Town and this tender and contract may implement hybrid inverter and battery back-up systems where it is impractical or preferred over the use of diesel drive standby generators sets. The proposed plants where hybrid inverter and battery back-up systems are provisionally planned, are listed in SECTION 13 SPECIFICATIONS clause 3.2.9.4.

Unless otherwise stated in the tender conditions, a contract will be concluded with the tenderer who scores the highest number of tender adjudication points.

The City of Cape Town intends to appoint one main contractor and a standby contractor for the allocation of work in Region 3 (three) of Engineering and Asset Management (ENGINEERING AND ASSET MANAGEMENT (EAM)) operating from Killarney ENGINEERING AND ASSET MANAGEMENT (EAM) Depot Koeberg Road, Milnerton.

The City of Cape Town reserves the right not to appoint a standby contractor.

The City reserves the right to award Region 3 to one contractor, depending on the contractors' eligibility, functionality, capacity, resources and the best financial offer to the City

If insufficient responsive bids are received, the CCT reserves the **RIGHT** not to appoint a tenderer at all or fewer tenders.

A standby contractor will only be allocated work should the Main contractor not be able to execute the works project (upon refusal of works as per GCC)

2.1.5.2 Proposal procedure using the two stage-system

A two-stage system will not be followed.

2.1.6 Objections, complaints, queries and disputes/ Appeals in terms of Section 62 of the Systems Act/ Access to court

2.1.6.1 Disputes, objections, complaints and queries

In terms of Regulations 49 and 50 of the Local Government: Municipal Finance Management Act, 56 of 2003 Municipal Supply Chain Management Regulations (Board Notice 868 of 2005):

- a) Persons aggrieved by decisions or actions taken by the City of Cape Town in the implementation of its supply chain management system, may lodge within 14 days of the decision or action, a written objection or complaint or query or dispute against the decision or action.

2.1.6.2 Appeals

- a) In terms of Section 62 of the Local Government: Municipal Systems Act, 32 of 2000 a person whose rights are affected by a decision taken by the City, may appeal against that decision by giving written notice of the appeal and reasons to the City Manager within 21 days of the date of the notification of the decision.
- b) An appeal must contain the following:
 - i. Must be in writing
 - ii. It must set out the reasons for the appeal
 - iii. It must state in which way the Appellant's rights were affected by the decision;
 - iv. It must state the remedy sought; and
 - v. It must be accompanied with a copy of the notification advising the person of the decision
- c) The relevant City appeal authority must consider the appeal and **may confirm, vary or revoke** the decision that has been appealed, but no such revocation of a decision may detract from any rights that may have accrued as a result of the decision.

2.1.6.3 Right to approach the courts and rights in terms of Promotion of Administrative Justice Act, 3 of 2000 and Promotion of Access to Information Act, 2 of 2000

The sub- clauses above do not influence any affected person's rights to approach the High Court at any time or its rights in terms of the Promotion of Administrative Justice Act (PAJA) and Promotion of Access to Information Act (PAIA).

2.1.6.4 All requests referring to sub clauses 2.1.6.1 and 2.1.6.2 must be submitted in writing to:

The City Manager - C/o the Manager: Legal Compliance Unit, Legal Services Department, Corporate Services Directorate

Via hand delivery at: 20th Floor, Tower Block, 12 Hertzog Boulevard, Cape Town 8001

Via post at: Private Bag X918, Cape Town, 8000

Via fax at: 021 400 5963 or 021 400 5830

Via email at: MSA.Appeals@capetown.gov.za

2.1.6.5 All requests referring to clause 2.1.6.3 ns must be submitted in writing to:

The City Manager - C/o the Manager: Access to Information Unit, Corporate Services Directorate

Via hand delivery at: 20th Floor, Tower Block, 12 Hertzog Boulevard, Cape Town 8001

Via post at: Private Bag X918, Cape Town, 8000

Via fax at: 086 202 9982

Via email at: Access2info.Act@capetown.gov.za

2.1.6.6 The minimum standards regarding accessing and 'processing' of any personal information belonging to another in terms of Protection of Personal Information Act, 2013 (POPIA).

The Employer, its employees, representatives and sub-contractors may, from time to time, Process the Contractor's and/or its employees', representatives' and/or sub-contractors' Personal Information, for purposes of, and/or relating to, the tender, this agreement, for research purposes, and/or as otherwise may be envisaged in the Employer's Privacy Notice and/or in relation to the Employer's

Supply Chain Management Policy or as may be otherwise permitted by law. This includes the employers assurance provider and Appeal Authority.

2.1.7 City of Cape Town Supplier Database Registration

Tenderers are required to be registered on the CCT Supplier Database as a service provider. Tenderers must register as such upon being requested to do so in writing and within the period contained in such a request, failing which no orders can be raised or payments processed from the resulting contract. In the case of Joint Venture partnerships this requirement will apply individually to each party of the Joint Venture.

Tenderers who wish to register on the City of Cape Town's Supplier Database may collect registration forms from the Supplier Management Unit located within the Supplier Management / Registration Office, 2nd Floor (Concourse Level), Civic Centre, 12 Hertzog Boulevard, Cape Town (Tel 021 400 9242/3/4/5). Registration forms and related information are also available on the City of Cape Town's website www.capetown.gov.za (follow the Supply Chain Management link to Supplier registration).

It is each tenderer's responsibility to keep all the information on the CCT Supplier Database updated.

2.1.8 National Treasury Web Based Central Supplier Database (CSD) Registration

Tenderers are required to be registered on the National Treasury Web Based Central Supplier Database (CSD) as a service provider. Tenderers must register as such upon being requested to do so in writing and within the period contained in such a request, failing which no orders can be raised or payments processed from the resulting contract. In the case of Joint Venture partnerships this requirement will apply individually to each party of the Joint Venture.

Tenderers who wish to register on the National Treasury Web Based Central Supplier Database (CSD) may do so via the web address **<https://secure.csd.gov.za>**.

It is each tenderer's responsibility to keep all the information on the National Treasury Web Based Central Supplier Database (CSD) updated.

2.2 Tenderer's obligations

2.2.1 Eligibility Criteria

2.2.1.1 Tenderers are obligated to submit a tender offer that complies in all aspects to the conditions as detailed in this tender document. An 'acceptable tender must "COMPLY IN ALL' aspects with the tender conditions, specifications, pricing instructions and contract conditions.

2.2.1.1.1 Submit a tender offer

Only those tender submissions from which it can be established that a clear, irrevocable and unambiguous offer has been made to CCT, by whom the offer has been made and what the offer constitutes, will be declared responsive.

2.2.1.1.2 Compliance with requirements of CCT SCM Policy and procedures

Only those tenders that are compliant with the requirements below will be declared responsive:

- a) A completed **Details of Tenderer** to be provided (applicable schedule to be completed);
- b) A completed **Certificate of Authority for Partnerships/ Joint Ventures/ Consortiums** to be provided authorising the tender to be made and the signatory to sign the tender on the partnership /joint venture/consortium's (applicable schedule to be completed);
- c) A copy of the partnership / joint venture / consortium agreement to be provided.
- d) A completed **Declaration of Interest – State Employees** to be provided and which does not indicate any non-compliance with the legal requirements relating to state employees (applicable schedule to be completed);
- e) A completed **Declaration – Conflict of Interest and Declaration of Bidders' past Supply Chain Management Practices** to be provided and which does not indicate any conflict or past practises that renders the tender non-responsive based on the conditions contained thereon (applicable schedules to be completed);
- f) A completed **Certificate of Independent Bid Determination** to be provided and which does not indicate any non-compliance with the requirements of the schedule (applicable schedule to be completed);
- g) The tenderer (including any of its directors or members), has not been restricted in terms of abuse of the Supply Chain Management Policy,
- h) The tenderer's tax matters with SARS are in order, or the tenderer is a foreign supplier that is not required to be registered for tax compliance with SARS;
- i) The tenderer is not an advisor or consultant contracted with the CCT whose prior or current obligations creates any conflict of interest or unfair advantage,
- j) The tenderer is not a person, advisor, corporate entity or a director of such corporate entity, involved with the bid specification committee;
- k) A completed **Authorisation for the Deduction of Outstanding Amounts Owed to the City of Cape Town** to be provided and which does not indicate any details that renders the tender non-responsive based on the conditions contained thereon (applicable schedules to be completed);
- l) The tenderer (including any of its directors or members), has not been found guilty of contravening the Competition Act 89 of 1998, as amended from time to time;
- m) The tenderer (including any of its directors or members), has not been found guilty on any other basis listed in the Supply Chain Management Policy.

2.2.1.1.3 Non-compulsory clarification meeting

Is is strongly recommended for Tenderers to attend a non-compulsory clarification meeting at which they may familiarise themselves with aspects of the proposed work, services or supply and pose questions.

Details of the meeting(s) are stated in the General Tender Information.

2.2.1.1.4 Minimum score for functionality and eligibility

Key Staff Personnel Requirement

Only those tenders submitted by tenderers who achieve the minimum score for functionality as stated below will be declared responsive.

The description of the functionality criteria and the maximum possible score for each is shown in the tables below. The score achieved for functionality will be the sum of the scores achieved, in the evaluation process, for the individual criteria.

Tenderers shall ensure that all relevant information has been submitted with the tender offer in the prescribed format to ensure optimal scoring of functionality points for each Evaluation Criteria. Failure to provide all information **IN THIS TENDER SUBMISSION** could result in the tenderer not being able to achieve the specified minimum scoring.

Where the entity tendering is a Joint Venture the tender must be accompanied by a statement describing exactly what aspects of the work will be undertaken by each party to the joint venture.

A more detailed explanation of the functionality criteria is given below:

Where a tenderer is submitting an offer, the tenderer is required to submit evidence of resources available specifically allocated for the ENGINEERING AND ASSET MANAGEMENT (EAM) Region, in the eligibility criteria tables below. **Schedule 15** contains the relevant eligibility criteria information to complete. A tenderer is required to complete the returnable schedules.

A statement (Memorandum of Understanding (MOU) describing exactly what aspects of the work will be undertaken by each party to the joint venture must accompany where the entity tendering is a Joint Venture the tender.

Where the entity tendering would be using sourced labour and resources this shall be clarified in a Memorandum of Understanding (MOU) between parties and included in the Curriculum Vitae of such persons accompanied by a statement describing exactly what aspects of the work will be undertaken by each party, and completed in **Schedule 14**.

Tenderers shall ensure that all relevant information has been submitted with the tender offer in the prescribed format to ensure optimal scoring of functionality points for each Evaluation Criteria. Failure to provide all information **IN THIS TENDER SUBMISSION AT TIME OF CLOSING OF TENDER** will result in the tenderer not being able to achieve the specified minimum scoring.

Tenderers **MUST** list the resource in the Eligibility Criteria in a separate, well-marked and chronological layout and labelled format for ease of reference and evaluation purposes.

1. The eligibility criteria is a measure of a vendor/contractor's ability to perform typical work done in the City of Cape Town, Water and Sanitation Department.
2. The tenderer will only be deemed responsive for Region 3, when all of the requirements of the eligibility criteria has been established and met.
3. The tenderer need to attach all relevant proof and documentation as specified in **Schedule 15**. Read **Schedule 15** in conjunction with ENGINEERING AND ASSET MANAGEMENT (EAM) Regional functionality and eligibility criteria requirements. Documentation required for staff or resources, Curriculum Vitae, shall include;
 - The full names and identity of the persons.
 - It shall list all relevant years and experience required to meet the eligibility criteria.
 - Copies of certificates, diplomas, degrees, driver licenses, operator licenses, professional registration cards or certificates shall prove qualifications.
 - The information required shall be submitted in a clear, chronological and logical manner to enable ease of reference thereby limiting or eliminating the need to clarify after tender closure.
 - No staff or resource shall be considered eligible if that person does not meet the requirements at the time of tender closure.

- The tenderer will not be allowed to submit an alternative person who qualifies after tender closure should the first or initial person tendered, not meet the eligibility criteria.
- The City of Cape Town may request clarifications to prove and support documentation and information contained in the tender bid.

Area of evaluation	Total Points to be obtained. Applicable values/points
B1 Key Staff Personnel	130
B2 Vehicles	40
Total	119/170

The minimum score for functionality for B1 Key Staff Personnel is 91 points out of 130 points (70% minimum) in order to be considered responsive for this tender.

The minimum score for functionality for B2 Vehicles is 28 points out of 40 points (70% minimum) in order to be considered responsive for this tender.

The minimum score has to be met for both evaluation criteria B1 and B2 to be considered functional responsive.

The total average minimum score for functionality is 119 points out of a maximum of 170 points.

Eligibility Criteria:

A1 Eligibility criteria – Key Staff Personnel required per ENGINEERING AND ASSET MANAGEMENT (EAM) Region				
Number	Position	Qualification	Experience	Minimum requirement
A.1.1	Installation Electrician (with SANS 10142-1 Wiring Regulations for low voltage electrical installations)	Passed certificate and completion of theory course in SANS 10142-1 Wiring Regulations for low voltage electrical installations below 1000VAC. Department of labour registration certificate as an Installation Electrician in terms of Wiring Regulations SANS 10142-1. Registration card; copy of both sides of the card is required	>3 Years Post Registration as an Installation Electrician registered with Department of Labour	x1 (One) required
A.1.2	Master Installation with SANS 10142-1 Wiring Regulations for low voltage electrical installations)	Trade tested Masters Electrician Passed certificate and completion of theory course in Wiring Regulations of Electrical Installations below 1000VAC. Department of labour registration certificate as a Master Installation Electrician in terms of Wiring Regulations SANS 10142-1. Registration card; copy of both sides of the card is required	>3 Years Post Post Registration as a Master Electrician registered with Department of Labour	x1 (One) required

Functionality criteria:

B1 Key Staff Personnel Requirement			
Designation	Qualification	Experience	Minimum requirement
B1.1 Supervisor/Site foreman/Site agent	Professional qualification (N6 National Diploma Electrical Engineering or National Diploma Electrical Engineering or B Degree Electrical Engineering or B-Tech Electrical Engineering)	• >3 Years Post Qualification. • Supervision of electrician staff • Scoping and estimating of electrical work • Quality assurance of electrical construction works • Quoting on estimates of work • Knowledge of Occupational Health and Safety Act and Regulations 85 of 1993 • Multi-disciplinary would be advantageous	x1 (One) required
B1.2 Electrician	Trade tested RSA Red Seal or SAQA equivalent certified for foreign nationals Electrician (three phase)	>3 Years Post Qualification	x2 (Two) required.
B1.3 Panel wireman	Trade related experience. This includes relevant experience working at building and wiring electrical panels from CAD drawing designs in a workshop and or in the field.	>3 years In-service job experience	x1 (One) required
B1.4 Electrical cable jointer	Must have the following: ▪ 2 years' experience in MV cable jointing and termination or similar experience. Certified competent by a recognized major cable joint manufacturer or certified competent in terms of South African Qualification Authority (SAQA) Further Education and Training Certificate: Cable Jointing and Termination , SAQA QUAL ID: 58204 or certified competent in terms of a similar MV cable jointing and termination certification or certified competent by the City of Cape Town Technical Training Centre. Previous Experience (This will be amplified in the CV of such a person) Tenderers shall have experience in each of the following aspects: ▪ Medium Voltage Cable Jointing ▪ Medium Voltage Cable Termination ▪ MV Aerial Bundle Conductor Jointing ▪ MV Aerial Bundle Conductor Termination	>2 Years Post Qualification	x1 (One) required

B1.5 PLC, HMI & SCADA Programmer	N6 or National Diploma in Electrical/Electronic Engineering or Software related programming or OEM Certification. City of Cape Town requires a system integrator with ability programming Schneider PLC and ADROIT SCADA coding.	>3 Years Post Qualification	x1 (One) required
B1.6 Instrumentation Technician/Artisan	N6 or National Diploma in Electrical/Electronic/Instrumentation Engineering/Trade Tested in Instrumentation or OEM Certification	>3 Years Post Qualification	x1 (One) required.
B1.7 Assistant to artisan	No tertiary qualification. Trade related experience would be advantageous for the position.	>1 year In-service job experience	X2 (Two) required
B1.8 Draughtsman	AutoCAD or similar drafting course qualification	>1 year In-service job experience	x1 (One) required
B1.9 Contractor's Health and Safety Officer (GMR8.5)	Occupational Health and Safety Act 85 of 1993 and Regulations	>1 year In-service job experience	x1 (One) required
B1.10 Certified Mechanical Handling (Rigger)	Mechanical handling. Rigging and Slings. Crane operator.	>1 year In-service job experience	x1 (One) required
B1.11 Technician/Artisan – Switchgear and circuit breaker services (Make: Schneider/Merlin Gerin, ABB and CBi) or equivalent	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required
B1.12 Service Technician/Artisan/Assistant – <u>Low Voltage 230/440 VAC</u> Electronic Soft starter and Variable Speed drive services (WEG, Yaskawa, Delta, ABB, Allan Bradley, or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required
B1.13 Service Engineer – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required
B1.14 Service Technician/Artisan/Assistant – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required
B1.15 Technician/Artisan – Electrical valve actuator (Make: AUMA)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required
B1.16 Technician/Artisan – Electrical valve actuator (Make: Greatork)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required
B1.17 Technician/Artisan – Electrical valve actuator (Make: ROTORK)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required.
B1.18 Technician/Artisan – Dynamic Power Factor Correction specialist (Impact Power Innovations & Bellco)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required
B1.19 Technician/Artisan – generator engine controllers and changeover (Deep Sea and Lovato or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required

B1 Key Staff Personnel Requirement			
Designation	Qualification	Experience	Minimum requirement
B1.20 Technician/Artisan – Uninterruptable Power Supply (Riello, Schneider Electric, APC or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required
B1.21 Air conditioner and dry air de-humidifier service technician (Dehu Tech or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification	x1 (One) required.

Functionality Points allocations:

B1 Key Staff Personnel Requirement				
Number	Position	Qualification as per tender specification	Years of experience as per tender specification	Applicable values/points
B1.1.1	Supervisor/Site foreman/Site agent for basic LV electrical Works	Trade tested Electrician and or Professional qualification (N6 National Diploma Electrical Engineering, National Diploma Electrical Engineering, B Degree Electrical Engineering or B-Tech Electrical Engineering)	• >3 Years Post Qualification. • Supervision of electrician staff • Scoping and estimating of electrical work • Quality assurance of electrical construction works • Quoting on estimates of work • Knowledge of Occupational Health and Safety Act and Regulations 85 of 1993	Meeting all requirements = 10 Not meeting requirements = 0
B1.1.2	Supervisor/Site foreman/Site agent for MV electrical works	Trade tested Electrician and or Professional qualification (N6 National Diploma Electrical Engineering, National Diploma Electrical Engineering, B Degree Electrical Engineering or B-Tech Electrical Engineering)	The following certificates for the Supervisor/Site foreman/Site agent shall be required at close of tender 1. Responsible Persons certificate in terms of NRS 040 – High Voltage Operating Regulations 2. SAQA US ID 242766: Demonstrate knowledge and understanding of Operating Regulation for High Voltage Systems 3. Basic Fire Fighting 4. First Aid level two	Meeting all requirements = 10 Not meeting requirements = 0
B1.2	Electricians (2 people)	Trade tested RSA Red Seal or SAQA equivalent certified for foreign nationals Electrician (three phase)	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 10 Not meeting requirements = 0
B1.3	Panel wireman	Trade related experience. This includes relevant experience working at building and wiring electrical panels from CAD drawing designs in a workshop and or in the field.	>3 years In-service job experience Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0

B1.4	Electrical cable jointer	Trade tested RSA Red Seal or SAQA equivalent certified for foreign nationals Electrician (three phase) 2 years' experience in MV cable jointing and termination or similar experience. Certified competent by a recognized major cable joint manufacturer or certified competent in terms of South African Qualification Authority (SAQA) Further Education and Training Certificate: Cable Jointing and Termination , SAQA QUAL ID: 58204 or certified competent in terms of a similar MV cable jointing and termination certification or certified competent by the City of Cape Town Technical Training Centre. Previous Experience (This will be amplified in the CV of such a person) Tenderers shall have experience in each of the following aspects: ▪ Medium Voltage Cable Jointing ▪ Medium Voltage Cable Termination ▪ MV Aerial Bundle Conductor Jointing ▪ MV Aerial Bundle Conductor Termination* The following certificates for the Cable Jointer shall be required at at close of tender and submitted again at commencement of contract. ▪ Responsible Persons certificate in terms of NRS 040 – High Voltage Operating Regulations ▪ SAQA US ID: 242766: Demonstrate knowledge and understanding of Operating Regulation for High Voltage Systems ▪ Basic Fire Fighting ▪ First Aid level two	>2 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.5	PLC, HMI & SCADA Programmer	N6 or National Diploma in Electrical/Electronic Engineering or Software related programming or OEM Certification. City of Cape Town requires a system integrator with ability programming Schneider PLC and ADROIT SCADA coding.	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0

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B1.6	Instrumentation Technician/Artisan	N6 or National Diploma in Electrical/Electronic/Instrumentation Engineering/Trade Tested in Instrumentation or OEM Certification	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.7	Assistant to artisans (2 people)	No tertiary qualification. Trade related experience would be advantageous for the position.	>1 year In-service job experience Less than 1 year	Meeting all requirements = 10 Not meeting requirements = 0
B1.8	Draughtsman	AutoCAD or similar drafting course qualification	>1 year In-service job experience Less than 1 year	Meeting all requirements = 5 Not meeting requirements = 0
B1.9	Contractor's Health and Safety Officer (GMR8.5)	Occupational Health and Safety Act 85 of 1993 and Regulations	>1 year In-service job experience Less than 1 year	Meeting all requirements = 5 Not meeting requirements = 0
B1.10	Certified Mechanical Handling (Rigger)	Mechanical handling. Rigging and Slings. Crane operator. (certificate of competency)	>1 year In-service job experience Less than 1 year	Meeting all requirements = 5 Not meeting requirements = 0
B1.11	Service Technician/Artisan– Switchgear and circuit breaker services (Make: Schneider/Merlin Gerin, ABB and CBI) or equivalent	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.12	Service Technician/Artisan/Assistant – <u>Low Voltage 230/440 VAC</u> Electronic Soft starter and Variable Speed drive services (WEG, Yaskawa, Delta, ABB, Allan Bradley, or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.13	Service Engineer – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.14	Service Technician/Artisan/Assistant – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.15	Technician/Artisan – Electrical valve actuator (Make: AUMA)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0

B1 Key Staff Personnel Requirement				
Number	Position	Qualification as per tender specification	Years of experience as per tender specification	Applicable values/points
B1.16	Technician/Artisan – Electrical valve actuator (Make: Greytork)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.17	Technician/Artisan – Electrical valve actuator (Make: ROTORK)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.18	Technician/Artisan – Dynamic Power Factor Correction specialist (Impact Power Innovations & Bellco)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.19	Technician/Artisan – generator engine controllers and changeover (Deep Sea and Lovato or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.20	Technician/Artisan – Uninterruptable Power Supply (Riello, Schneider Electric, APC or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
B1.21	Air conditioner and dry air de-humidifier service technician (Dehu Tech or equivalent)	Trade related experience or certified by OEM Representative	>3 Years Post Qualification Less than 3 years	Meeting all requirements = 5 Not meeting requirements = 0
Total for category B1				130

B2 Vehicles required The vehicles of the tenderer need to be presented upon site inspection/evaluation at the sole discretion of the Bid Evaluation Committee. For the tender it is required to disclose full details of the vehicles (Proof of documented ownership or Rental agreement)			
Number	Vehicle Type	Minimum requirement	Applicable values/points
B2.1	0.5 – 0.75 ton Light Delivery Vehicle (LDV)	2 x (Two) vehicles are required. NO panels van versions of motor car vehicles allowed. Vehicles must be flat bed bakkies, which will be eligible. Included a copy of registration document for each indicating ownership or a letter of intent to hire. No proof supplied	Meeting all the requirements = 10 points per vehicle Not meeting all the requirements =0
B2.2	1.0 ton Light Delivery Vehicle (LDV)	1 x (One) vehicle is required. NO panel van versions of motor car vehicles allowed. Vehicles must be flat bed bakkies, which will be eligible. Included a copy of registration document for each indicating ownership or a letter of intent to hire. No proof supplied	Meeting all the requirements = 10 points per vehicle Not meeting all the requirements =0
B2.3	Truck, 3 ton flat bed with 3 or 5 ton truck mounted crane Should the tenderer own or have 24/7 daily access to a 5 ton flat bed with truck mounted crane, there is no requirement to also have a 3 ton flat bed with truck mounted crane in above no. 2	x1 (One) required for an offer in the ENGINEERING AND ASSET MANAGEMENT (EAM) Region. (Any one of the trucks detailed will be eligible. Included a copy of registration document for each indicating ownership or a letter of intent to hire. Proof shall be listed in Schedule 14 or Schedule 15 whichever is applicable If none of these vehicles are owned, the tenderer need to prove to the City of Cape Town that such fleet can be acquired by means of rental or agreement with a fleet supplier etc. No proof supplied	Meeting all the requirements = 10 points per vehicle Not meeting all the requirements =0
B2.4	Truck mounted or mobile 15 meter aerial platform (Cherry picker)	x1 (One) required. Included a copy of registration document for each indicating owner. If none of these vehicles are owned, the tenderer need to prove to the City of Cape Town that such fleet can be acquired by means of rental or agreement or intent to rent with a fleet rental supplier etc. Proof shall be listed in Schedule 14 or Schedule 15 whichever is applicable	Meeting all the requirements = 10 points per vehicle Not meeting all the requirements =0
Max. Total for category B2			40

2.2.1.1.7 Provision of samples

Not applicable

2.2.2 Cost of tendering

The CCT will not be liable for any costs incurred in the preparation and submission of a tender offer, including the costs of any testing necessary to demonstrate that aspects of the offer complies with requirements.

2.2.3 Check documents

The documents issued by the CCT for the purpose of a tender offer are listed in the index of this tender document.

Before submission of any tender, the tenderer should check the number of pages, and if any are found to be missing or duplicated, or the figures or writing is indistinct, or if the Price Schedule contains any obvious errors, the tenderer must apply to the CCT at once to have the same rectified.

2.2.4 Confidentiality and copyright of documents

Treat as confidential all matters arising in connection with the tender. Use and copy the documents issued by the CCT only for the purpose of preparing and submitting a tender offer in response to the invitation.

2.2.5 Reference documents

Obtain, as necessary for submitting a tender offer, copies of the latest versions of standards, specifications, Conditions of Contract and other publications, which are not attached but which are incorporated into the tender documents by reference.

2.2.6 Acknowledge and comply with notices

Acknowledge receipt of notices to the tender documents, which the CCT may issue, fully comply with all instructions issued in the notices, and if necessary, apply for an extension of the closing time stated on the front page of the tender document, in order to take the notices into account. Notwithstanding any requests for confirmation of receipt of notices issued, the tenderer shall be deemed to have received such notices if the CCT can show proof of transmission thereof via electronic mail, facsimile or registered post.

2.2.7 Clarification meeting

Attend, where required, a clarification meeting at which tenderers may familiarise themselves with aspects of the proposed work, services or supply and pose questions. Details of the meeting(s) are stated in the General Tender Information.

Tenderers should be represented at the site visit/clarification meeting by a person who is suitably qualified and experienced to comprehend the implications of the work involved.

2.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the CCT at least one week before the closing time stated in the General Tender Information, where possible.

2.2.9 Pricing the tender offer

2.2.9.1 Comply with all pricing instructions as stated on the Price Schedule.

2.2.10 Alterations to documents

Do not make any alterations or additions to the tender documents, except to comply with instructions issued by the CCT in writing, or necessary to correct errors made by the tenderer. All signatories to the tender offer shall initial all such alterations.

2.2.11 Alternative tender offers

2.2.11.1 Unless otherwise stated in the tender conditions submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted.

If a tenderer wishes to submit an alternative tender offer, he shall do so as a separate offer on a complete set of tender documents. The alternative tender offer shall be submitted in a separate sealed envelope clearly marked "Alternative Tender" in order to distinguish it from the main tender offer.

Only the alternative of the highest ranked acceptable main tender offer (that is, submitted by the same tenderer) will be considered, and if appropriate, recommended for award.

Alternative tender offers of any but the highest ranked main tender offer will not be considered.

An alternative of the highest ranked acceptable main tender offer that is priced higher than the main tender offer may be recommended for award, provided that the ranking of the alternative tender offer is higher than the ranking of the next ranked acceptable main tender offer.

The CCT will not be bound to consider alternative tenders and shall have sole discretion in this regard.

In the event that the alternative is accepted, the tenderer warrants that the alternative offer complies in all respects with the CCT's standards and requirements.

2.2.11.2 Accept that an alternative tender offer may be based only on the criteria stated in the tender conditions or criteria otherwise acceptable to the CCT.

2.2.12 Submitting a tender offer

2.2.12.1 Submit one tender offer only on the original tender documents as issued by the CCT, either as a single tendering entity or as a member in a joint venture to provide the whole of the works, services or supply identified in the contract conditions and described in the specifications. Only those tenders submitted on the tender documents as issued by the CCT together with all Returnable Schedules duly completed and signed will be declared responsive.

2.2.12.2 Return the entire document to the CCT after completing it in its entirety, either electronically (if they were issued in electronic format) or by writing legibly in non-erasable ink.

2.2.12.3 Submit the parts of the tender offer communicated on paper as an original with an English translation for any part of the tender submission not made in English.

1 (One) copy(ies) of the following elements of the bid submission must be submitted separately bound in the same envelope where possible:

Part	Heading
5	Pricing Schedules
6	Supporting Schedules
	All other attachments submitted by bidder

2.2.12.4 Sign the original tender offer where required in terms of the tender conditions. The tender shall be signed by a person duly authorised to do so. Tenders submitted by joint ventures of two or more firms shall be accompanied by the document of formation of the joint venture or any other document signed by all parties, in which is defined precisely the conditions under which the joint venture will function, its period of duration, the persons authorised to represent and obligate it, the participation of the several firms forming the joint venture, and any other information necessary to permit a full appraisal of its functioning. Signatories for tenderers proposing to contract as joint ventures shall state which of the signatories is the lead partner.

2.2.12.5 Where a two-envelope system is required in terms of the tender conditions, place and seal the returnable documents listed in the tender conditions in an envelope marked "financial proposal" and place the remaining returnable documents in an envelope marked "technical proposal". Each envelope shall state on the outside the CCT's address and identification details stated in the General Tender Information, as well as the tenderer's name and contact address.

2.2.12.6 Seal the original tender offer and copy packages together in an outer package that states on the outside only the CCT's address and identification details as stated in the General Tender Information. . If it is not possible to submit the original tender and the required copies (see 2.2.12.3) in a single envelope, then the tenderer must seal the original and each copy of the tender offer as separate packages marking the packages as "ORIGINAL" and "COPY" in addition to the aforementioned tender submission details.

2.2.12.7 Accept that the CCT shall not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.

2.2.12.8 Accept that tender offers submitted by facsimile or e-mail will be rejected by the CCT, unless stated otherwise in the tender conditions.

2.2.12.9 By signing the offer part of the Form of Offer (**Section 2, Part A**) the tenderer warrants that all information provided in the tender submission is true and correct.

2.2.12.10 Tenders must be properly received and deposited in the designated tender box (as detailed on the front page of this tender document) on or before the closing date and before the closing time, in the relevant tender box at the Tender & Quotation Boxes Office situated on the 2nd floor, Concourse Level, Civic Centre, 12 Hertzog Boulevard, Cape Town. If the tender submission is too large to fit in the allocated box, please enquire at the public counter for assistance.

2.2.12.12 The tenderer must record and reference all information submitted contained in other documents for example cover letters, brochures, catalogues, etc. in the returnable schedule titled **List of Other Documents Attached by Tenderer**.

2.2.13 Information and data to be completed in all respects

Accept that tender offers, which do not provide all the data or information requested completely and in the form required, may be regarded by the CCT as non-responsive.

2.2.14 Closing time

2.2.14.1 Ensure that the CCT receives the tender offer at the address specified in the General Tender Information prior to the closing time stated on the front page of the tender document.

2.2.14.2 Accept that, if the CCT extends the closing time stated on the front page of the tender document for any reason, the requirements of these Conditions of Tender apply equally to the extended deadline.

2.2.14.3 Accept that, the CCT shall not consider tenders that are received after the closing date and time for such a tender (late tenders).

2.2.15 Tender offer validity and withdrawal of tenders

2.2.15.1 Warrants that the tender offer(s) remains valid, irrevocable and open for acceptance by the CCT at any time for a period of 120 days after the closing date stated on the front page of the tender document.

2.2.15.2 Notwithstanding the period stated above, bids shall remain valid for acceptance for a period of twelve (12) months after the expiry of the original validity period, unless the City is notified in writing of anything to the contrary by the bidder. The validity of bids may be further extended by a period of not more than six months subject to mutual agreement and administrative processes and upon approval by the City Manager.

2.2.15.3 A tenderer may request in writing, after the closing date, that the tender offer be withdrawn. Such withdrawal will be permitted or refused at the sole discretion of the CCT after consideration of the reasons for the withdrawal, which shall be fully set out by the tenderer in such written request for withdrawal. Should the tender offer be withdrawn in contravention hereof, the tenderer agrees that:

- a) it shall be liable to the CCT for any additional expense incurred or losses suffered by the CCT in having either to accept another tender or, if new tenders have to be invited, the additional expenses incurred or losses suffered by the invitation of new tenders and the subsequent acceptance of any other tender;
- b) the CCT shall also have the right to recover such additional expenses or losses by set-off against monies which may be due or become due to the tenderer under this or any other tender or contract or against any guarantee or deposit that may have been furnished by the tenderer or on its behalf for the due fulfilment of this or any other tender or contract. Pending the ascertainment of the amount of such additional expenses or losses, the CCT shall be entitled to retain such monies, guarantee or deposit as security for any such expenses or loss.

2.2.16 Clarification of tender offer, or additional information, after submission

Provide clarification of a tender offer, or additional information, in response to a written request to do so from the CCT during the evaluation of tender offers within the time period stated in such request. No change in the competitive position of tenderers or substance of the tender offer is sought, offered, or permitted.

Note: This clause does not preclude the negotiation of the final terms of the contract with a preferred tenderer following a competitive selection process, should the CCT elect to do so.

Failure, or refusal, to provide such clarification or additional information within the time for submission stated in the CCT's written request may render the tender non-responsive.

2.2.17 Provide other material

2.2.17.1 Provide, on request by the CCT, any other material that has a bearing on the tender offer, the tenderer's commercial position (including joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the CCT for the purpose of the evaluation of the tender. Should the tenderer not provide the material, or a satisfactory reason as to why it cannot be provided, by the time for submission stated in the CCT's request, the CCT may regard the tender offer as non-responsive.

2.2.17.2 Provide, on written request by the CCT, where the transaction value inclusive of VAT **exceeds R 10 million**:

- a) audited annual financial statement for the past 3 years, or for the period since establishment if established during the past 3 years, if required by law to prepare annual financial statements for auditing;
- b) a certificate signed by the tenderer certifying that the tenderer has no undisputed commitments for municipal services towards a municipality or other service provider in respect of which payment is overdue for more than 30 days;

- c) particulars of any contracts awarded to the tenderer by an organ of state during the past five years, including particulars of any material non-compliance or dispute concerning the execution of such contract;
- d) a statement indicating whether any portion of the goods or services are expected to be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from the municipality or municipal entity is expected to be transferred out of the Republic.

Each party to a Consortium/Joint Venture shall submit separate certificates/statements in the above regard.

2.2.17.3 Tenderers undertake to fully cooperate with the CCT's external service provider appointed to perform a due diligence review and risk assessment upon receipt of such written instruction from the CCT.

2.2.18 Samples, Inspections, tests and analysis

Provide access during working hours to premises for inspections, tests and analysis as provided for in the tender conditions or specifications.

If the **Specification** requires the tenderer to provide samples, these shall be provided strictly in accordance with the instructions set out in the Specification.

If such samples are not submitted as required in the bid documents or within any further time stipulated by the CCT in writing, then the bid concerned may be declared non-responsive.

The samples provided by all successful bidders will be retained by the CCT for the duration of any subsequent contract. Bidders are to note that samples are requested for testing purposes therefore samples submitted to the CCT may not in all instances be returned in the same state of supply and in other instances may not be returned at all. Unsuccessful bidders will be advised by the Project Manager or dedicated CCT Official to collect their samples, save in the aforementioned instances where the samples would not be returned.

2.2.19 Certificates

The tenderer must provide the CCT with all certificates as stated below:

2.2.19.2 Evidence of tax compliance

Tenderers shall be registered with the South African Revenue Service (SARS) and their tax affairs must be in order and they must be tax compliant subject to the requirements of clause 2.2.1.1.2.h. The tenderer must also provide its Tax Compliance Status PIN number on the **Details of Tenderer** pages of the tender submission.

Each party to a Consortium/Joint Venture shall submit a separate Tax Clearance Certificate.

Before making an award the City must verify the bidder's tax compliance status. Where the recommended bidder is not tax compliant, the bidder should be notified of the non-compliant status and be requested to submit to the City, within 7 working days, written proof from SARS that they have made arrangement to meet their outstanding tax obligations. The proof of tax compliance submitted by the bidder must be verified by the City via CSD or e-Filing. The City should reject a bid submitted by the bidder if such bidder fails to provide proof of tax compliance within the timeframe stated herein.

Only foreign suppliers who have answered "NO" to all the questions contained in the Questionnaire to Bidding Foreign Suppliers section on the **Details of Tenderer** pages of the tender submission, are not required to register for a tax compliance status with SARS.

2.2.20 Compliance with Occupational Health and Safety Act, 85 of 1993

Tenderers are to note the requirements of the Occupational Health and Safety Act, 85 of 1993. The Tenderer shall be deemed to have read and fully understood the requirements of the above Act and Regulations and to have allowed for all costs in compliance therewith.

In this regard the Tenderer shall submit **upon written request to do so by the CCT**, a Health and Safety Plan in sufficient detail to demonstrate the necessary competencies and resources to deliver the goods or services all in accordance with the Act, Regulations and Health and Safety Specification.

2.2.21 Claims arising from submission of tender

The tenderer warrants that it has:

- a) inspected the Specifications and read and fully understood the Conditions of Contract.
- b) read and fully understood the whole text of the Specifications and Price Schedule and thoroughly acquainted himself with the nature of the goods or services proposed and generally of all matters which may influence the Contract.
- c) visited the site(s) where delivery of the proposed goods will take place, carefully examined existing conditions, the means of access to the site(s), the conditions under which the delivery is to be made, and acquainted himself with any limitations or restrictions that may be imposed by the Municipal or other Authorities in regard to access and transport of materials, plant and equipment to and from the site(s) and made the necessary provisions for any additional costs involved thereby.
- d) requested the CCT to clarify the actual requirements of anything in the Specifications and Price Schedule, the exact meaning or interpretation of which is not clearly intelligible to the Tenderer.
- e) received any notices to the tender documents which have been issued in accordance with the CCT's Supply Chain Management Policy.

The CCT will therefore not be liable for the payment of any extra costs or claims arising from the submission of the tender.

2.3 The CCT's undertakings

2.3.1 Respond to requests from the tenderer

2.3.1.1 Unless otherwise stated in the Tender Conditions, respond to a request for clarification received up to one week (where possible) before the tender closing time stated on the front page of the tender document.

2.3.1.2 The CCT's representative for the purpose of this tender is stated on the General Tender Information page.

2.3.2 Issue Notices

If necessary, issue addenda in writing that may amend or amplify the tender documents to each tenderer during the period from the date the tender documents are available until one week before the tender closing time stated in the Tender Data. The Employer reserves its rights to issue addenda less than one week before the tender closing time in exceptional circumstances. If, as a result a tenderer applies for an extension to the closing time stated on the front page of the tender document, the CCT may grant such extension and, shall then notify all tenderers who drew documents.

Notwithstanding any requests for confirmation of receipt of notices issued, the tenderer shall be deemed to have received such notices if the CCT can show proof of transmission thereof via electronic mail, facsimile or registered post.

2.3.3 Opening of tender submissions

2.3.3.1 Unless the two-envelope system is to be followed, open tender submissions in the presence of tenderers' agents who choose to attend at the time and place stated in the tender conditions.

Tenders will be opened immediately after the closing time for receipt of tenders as stated on the front page of the tender document, or as stated in any Notice extending the closing date and at the closing venue as stated in the General Tender Information.

2.3.3.2 Announce at the meeting held immediately after the opening of tender submissions, at the closing venue as stated in the General Tender Information, the name of each tenderer whose tender offer is opened and, where possible, the prices indicated.

2.3.3.3 Make available a record of the details announced at the tender opening meeting on the CCT's website (<http://www.capetown.gov.za/en/SupplyChainManagement/Pages/default.aspx>.)

2.3.4 Two-envelope system

2.3.4.1 Where stated in the tender conditions that a two-envelope system is to be followed, open only the technical proposal of tenders in the presence of tenderers' agents who choose to attend at the time and place stated in the tender conditions and announce the name of each tenderer whose technical proposal is opened.

2.3.4.2 Evaluate the quality of the technical proposals offered by tenderers, then advise tenderers who have submitted responsive technical proposals of the time and place when the financial proposals will be opened. Open only the financial proposals of tenderers, who have submitted responsive technical proposals in accordance with the requirements as stated in the tender conditions, and announce the total price and any preferences claimed. Return unopened financial proposals to tenderers whose technical proposals were non responsive.

2.3.5 Non-disclosure

Not disclose to tenderers, or to any other person not officially concerned with such processes, information relating to the evaluation and comparison of tender offers and recommendations for the award of a contract, until after the award of the contract to the successful tenderer.

2.3.6 Grounds for rejection and disqualification

Determine whether there has been any effort by a tenderer to influence the processing of tender offers and instantly disqualify a tenderer (and his tender offer) if it is established that he engaged in corrupt or fraudulent practices.

2.3.7 Test for responsiveness

2.3.7.1 Appoint a Bid Evaluation Committee and determine after opening whether each tender offer properly received:

- a) complies with the requirements of these Conditions of Tender,
- b) has been properly and fully completed and signed, and
- c) is responsive to the other requirements of the tender documents.

2.3.7.2 A responsive tender is one that conforms to all the terms, conditions, and specifications of the tender documents without material deviation or qualification. A material deviation or qualification is one which, in the CCT's opinion, would:

- a) detrimentally affect the scope, quality, or performance of the goods, services or supply identified in the Specifications,
- b) significantly change the CCT's or the tenderer's risks and responsibilities under the contract, or
- c) affect the competitive position of other tenderers presenting responsive tenders, if it were to be rectified.

Reject a non-responsive tender offer, and not allow it to be subsequently made responsive by correction or withdrawal of any material deviation or qualification.

The CCT reserves the right to accept a tender offer which does not, in the CCT's opinion, materially and/or substantially deviate from the terms, conditions, and specifications of the tender documents.

2.3.8 Arithmetical errors, omissions and discrepancies

2.3.8.1 Check the responsive tenders for:

- a) the gross misplacement of the decimal point in any unit rate;
- b) omissions made in completing the Price Schedule; or
- c) arithmetic errors in:
 - i) line item totals resulting from the product of a unit rate and a quantity in the Price Schedule; or
 - ii) the summation of the prices; or
 - iii) calculation of individual rates.

2.3.8.2 The CCT must correct the arithmetical errors in the following manner:

- a) Where there is a discrepancy between the amounts in words and amounts in figures, the amount in words shall govern.
- b) If pricing schedules apply and there is an error in the line item total resulting from the product of the unit rate and the quantity, the line item total shall govern and the rate shall be corrected. Where there is an obviously gross misplacement of the decimal point in the unit rate, the line item total as tendered shall govern, and the unit rate shall be corrected.
- c) Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall govern and the

tenderer will be asked to revise selected item prices (and their rates if Price Schedules apply) to achieve the tendered total of the prices.

Consider the rejection of a tender offer if the tenderer does not correct or accept the correction of the arithmetical error in the manner described above.

2.3.8.3 In the event of tendered rates or lump sums being declared by the CCT to be unacceptable to it because they are not priced, either excessively low or high, or not in proper balance with other rates or lump sums, the tenderer may be required to produce evidence and advance arguments in support of the tendered rates or lump sums objected to. If, after submission of such evidence and any further evidence requested, the CCT is still not satisfied with the tendered rates or lump sums objected to, it may request the tenderer to amend these rates and lump sums along the lines indicated by it.

The tenderer will then have the option to alter and/or amend the rates and lump sums objected to and such other related amounts as are agreed on by the CCT, but this shall be done without altering the tender offer in accordance with this clause.

Should the tenderer fail to amend his tender in a manner acceptable to and within the time stated by the CCT, the CCT may declare the tender as non-responsive.

2.3.9 Clarification of a tender offer

The CCT may, after the closing date, request additional information or clarification from tenderers, in writing on any matter affecting the evaluation of the tender offer or that could give rise to ambiguity in a contract arising from the tender offer, which written request and related response shall not change or affect their competitive position or the substance of their offer. Such request may only be made in writing by the Director: Supply Chain Management using any means as appropriate.

2.3.10 Evaluation of tender offers

2.3.10.1 General

2.3.10.1.1 Reduce each responsive tender offer to a comparative price and evaluate them using the tender evaluation methods and associated evaluation criteria and weightings that are specified in the tender conditions.

2.3.10.1.2 For evaluation purposes only, the effects of the relevant contract price adjustment methods will be considered in the determination of comparative prices as follows:

- a. If the selected method is based on bidders supplying rates or percentages for outer years, comparative prices would be determined over the entire contract period based on such rates or percentages.
- b. If the selected method is based on a formula, indices, coefficients, etc. that is the same for all bidders during the contract period, comparative prices would be the prices as tendered for year one.
- c. If the selected method is based on a formula, indices, coefficients, etc. that varies between bidders, comparative prices would be determined over the entire contract period based on published indices relevant during the 12 months prior to the closing date of tenders.
- d. If the selected method includes an imported content requiring rate of exchange variation, comparative prices would be determined based on the exchange rates tendered for the prices as tendered for year one. The rand equivalent of the applicable currency 14 days prior to the closing date of tender will be used (the CCT will check all quoted rates against those supplied by its own bank).
- e. If the selected method is based on suppliers' price lists, comparative prices would be the prices as tendered for year one.
- f. If the selected method is based on suppliers' price lists and / or rate of exchange, comparative prices would be determined as tendered for year one whilst taking into account the tendered percentage subject to rate of exchange (see sub clause (d) for details on the calculation of the rate of exchange).

2.3.10.1.3 Where the scoring of functionality forms part of a bid process, each member of the Bid Evaluation Committee must individually score functionality. The individual scores must then be interrogated and calibrated if required where there are significant discrepancies. The individual scores must then be added together and averaged to determine the final score.

2.3.10.2 Decimal places

Score financial offers, preferences and functionality, as relevant, to two decimal places.

2.3.10.3 Scoring of tenders (price and preference)

2.3.10.3.1 Points for price will be allocated in accordance with the formula set out in this clause based on the price per item / rates as set out in the **Price Schedule (Part 5)**:

- based on the sum of the prices/rates in relation to the estimated quantities. All line items will form part of the evaluation.
- All line items evaluated and accepted by the BEC for award, will form part of the evaluation.

2.3.10.3.2 Points for preference will be allocated in accordance with the provisions of **Preference Schedule** and the table in this clause.

2.3.10.3.3 The terms and conditions of **Preference Schedule** as it relates to preference shall apply in all respects to the tender evaluation process and any subsequent contract.

2.3.10.3.4 Applicable formula:

The 90/10 price/preference points system will be applied to the evaluation of responsive tenders over a Rand value of R50'000'000 (all applicable taxes included), whereby the order(s) will be placed with the tenderer(s) scoring the highest total number of adjudication points.

Price shall be scored as follows:

$$Ps = 90 \times \left(1 - \frac{(Pt - Pmin)}{Pmin}\right)$$

Where: Ps is the number of points scored for price;
Pt is the price of the tender under consideration;
Pmin is the price of the lowest responsive tender.

Preference points shall be based on the Specific Goal as per below:

HDI COMPLIANCE WITH SECTION 2(1)(d)(i) OF THE ACT

No	Specific Goal	Definition	Required Evidence	Points to be allocated
1	Gender (Ownership)	Persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of gender are women.	CSD Registration report B-BBEE Certificate CIPC Certificate	5

AND

3	Race (Ownership)	Persons, or categories of persons, historically disadvantaged by unfair discrimination on the basis of race.	B-BBEE Certificate CSD Registration report CIPC Company Registration	5
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SPECIFIC GOALS IN COMPLIANCE WITH SECTION 2(1)(d)(ii) OF THE ACT

Not applicable

2.3.10.5 Risk Analysis

Notwithstanding compliance with regard to any requirements of the tender, the CCT will perform a risk analysis in respect of the following:

- reasonableness of the financial offer
- reasonableness of unit rates and prices
- the tenderer's ability to fulfil its obligations in terms of the tender document, that is, that the tenderer can demonstrate that he/she possesses the necessary professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, capacity, experience, reputation, personnel to perform the contract, etc.; the CCT reserves the right to consider a tenderer's existing contracts with the CCT in this regard

- d) any other matter relating to the submitted bid, the tendering entity, matters of compliance, verification of submitted information and documents, etc.

The conclusions drawn from this risk analysis will be used by the CCT in determining the acceptability of the tender offer.

No tenderer will be recommended for an award unless the tenderer has demonstrated to the satisfaction of the CCT that he/she has the resources and skills required.

2.3.11 Negotiations with preferred tenderers

The CCT may negotiate the final terms of a contract with tenderers identified through a competitive tendering process as preferred tenderers provided that such negotiation:

- a) does not allow any preferred tenderer a second or unfair opportunity;
- b) is not to the detriment of any other tenderer; and
- c) does not lead to a higher price than the tender as submitted.

If negotiations fail to result in acceptable contract terms, the City Manager (or his delegated authority) may terminate the negotiations and cancel the tender, or invite the next ranked tenderer for negotiations. The original preferred tenderer should be informed of the reasons for termination of the negotiations. If the decision is to invite the next highest ranked tenderer for negotiations, the failed earlier negotiations may not be reopened by the CCT.

Minutes of any such negotiations shall be kept for record purposes.

The provisions of this clause will be equally applicable to any invitation to negotiate with any other tenderers.

In terms of the PPPFA Regulations, 2023, tenders must be cancelled in the event that negotiations fail to achieve a market related price with any of the three highest scoring tenderers.

2.3.12 Acceptance of tender offer

Notwithstanding any other provisions contained in the tender document, the CCT reserves the right to:

2.3.12.1 Accept a tender offer(s) which does not, in the CCT's opinion, materially and/or substantially deviate from the terms, conditions, and specifications of the tender document.

2.3.12.2 Accept the whole tender or part of a tender or any item or part of any item or items from multiple manufacturers, or to accept more than one tender (in the event of a number of items being offered), and the CCT is not obliged to accept the lowest or any tender.

2.3.12.3 Accept the tender offer(s), if in the opinion of the CCT, it does not present any material risk and only if the tenderer(s)::

- a) is not under restrictions, has any principals who are under restrictions, or is not currently a supplier to whom notice has been served for abuse of the supply chain management system, preventing participation in the employer's procurement,
- b) can, as necessary and in relation to the proposed contract, demonstrate that he or she possesses the professional and technical qualifications, professional and technical competence, financial resources, equipment and other physical facilities, managerial capability, reliability, experience and reputation, expertise and the personnel, to perform the contract,) has the legal capacity to enter into the contract,
- d) is not insolvent, in receivership, under Business Rescue as provided for in chapter 6 of the Companies Act, 2008, bankrupt or being wound up, has his affairs administered by a court or a judicial officer, has suspended his business activities, or is subject to legal proceedings in respect of any of the foregoing, complies with the legal requirements, if any, stated in the tender data, and
- e) is able, in the opinion of the employer, to perform the contract free of conflicts of interest.

If an award cannot be made in terms of anything contained herein, the Employer reserves the right to consider the next ranked tenderer(s).

2.3.12.4 Not to make an award, or revoke an award already made, where the implementation of the contract may result in reputational risk or harm to the City as a result of (inter alia):

- a) reports of poor governance and/or unethical behaviour;

- b) association with known family of notorious individuals;
- c) poor performance issues, known to the City;
- d) negative social media reports; and
- e) adverse assurance (e.g. due diligence) report outcomes.

2.3.12.5 The CCT reserves the right to nominate an alternative bidder at the time when an award is made and in the event that a contract is terminated during the execution thereof, the CCT may consider the award of the contract, or non-award, to the alternative bidder in terms of the procedures included its SCM Policy.

2.3.13 Prepare contract documents

2.3.13.1 If necessary, revise documents that shall form part of the contract and that were issued by the CCT as part of the tender documents to take account of:

- a) notices issued during the tender period,
- b) inclusion of some of the returnable documents, and
- c) other revisions agreed between the CCT and the successful tenderer.

2.3.13.2 Complete the schedule of deviations attached to the form of offer and acceptance, if any.

2.3.14 Notice to successful and unsuccessful tenderers

2.3.14.1 Before accepting the tender of the successful tenderer the CCT shall notify the successful tenderer in writing of the decision of the CCT's Bid Adjudication Committee to award the tender to the successful tenderer. No rights shall accrue to the successful tenderer in terms of this notice

2.3.14.2 The CCT shall, at the same time as notifying the successful tenderer of the Bid Adjudication Committee's decision to award the tender to the successful tenderer, also give written notice to the other tenderers informing them that they have been unsuccessful.

2.3.15 Provide written reasons for actions taken

Provide upon request written reasons to tenderers for any action that is taken in applying these Conditions of Tender, but withhold information which is not in the public interest to be divulged, which is considered to prejudice the legitimate commercial interests of tenderers or might prejudice fair competition between tenderers.

TENDER DOCUMENT GOODS AND SERVICES		 CITY OF CAPE TOWN ISIXEKO SASEKAPA STAD KAAPSTAD	
SUPPLY CHAIN MANAGEMENT			
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TENDER NO: 298S/2022/23

TENDER DESCRIPTION: PROVISION OF MAINTENANCE OF MOTOR CONTROL CENTRES AT VARIOUS WATER AND SANITATION, CITY OF CAPE TOWN SITES IN ENGINEERING AND ASSET MANAGEMENT (EAM) REGION 3

CONTRACT PERIOD: FROM COMMENCEMENT DATE TILL 30 JUNE 2026

VOLUME 2: RETURNABLE DOCUMENTS

TENDERER	
NAME of Company/Close Corporation or Partnership / Joint Venture/ Consortium or Sole Proprietor /Individual	
TRADING AS (if different from above)	

NATURE OF TENDER OFFER (please indicate below)	
Main Offer (see clause 2.2.11.1)	
Alternative Offer (see clause 2.2.11.1)	

VOLUME 2: RETURNABLE DOCUMENTS

(3) DETAILS OF TENDERER

1.1 Type of Entity (Please tick one box)☐ Individual / Sole Proprietor☐ Close Corporation☐ Company☐ Partnership or Joint Venture or Consortium☐ Trust☐ Other:**1.2 Required Details** (Please provide applicable details in full):

Name of Company / Close Corporation or Partnership / Joint Venture / Consortium or Individual /Sole Proprietor	
Trading as (if different from above)	
Company / Close Corporation registration number (if applicable)	
Postal address	Postal Code _____
Physical address (Chosen domicilium citandi et executandi)	Postal Code _____
Contact details of the person duly authorised to represent the tenderer	Name: Mr/Ms _____ (Name & Surname) Telephone:(____) _____ Fax:(____) _____ Cellular Telephone: _____ E-mail address: _____
Income tax number	
VAT registration number	
SARS Tax Compliance Status PIN	
City of Cape Town Supplier Database Registration Number (See Conditions of Tender)	
National Treasury Central Supplier Database registration number (See Conditions of Tender)	

Is tenderer the accredited representative in South Africa for the Goods / Services / Works offered?	☐ Yes ☐ No If yes, enclose proof
Is tenderer a foreign based supplier for the Goods / Services / Works offered?	☐ Yes ☐ No If yes, answer the Questionnaire to Bidding Foreign Suppliers (below)
Questionnaire to Bidding Foreign Suppliers	a) Is the tenderer a resident of the Republic of South Africa or an entity registered in South Africa? ☐ Yes ☐ No
	b) Does the tenderer have a permanent establishment in the Republic of South Africa? ☐ Yes ☐ No
	c) Does the tenderer have any source of income in the Republic of South Africa? ☐ Yes ☐ No
	d) Is the tenderer liable in the Republic of South Africa for any form of taxation? ☐ Yes ☐ No
Department of Labour registration number as Electrical Contractor (Installation Electrician)	
Department of Labour registration number as Electrical Contractor (Master Installation Electrician)	

(4) FORM OF OFFER AND ACCEPTANCE

TENDER 298S/2022/23 PROVISION OF MAINTENANCE OF MOTOR CONTROL CENTRES AT VARIOUS WATER AND SANITATION, CITY OF CAPE TOWN SITES IN ENGINEERING AND ASSET MANAGEMENT (EAM) REGION 3

OFFER: (TO BE FILLED IN BY TENDERER):

Required Details (Please provide applicable details in full):

Name of Tendering Entity* (“the tenderer”)	
Trading as (if different from above)	

AND WHO IS represented herein by: (full names of signatory)

duly authorised to act on behalf of the tenderer in his capacity as: (title/ designation)

HEREBY AGREES THAT by signing the *Form of Offer and Acceptance*, the tenderer:

1. confirms that it has examined the documents listed in the Index (including Schedules and Annexures) and has accepted all the Conditions of Tender;
2. confirms that it has received and incorporated any and all notices issued to tenderers issued by the CCT;
3. confirms that it has satisfied itself as to the correctness and validity of the tender offer; that the price(s) and rate(s) offered cover all the goods and/or services specified in the tender documents; that the price(s) and rate(s) cover all its obligations and accepts that any mistakes regarding price(s), rate(s) and calculations will be at its own risk;
4. offers to supply all or any of the goods and/or render all or any of the services described in the tender document to the CCT in accordance with the:
 - 4.1 terms and conditions stipulated in this tender document;
 - 4.2 specifications stipulated in this tender document; and
 - 4.3 at the prices as set out in the **Price Schedule**.
5. accepts full responsibility for the proper execution and fulfilment of all obligations and conditions devolving on it in terms of the Contract.

Signature(s)

Print name(s):

On behalf of the tenderer (duly authorised)

Date

INITIALS OF CITY OFFICIALS		
1	2	3

FORM OF OFFER AND ACCEPTANCE (continued)

TENDER 298S/2022/23- TENDER DESCRIPTION: PROVISION OF MAINTENANCE OF MOTOR CONTROL CENTRES AT VARIOUS WATER AND SANITATION, CITY OF CAPE TOWN SITES IN ENGINEERING AND ASSET MANAGEMENT (EAM) REGION 3

ACCEPTANCE (TO BE FILLED IN BY THE CITY OF CAPE TOWN)

By signing this part of this form of offer and acceptance, the employer identified below accepts the tenderer's offer. In consideration thereof, the employer shall pay the supplier the amount due in accordance with the conditions of contract. Acceptance of the tenderer's offer shall form an agreement between the employer and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract are contained in:

- (7) & (8): Special and General Conditions of Tender
- (5) Price schedule
- 13: Specifications

and drawings and documents or parts thereof, which may be incorporated by reference into the above listed Parts.

Deviations from and amendments to the documents listed in the tender data and any addenda thereto as listed in the returnable schedules as well as any changes to the terms of the offer agreed by the tenderer and the employer during this process of offer and acceptance, are contained in the schedule of deviations attached to and forming part of this form of offer and acceptance. No amendments to or deviations from said documents are valid unless contained in this schedule.

The tenderer shall within two weeks after receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the employer to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documents to be provided in terms of the conditions of contract identified in the special contract conditions. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the parties have signed the table below and confirms receipt from the employer of one fully completed original copy of this agreement, including the schedule of deviations (if any). The tenderer (now supplier) shall within five working days of the agreement coming into effect notify the employer in writing of any reason why he cannot accept the contents of this agreement as a complete and accurate memorandum thereof, failing which the agreement presented to the contractor shall constitute the binding contract between the parties.

The Parties	Employer	Supplier
Business Name		
Business Registration		
Tax number (VAT)		
Physical Address		
Accepted contract sum including tax		
Accepted contract duration		
Signed – who by signature hereto warrants authority		
Name of signatory		
Signed: Date		
Signed: Location		
Signed: Witness		
Name of Witness		

FORM OF OFFER AND ACCEPTANCE (continued)

(TO BE FILLED IN BY THE CITY OF CAPE TOWN)

Schedule of Deviations

Notes:

1. The extent of deviations from the tender documents issued by the CCT before the tender closing date is limited to those permitted in terms of the conditions of tender.
2. A tenderer's covering letter shall not be included in the final contract document. Should any matter in such letter, which constitutes a deviation as aforesaid, become the subject of agreements reached during the process of offer and acceptance, the outcome of such agreement shall be recorded here.
3. Any other matter arising from the process of offer and acceptance either as a confirmation, clarification or change to the tender documents and which it is agreed by the Parties becomes an obligation of the contract shall also be recorded here.
4. Any change or addition to the tender documents arising from the above agreements and recorded here, shall also be incorporated into the final draft of the Contract.

1 Subject

Details

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.....
.....

2 Subject

Details

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.....
.....

3 Subject

Details

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.....

4 Subject

Details

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.....

By the duly authorised representatives signing this agreement, the CCT and the tenderer agree to and accept the foregoing schedule of deviations as the only deviations from and amendments to this tender document and addenda thereto as listed in the returnable schedules, as well as any confirmation, clarification or changes to the terms of the offer agreed by the tenderer and the CCT during this process of offer and acceptance.

It is expressly agreed that no other matter whether in writing, oral communication or implied during the period between the issue of the tender documents and the receipt by the tenderer of a completed signed copy of this Agreement shall have any meaning or effect in the contract between the parties arising from this agreement.

(5) PRICE SCHEDULE

Bid specifications may not make any reference to any particular trade mark, name, patent, design, type, specific origin or producer, unless there is no other sufficiently precise or intelligible way of describing the characteristics of the work, in which case such reference must be accompanied by the words "or equivalent".

TENDERERS MUST NOTE THAT WHEREVER THIS DOCUMENT REFERS TO ANY PARTICULAR TRADE MARK, NAME, PATENT, DESIGN, TYPE, SPECIFIC ORIGIN OR PRODUCER, SUCH REFERENCE SHALL BE DEEMED TO BE ACCOMPANIED BY THE WORDS 'OR EQUIVALENT'

Pricing Instructions:

- 5.1 State the rates and prices in Rand unless instructed otherwise in the tender conditions.
- 5.2 Include in the rates, prices, and the tendered total of the prices (if any) all duties, taxes (except Value Added Tax (VAT), and other levies payable by the successful tenderer, such duties, taxes and levies being those applicable 14 days before the closing time stated in the General Tender Information.
- 5.3 All prices tendered must include all expenses, disbursements and costs (e.g. transport, accommodation etc.) that may be required for the execution of the tenderer's obligations in terms of the Contract, and shall cover the cost of all general risks, liabilities and obligations set forth or implied in the Contract as well as overhead charges and profit (in the event that the tender is successful). All prices tendered will be final and binding.
- 5.4 All prices shall be tendered in accordance with the units specified in this schedule.
- 5.5 Where a value is given in the Quantity column, a Rate and Price (the product of the Quantity and Rate) is required to be inserted in the relevant columns.
- 5.6 The successful tenderer is required to perform all tasks listed against each item. The tenderer must therefore tender prices/rates on all items as per the section in the Price Schedule. **An item against which no rate is/are entered, or if anything other than a rate or a nil rate (for example, a zero, a dash or the word "included" or abbreviations thereof) is entered against an item, it will also be regarded as a nil rate having been entered against that item, i.e. that there is no charge for that item. The Tenderer may be requested to clarify nil rates, or items regarded as having nil rates; and the Employer may also perform a risk analysis with regard to the reasonableness of such rates.**
- 5.7 Provide fixed rates and prices for the duration of the contract that are not subject to adjustment except as otherwise provided for in clause 17 of the Conditions of Contract and as amplified in the Special Conditions of Contract.
- 5.8 Where a tenderer may find a specific goods or service product no longer available, the tenderer shall include a memorandum or letter stating the latter with motivating reasons why a particular line item/s could not be tendered for in the pricing schedule. The Bid Evaluation Committee (BEC) reserves the right to accept or decline the motivation based on other or similar bid offers received or a market analysis. When there is sufficient motivation or basis to accept that a Goods of Services product may no longer be available, the BEC may decide not to evaluate and to recommend an award on the particular pricing line items.
- 5.9 Subject to clause 5.8, in order to be considered responsive for this tender, the tenderer must tender on all items in the pricing schedule.

INITIALS OF CITY OFFICIALS		
1	2	3

Price Schedule 3: Region 3 Killarney

1.	Payment reference to specification	Control Panels (modular construction type)		
1.1		Type Tested (dimensions WxH (mm) with standard depth of 600mm. Complete cubicle consisting of all included components such as, brackets, screws, framework, chassis plate with brackets and adjustable bearers, front door, rear door with locks, hinges and lock catches. Manufactured from 3CR12 steel.	Unit	Rate/Price ZAR (excl.Vat) R c
1.1.1	(13) SPECIFICATIONS section 3.8.10, 3.9	1 High 374 x182 with backplate, door, handle and square keylocks	ea	
1.1.2	(13) SPECIFICATIONS section 3.8.10, 3.9	2 High 374 x 374 with backplate, door, handle and square keylocks	ea	
1.1.3	(13) SPECIFICATIONS section 3.8.10, 3.9	3 High 374 x 566 with backplate, door, handle and square keylocks	ea	
1.1.4	(13) SPECIFICATIONS section 3.8.10, 3.9	4 High 374 x 758 with backplate, door, handle and square keylocks	ea	
1.1.5	(13) SPECIFICATIONS section 3.8.10, 3.9	5 High 374 x 950 with backplate, door, handle and square keylocks	ea	
1.1.6	(13) SPECIFICATIONS section 3.8.10, 3.9	6 High 374 x 1142 with backplate, door, handle and square keylocks	ea	
1.1.7	(13) SPECIFICATIONS section 3.8.10, 3.9	7 High 374 x 1334 with backplate, door, handle and square keylocks	ea	
1.1.8	(13) SPECIFICATIONS section 3.8.10, 3.9	8 High 374 x 1526 with backplate, door, handle and square keylocks	ea	
1.1.9	(13) SPECIFICATIONS section 3.8.10, 3.9	9 High 374 x 1718 with backplate, door, handle and square keylocks	ea	
1.1.10	(13) SPECIFICATIONS section 3.8.10, 3.9	10 High 374 x 1910 with backplate, door, handle and square keylocks	ea	
1.1.11	(13) SPECIFICATIONS section 3.8.10, 3.9	1 High 566 x182 with backplate, door, handle and square keylocks	ea	
1.1.12	(13) SPECIFICATIONS section 3.8.10, 3.9	2 High 566 x 374 with backplate, door, handle and square keylocks	ea	
1.1.13	(13) SPECIFICATIONS section 3.8.10, 3.9	3 High 566 x 566 with backplate, door, handle and square keylocks	ea	
1.1.14	(13) SPECIFICATIONS section 3.8.10, 3.9	4 High 566 x 758 with backplate, door, handle and square keylocks	ea	
1.1.15	(13) SPECIFICATIONS section 3.8.10, 3.9	5 High 566 x 950 with backplate, door, handle and square keylocks	ea	

	Payment reference to specification	Control Panels (modular construction type)		
		Type Tested (dimensions WxH (mm) with standard depth of 600mm. Complete cubicle consisting of all included components such as, brackets, screws, framework, chassis plate with brackets and adjustable bearers, front door, rear door with locks, hinges and lock catches. Manufactured from 3CR12 steel.	Unit	Rate/Price ZAR (excl.Vat) R c
1.1.16	(13) SPECIFICATIONS section 3.8.10, 3.9	6 High 566 x 1142 with backplate, door, handle and square keylocks	ea	
1.1.17	(13) SPECIFICATIONS section 3.8.10, 3.9	7 High 566 x 1334 with backplate, door, handle and square keylocks	ea	
1.1.18	(13) SPECIFICATIONS section 3.8.10, 3.9	8 High 566 x 1526 with backplate, door, handle and square keylocks	ea	
1.1.19	(13) SPECIFICATIONS section 3.8.10, 3.9	9 High 566 x 1718 with backplate, door, handle and square keylocks	ea	
1.1.20	(13) SPECIFICATIONS section 3.8.10, 3.9	10 High 566 x 1910 with backplate, door, handle and square keylocks	ea	
1.1.21	(13) SPECIFICATIONS section 3.8.10, 3.9	1 High 758 x182 with backplate, door, handle and square keylocks	ea	
1.1.22	(13) SPECIFICATIONS section 3.8.10, 3.9	2 High 758 x 374 with backplate, door, handle and square keylocks	ea	
1.1.23	(13) SPECIFICATIONS section 3.8.10, 3.9	3 High 758 x 566 with backplate, door, handle and square keylocks	ea	
1.1.24	(13) SPECIFICATIONS section 3.8.10, 3.9	4 High 758 x 758 with backplate, door, handle and square keylocks	ea	
1.1.25	(13) SPECIFICATIONS section 3.8.10, 3.9	5 High 758 x 950 with backplate, door, handle and square keylocks	ea	
1.1.26	(13) SPECIFICATIONS section 3.8.10, 3.9	6 High 758 x 1142 with backplate, door, handle and square keylocks	ea	
1.1.27	(13) SPECIFICATIONS section 3.8.10, 3.9	7 High 758 x 1334 with backplate, door, handle and square keylocks	ea	
1.1.28	(13) SPECIFICATIONS section 3.8.10, 3.9	8 High 758 x 1526 with backplate, door, handle and square keylocks	ea	
1.1.29	(13) SPECIFICATIONS section 3.8.10, 3.9	9 High 758 x 1718 with backplate, door, handle and square keylocks	ea	
1.1.30	(13) SPECIFICATIONS section 3.8.10, 3.9	10 High 758 x 1910 with backplate, door, handle and square keylocks	ea	

1.2	Manufactured panels		
1.2.1	3CR12 Steel 1.6mm-2.0mm. Complete welded construction cubicle/panel consisting of all included components such as, brackets, screws, framework, chassis plate with brackets and adjustable bearers, front door, rear door with locks, hinges and lock catches Manufactured from high-grade 3CR12 steel, powder-coated Supplied with internal Aluzinc chassis plate (2 mm thick) Supplied with 6 mm square drive locks, key lock and mounting brackets Degree of protection: IP65 with continuous foam gasket RAL 6010 or RAL7000 or RAL7032 Sheet metal electric orange/grey/green wall mount with top/bottom gland plate	Unit	Rate/Price ZAR (excl.Vat) R c
1.2.1.1	1 cubicle 2075x600x400 with backplate, door, handle and square keylocks	ea	
1.2.1.2	2 cubicle 2075x600x400 with backplate, door, handle and square keylocks	ea	
1.2.1.3	3 cubicle 2075x600x400 with backplate, door, handle and square keylocks	ea	
1.2.1.4	4 cubicle 2075x600x400 with backplate, door, handle and square keylocks	ea	
1.2.1.5	1 cubicle 2075x600x600 with backplate, door, handle and square keylocks	ea	
1.2.1.6	2 cubicle 2075x600x600 with backplate, door, handle and square keylocks	ea	
1.2.1.7	3 cubicle 2075x600x600 with backplate, door, handle and square keylocks	ea	
1.2.1.8	4 cubicle 2075x600x600 with backplate, door, handle and square keylocks	ea	
1.2.1.9	1 cubicle 2075x600x800 with backplate, door, handle and square keylocks	ea	
1.2.1.10	2 cubicle 2075x600x800 with backplate, door, handle and square keylocks	ea	
1.2.1.11	3 cubicle 2075x600x800 with backplate, door, handle and square keylocks	ea	
1.2.1.12	4 cubicle 2075x600x800 with backplate, door, handle and square keylocks	ea	
1.2.1.13	1 cubicle 2075x800x400 with backplate, door, handle and square keylocks	ea	
1.2.1.14	2 cubicle 2075x800x400 with backplate, door, handle and square keylocks	ea	
1.2.1.15	3 cubicle 2075x800x400 with backplate, door, handle and square keylocks	ea	
1.2.1.16	4 cubicle 2075x800x400 with backplate, door, handle and square keylocks	ea	
1.2.1.17	1 cubicle 2075x800x600 with backplate, door, handle and square keylocks	ea	
1.2.1.18	2 cubicle 2075x800x600 with backplate, door, handle and square keylocks	ea	
1.2.1.19	3 cubicle 2075x800x600 with backplate, door, handle and square keylocks	ea	
1.2.1.20	4 cubicle 2075x800x600 with backplate, door, handle and square keylocks	ea	
1.2.1.21	1 cubicle 2075x800x800 with backplate, door, handle and square keylocks	ea	
1.2.1.22	2 cubicle 2075x800x800 with backplate, door, handle and square keylocks	ea	
1.2.1.23	3 cubicle 2075x800x800 with backplate, door, handle and square keylocks	ea	
1.2.1.24	4 cubicle 2075x800x800 with backplate, door, handle and square keylocks	ea	
1.2.2	304 Stainless Steel 1.6mm-2.0mm. Complete welded construction cubicle/panel consisting of all included components such as, brackets, screws, framework, chassis plate with brackets and adjustable bearers, front door, rear door with locks, hinges and lock catches Supplied with internal Aluzinc chassis plate (2 mm thick) Supplied with 6 mm square drive locks, key lock and mounting brackets Degree of protection: IP65 with continuous foam gasket RAL 6010 or RAL7000 or RAL7032 Sheet metal electric orange/grey/green wall mount with top/bottom gland plate	Unit	Rate/Price ZAR (excl.Vat) R c
1.2.2.1	1 cubicle 2075x600x400 with backplate, door, handle and square keylocks	ea	
1.2.2.2	2 cubicle 2075x600x400 with backplate, door, handle and square keylocks	ea	
1.2.2.3	3 cubicle 2075x600x400 with backplate, door, handle and square keylocks	ea	
1.2.2.4	4 cubicle 2075x600x400 with backplate, door, handle and square keylocks	ea	
1.2.2.5	1 cubicle 2075x600x600 with backplate, door, handle and square keylocks	ea	
1.2.2.6	2 cubicle 2075x600x600 with backplate, door, handle and square keylocks	ea	
1.2.2.7	3 cubicle 2075x600x600 with backplate, door, handle and square keylocks	ea	
1.2.2.8	4 cubicle 2075x600x600 with backplate, door, handle and square keylocks	ea	
1.2.2.9	1 cubicle 2075x600x800 with backplate, door, handle and square keylocks	ea	

1.2.2.10	2 cubicle 2075x600x800 with backplate, door, handle and square keylocks	ea	
1.2.2.11	3 cubicle 2075x600x800 with backplate, door, handle and square keylocks	ea	
1.2.2.12	4 cubicle 2075x600x800 with backplate, door, handle and square keylocks	ea	
1.2.2.13	1 cubicle 2075x800x400 with backplate, door, handle and square keylocks	ea	
1.2.2	304 Stainless Steel 1.6mm-2.0mm. Complete welded construction cubicle/panel consisting of all included components such as, brackets, screws, framework, chassis plate with brackets and adjustable bearers, front door, rear door with locks, hinges and lock catches	Unit	Rate/Price ZAR (excl.Vat) R c
1.2.2.14	2 cubicle 2075x800x400 with backplate, door, handle and square keylocks	ea	
1.2.2.15	3 cubicle 2075x800x400 with backplate, door, handle and square keylocks	ea	
1.2.2.16	4 cubicle 2075x800x400 with backplate, door, handle and square keylocks	ea	
1.2.2.17	1 cubicle 2075x800x600 with backplate, door, handle and square keylocks	ea	
1.2.2.18	2 cubicle 2075x800x600 with backplate, door, handle and square keylocks	ea	
1.2.2.19	3 cubicle 2075x800x600 with backplate, door, handle and square keylocks	ea	
1.2.2.20	4 cubicle 2075x800x600 with backplate, door, handle and square keylocks	ea	
1.2.2.21	1 cubicle 2075x800x800 with backplate, door, handle and square keylocks	ea	
1.2.2.22	2 cubicle 2075x800x800 with backplate, door, handle and square keylocks	ea	
1.2.2.23	3 cubicle 2075x800x800 with backplate, door, handle and square keylocks	ea	
1.2.2.24	4 cubicle 2075x800x800 with backplate, door, handle and square keylocks	ea	
1.3	Pre-manufactured enclosures		
1.3.1	Pre-manufactured enclosures, dimensions HxWxD (mm). Complete cubicle/panel consisting of all included components such as, brackets, screws, framework, chassis plate with brackets and adjustable bearers, front door, locks, hinges and lock catches. Manufactured from high-grade mild steel, powder-coated Supplied with internal Aluzinc chassis plate (2 mm thick) Supplied with 6 mm square drive locks, key lock and mounting brackets Degree of protection: IP65 with continuous foam gasket RAL 2000 Sheet metal electric orange wall mount with top/bottom gland plate	Unit	Rate/Price ZAR (excl.Vat) R c
1.3.1.1	Wall mount 250x200x170 and 350x 250x170	ea	
1.3.1.2	Wall mount 450x300x220 and 550x400x220	ea	
1.3.1.3	Wall mount 650x450x270 and 750x550x270	ea	
1.3.1.4	Wall mount 850x 600x 270 and 850x600x330	ea	
1.3.1.5	Wall mount 950x700x270 and 950x700x330	ea	
1.3.1.6	Wall mount 1150x850x270 and 1150x850x330	ea	
1.3.2	Pre-manufactured enclosures, dimensions HxWxD (mm). Complete cubicle/panel consisting of all included components such as, brackets, screws, framework, chassis plate with brackets and adjustable bearers, front door, locks, hinges and lock catches. Manufactured from high-grade mild steel, powder-coated Supplied with internal Aluzinc chassis plate (2 mm thick) Supplied with 6 mm square drive locks, key lock and mounting brackets Degree of protection: IP65 with continuous foam gasket RAL 7032 Sheet metal electric orange wall mount with top/bottom gland plate	Unit	Rate/Price ZAR (excl.Vat) R c
1.3.2.1	Enclosure with transparent door 350x250x170 to 550x400x220	ea	
1.3.2.2	Enclosure with transparent door 650x450x270 to 750x550x270	ea	
1.3.2.3	Enclosure with transparent door 850x600x270 to 850x600x330	ea	
1.3.2.4	Enclosure with transparent door 950x700x270 to 950x700x330	ea	
1.3.2.5	Enclosure with transparent door 1150x850x270 to 1150x850x330	ea	

			Rate/Price ZAR (excl.Vat) R c
1.3.3	Internal door kit for RAL2000 Orange RAL7032Grey enclosures. Pre-manufactured	Unit	
1.3.3.1	White internal door kit for enclosure size 350x250x170 to 550x400x220	ea	
1.3.3.2	White internal door kit for enclosure size 650x450x270 to 750x550x270	ea	
1.3.3.3	White internal door kit for enclosure size 850x600x270 to 850x600x330	ea	
1.3.3.4	White internal door kit for enclosure size 950x700x270 to 950x700x330	ea	
1.3.3.5	White internal door kit for enclosure size 1150x850x270 to 1150x850x330	ea	
1.3.4	Canopy for enclosures	Unit	Rate/Price ZAR (excl.Vat) R c
1.3.4.1	RAL2000 range steel canopy width 250mm	ea	
1.3.4.2	RAL2000 range steel canopy width 450mm	ea	
1.3.4.3	RAL2000 range steel canopy width 550mm	ea	
1.3.4.4	RAL2000 range steel canopy width 600mm	ea	
1.3.4.5	RAL2000 range steel canopy width 850mm	ea	
1.3.5	Accessories	Unit	Rate/Price ZAR (excl.Vat) R c
1.3.5.1	16 mm black padlockable lever handle for enclosures including stainless steel handle	ea	
1.3.6	3CR12 steel enclosures. Complete cubicle consisting of all included components such as, brackets, screws, framework, chassis plate with brackets and adjustable bearers, front door, locks, hinges and lock catches Manufactured from 3CR12 stainless steel and powder-coated Supplied with internal Aluzinc chassis plate (2 mm thick) Supplied with 6 mm square drive locks, key lock and mounting brackets Degree of protection: IP65 with continuous foam gasket Colour: RAL2000 electric orange	Unit	Rate/Price ZAR (excl.Vat) R c
1.3.6.1	3CR12 steel enclosure 350x250x170 to 400x300x220	ea	
1.3.6.2	3CR12 steel enclosure 500x400x220 to 600x500x220	ea	
1.3.6.3	3CR12 steel enclosure 700x600x270 to 800x600x270	ea	
1.3.6.4	3CR12 steel enclosure 900x700x330	ea	
1.3.6.5	3CR12 steel enclosure 1000x800x330	ea	
1.3.6.6	3CR12 steel enclosure 1200x800x330	ea	
1.3.7	Steel enclosures with transparent glass door. Complete cubicle consisting of all included components such as, brackets, screws, framework, chassis plate with brackets and adjustable bearers, front door, locks, hinges and lock catches. Manufactured from 3CR12 stainless steel and powder-coated Supplied with internal Aluzinc chassis plate (2 mm thick) Supplied with 6 mm square drive locks, key lock and mounting brackets Degree of protection: IP65 with continuous foam gasket Colour: RAL2000 electric orange	Unit	Rate/Price ZAR (excl.Vat) R c
1.3.7.1	Orange 3CR12 enclosure with transparent door 400x300x220 to 500x400x220	ea	
1.3.7.2	Orange 3CR12 enclosure with transparent door 600x500x220	ea	
1.3.7.3	Orange 3CR12 enclosure with transparent door 700x600x270	ea	
1.3.7.4	Orange 3CR12 enclosure with transparent door 800x600x270	ea	
1.3.7.5	Orange 3CR12 enclosure with transparent door 900x700x330	ea	
1.3.7.6	Orange 3CR12 enclosure with transparent door 1000x800x330	ea	
1.3.7.7	Orange 3CR12 enclosure with transparent door 1200x800x330	ea	

			Rate/Price ZAR (excl.Vat) R c
1.3.8	Canopy for 3CR12 enclosures	Unit	
1.3.8.1	Canopy for steel enclosures 300mm	ea	
1.3.8.2	Canopy for steel enclosures 400mm	ea	
1.3.8.3	Canopy for steel enclosures 500mm	ea	
1.3.8.4	Canopy for steel enclosures 600mm	ea	
1.3.8.5	Canopy for steel enclosures 800mm	ea	
1.3.9	304 stainless steel enclosures. Complete cubicle consisting of all included components such as, brackets, screws, framework, chassis plate with brackets and adjustable bearers, front door, locks, hinges and lock catches. Pre-manufactured Manufactured from high grade SS 304 stainless steel Supplied with internal Aluzinc chassis plate (2 mm thick) Supplied with bottom SS 304 gland plate and enclosure mounting brackets Degree of protection: IP65 with <i>continuous foam gasket</i> Colour: Stainless Steel - brushed finish	Unit	Rate/Price ZAR (excl.Vat) R c
1.3.9.1	304 stainless steel enclosure 350x250x170 to 400x300x220	ea	
1.3.9.2	304 stainless steel enclosure 500x400x220	ea	
1.3.9.3	304 stainless steel enclosure 600x500x220	ea	
1.3.9.4	304 stainless steel enclosure 700x600x270	ea	
1.3.9.5	304 stainless steel enclosure 800x600x270	ea	
1.3.9.6	304 stainless steel enclosure 900x700x330	ea	
1.3.9.7	304 stainless steel enclosure 1000x800x330	ea	
1.3.9.8	304 stainless steel enclosure 1200x800x330	ea	
1.3.10	Internal door kit for 304 stainless steel enclosures enclosures (mild steel)	Unit	Rate/Price ZAR (excl.Vat) R c
1.3.10.1	White internal door kit for enclosures 400x300x170	ea	
1.3.10.2	White internal door kit for enclosures 500x400x220	ea	
1.3.10.3	White internal door kit for enclosures 600x500x220	ea	
1.3.10.4	White internal door kit for enclosures 700x600x270	ea	
1.3.10.5	White internal door kit for enclosures 800x600x270	ea	
1.3.10.6	White internal door kit for enclosures 900x700x330	ea	
1.3.10.7	White internal door kit for enclosures 1000x800x330	ea	
1.3.10.8	White internal door kit for enclosures 1200x800x330	ea	

1.3.11	Specification	CONTAINER ENCLOSURE	Unit	Rate/Price ZAR (excl.Vat) R c
1.3.11.1	(13) SPECIFICATION Clause 3.2.9.5	3.03 × 2.44 × 2.59 m new steel maritime double door container or nearest equivalent size	SUM	
1.3.11.2	(13) SPECIFICATION Clause 3.2.9.5	2.44 × 2.26 × 2.06 m new steel mini- maritime double door container or nearest equivalent size	SUM	
1.3.11.3	(13) SPECIFICATION Clause 3.2.9.5	6.09 × 2.44 × 2.74 m new steel maritime double door container or nearest equivalent size	SUM	
1.3.11.4	(13) SPECIFICATION Clause 3.2.9.5	3m x 3m Concrete cast plinth, including excavating trenches (300mm x 300mm x 300 depth) at each corner and to fill the trenches with concrete (30MPa strength) and then securing it with a 1.5m long reinforced steel rod (diameter of 30 mm) through the floor at each corner where the top of the rod is welded to the side of the container.	SUM	
1.3.11.5	(13) SPECIFICATION Clause 3.2.9.5	3m x 6m Concrete cast plinth, including excavating trenches (300mm x 300mm x 300 depth) at each corner and to fill the trenches with concrete (30MPa strength) and then securing it with a 1.5m long reinforced steel rod (diameter of 30 mm) through the floor at each corner where the top of the rod is bolted to the side corners of the container.	SUM	
1.3.11.6	(13) SPECIFICATION Clause 3.2.9.5	3m Steel maritime container painting	SUM	
1.3.11.7	(13) SPECIFICATION Clause 3.2.9.5	6m Steel maritime container painting	SUM	
1.3.11.8		Allow for the provisional sum for the selection, supply, delivery to site and installation for an electrical panel, enclosures, containers parts and accesories not listed in the schedule	Prov. Sum	R300 000.00 Incl VAT
		Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

1.4	Payment reference to specification	Complete kiosk panels and MCC	Unit	Rate/Price ZAR (excl.Vat) R c
1.4.1	(13) SPECIFICATION Clauses 3.2.6.1, 3.8, 3.9	Electrical Motor Control Centre three pump control	SUM	
1.4.2	(13) SPECIFICATION Clauses 3.2.6.2, 3.8, 3.9	Electrical Metering Panel kiosk type	SUM	
1.4.3	(13) SPECIFICATION Clauses 3.2.6.3, 3.8, 3.9	Electrical Control panel, one pump, kiosk type	SUM	
1.4.4	(13) SPECIFICATION Clauses 3.2.6.4, 3.8, 3.9	Electrical Control panel, two pump, kiosk type	SUM	
1.4.5	(13) SPECIFICATION Clauses 3.2.6.5, 3.8, 3.9	Electrical Control panel, two pump, wall mount type	SUM	
1.4.6	(13) SPECIFICATION Clauses 3.2.6.6, 3.8, 3.9	Electrical Control panel, two pump control	SUM	
1.4.7	(13) SPECIFICATION Clauses 3.2.6.7, 3.8, 3.9	Electrical Control panel, two pump control	SUM	
1.4.8	(13) SPECIFICATION Clauses 3.2.6.9, 3.8, 3.9	Electrical Control panel, two pump, wall mount type	SUM	

			Rate/Price ZAR (excl.Vat) R c
2.	Motor Control and Drives (Lovato, ABB and Schneider) or equivalent	Unit	
2.1	Mini contactors		
2.1.1	3 pole mini contactors with 1 auxiliary contacts, 230VAC coil		
2.1.1.1	6 Ampere	ea	
2.1.1.2	9 Ampere	ea	
2.1.1.3	12 Ampere	ea	
2.1.2	4 pole mini contactors , 230VAC coil		
2.1.2.1	20A with 4NO auxiliary contacts	ea	
2.1.2.2	20A with 2NO+2NC auxiliary contacts	ea	
2.1.3	clip-on Auxiliary contacts for mini contactor, 10A		
2.1.3.1	2NO/2NO	ea	
2.1.3.2	2NC/2NC	ea	
2.1.3.3	4NO or 4NC	ea	
2.1.3.4	2NO or 2NC	ea	
2.1.4	Three-pole contactors (Ui 690V) 230V AC coil AC3 type		
2.1.4.1	16A 6A 2.2kW AC 3-pole mini contactor + 1NO 230V AC coil	ea	
2.1.4.2	20A 9A 4.0kW AC 3-pole mini contactor + 1NO 230V AC coil	ea	
2.1.4.3	20A 9A 4.0kW AC 3-pole mini contactor + 1NC 230V AC coil	ea	
2.1.4.4	20A 12A 5.7kW AC 3-pole mini contactor + 1NO 230V AC coil	ea	
2.1.4.5	20A 12A 5.7kW AC 3-pole mini contactor + 1NC 230V AC coil	ea	
2.1.4.6	20A 9A 4.0kW DC 3-pole mini contactor + 1NO 230V AC coil	ea	
2.1.4.7	20A 9A 4.0kW DC 3-pole mini contactor + 1NC 230V AC coil	ea	

2.	Motor Control and Drives		
2.2	Contactors (Lovato, ABB and Schneider) or equivalent		
2.2.1	3 pole contactors AC coil AC3	Unit	Rate/Price ZAR (excl.Vat) R c
2.2.1.1	9A 4.2kW AC 3-pole contactor + 1NO, 230V AC coil	ea	
2.2.1.2	9A 4.2kW AC 3-pole contactor + 1NC, 230V AC coil	ea	
2.2.1.3	12A 5.7kW AC 3-pole contactor + 1NO, 230V AC coil	ea	
2.2.1.4	12A 5.7kW AC 3-pole contactor + 1NC, 230V AC coil	ea	
2.2.1.5	18A 7.5kW AC 3-pole contactor + 1NO, 230V AC coil	ea	
2.2.1.6	18A 7.5kW AC 3-pole contactor + 1NC, 230V AC coil	ea	
2.2.1.7	25A 12.5kW AC 3-pole contactor + 1NO, 230V AC coil coil	ea	
2.2.1.8	25A 12.5kW AC 3-pole contactor + 1NC, 230V AC coil	ea	
2.2.1.9	26A 13.0kW AC 3-pole contactor, 230V AC coil	ea	
2.2.1.10	32A 16.0kW AC 3-pole contactor, 230V AC coil	ea	
2.2.1.11	56A 38A 18.5kW AC 3-pole contactor, 230V AC coil	ea	
2.2.1.12	40A 18.5kW AC 3-pole contactor, 230V AC coil	ea	
2.2.1.13	50A 22kW AC 3-pole contactor, 230V AC coil	ea	
2.2.1.14	65A 30kW AC 3-pole contactor, 230V AC coil	ea	
2.2.1.15	45kW AC 3-pole contactor, 230V AC coil	ea	
2.2.1.16	50kW AC 3-pole contactor, 230V AC coil	ea	
2.2.1.17	61kW AC 3-pole contactor, 230V AC coil	ea	
2.2.1.18	61kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.19	80kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.20	100kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.21	140kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.22	320A 170kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.23	420A 225kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.24	520A 290kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.25	630A 335kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.26	40A 18.5kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.27	50A 22kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.28	65A 30kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.29	80A 45kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.30	110A 61kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.31	150A 80kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.32	185A 100kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.33	265A 140kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.34	320A 170kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.35	420A 225kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.36	520A 290kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.37	630A 335kW AC/DC 3-pole contactor, 230V AC coil	ea	
2.2.1.38	1250A – 830kW AC 3-pole contactor, 230V AC coil	ea	
2.2.1.39	1600A – 950kW AC 3-pole contactor, 230V AC coil	ea	

2.	Motor Control and Drives		
2.3	Thermal overload relays (Lovato, ABB and Schneider) or equivalent. Compensated, differential single-phase protection Incorporating test button facility and mechanical trip indication Selectable automatic or manual reset	Unit	Rate/Price ZAR (excl.Vat) R c
	Thermal overload relays with 1NC+1NO		
2.3.1	Thermal overload relay 0.10 - 0.16A	ea	
2.3.2	Thermal overload relay 0.16 - 0.25A	ea	
2.3.3	Thermal overload relay 0.25 - 0.40A 0.06kW	ea	
2.3.4	Thermal overload relay 0.45 - 0.63A 0.12kW	ea	
2.3.5	Thermal overload relay 0.55 - 0.80A 0.18kW	ea	
2.3.6	Thermal overload relay 0.75 - 1.00A 0.25 - 0.37kW	ea	
2.3.7	Thermal overload relay 1.10 - 1.60A 0.55kW	ea	
2.3.8	Thermal overload relay 1.80 - 2.50A 0.75kW	ea	
2.3.9	Thermal overload relay 2.90 - 4.00A 1.10 - 1.50kW	ea	
2.3.10	Thermal overload relay 4.50 - 6.30A 2.2kW	ea	
2.3.11	Thermal overload relay 7.20 - 10.00A 4.0kW	ea	
2.3.12	Thermal overload relay 9.00 - 12.50A 5.5kW	ea	
2.3.13	Thermal overload relay 13.0 - 18.0A 7.5 kW	ea	
2.3.14	Thermal overload relay 17.0 - 23.0A 11 kW	ea	
2.3.15	Thermal overload relay 20.0 - 25.0A 11 kW	ea	
2.3.16	Thermal overload relay 24.0 - 32.0A 15 kW	ea	
2.3.17	Thermal overload relay 32.0 - 38.0A 18.5 kW	ea	
2.3.18	Thermal overload relay 28 - 42A 15 - 18.5 kW	ea	
2.3.19	Thermal overload relay 35 - 50A 22 kW	ea	
2.3.20	Thermal overload relay 46 - 65A 25 - 30 kW	ea	
2.3.21	Thermal overload relay 60 - 82A 33 - 40 kW	ea	
2.3.22	Thermal overload relay 70 - 95A 40 - 45 kW	ea	
2.3.23	Thermal overload relay 90 - 110A 55 kW	ea	
2.3.24	Thermal overload relay 75.0 - 125A 40/63 kW	ea	
2.3.25	Thermal overload relay 90.0 - 150A 51/80 kW	ea	
2.3.26	Thermal overload relay 120.0 - 200A 75/100 kW	ea	
2.3.27	Thermal overload relay 150.0 - 250A 92/132 kW	ea	
2.3.28	Thermal overload relay 180.0 - 300A 100/162 kW	ea	
2.3.29	Thermal overload relay 250.0 - 420A 129/198 kW	ea	
2.3.30	Electronic thermal overload relay 1.6 – 8.0 Amp 0.75kW – 3.0 kW	ea	
2.3.31	Electronic thermal overload relay 6.4 – 32 Amp, 3 kW – 15 kW	ea	
2.3.32	Electronic thermal overload relay 9 – 45 Amp, 4 kW – 22 kW	ea	
2.3.33	Electronic thermal overload relay 22 – 110 Amp, 11 – 55 kW	ea	
2.3.34	Allow for the provisional sum for the selection, supply, delivery to site and installation for contactors, overloads and accessories of unknown parts not listed in the schedule. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment clause 4.16	Prov. Sum	R300 000.00 Incl VAT
	Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

2.	Motor Control and Drives	Unit	Rate/Price ZAR (excl.Vat) R c
2.4	Altistart 48 Soft starter 400 V 3Ø with 3C3 conformal coating or equivalent.		
2.4.1	5.5 kW or equivalent soft starter	ea	
2.4.2	7.5 kW or equivalent soft starter	ea	
2.4.3	11 kW or equivalent soft starter	ea	
2.4.4	15 kW or equivalent soft starter	ea	
2.4.5	18.5 kW or equivalent soft starter	ea	
2.4.6	22 kW or equivalent soft starter	ea	
2.4.7	30 kW or equivalent soft starter	ea	
2.4.8	37 kW or equivalent soft starter	ea	
2.4.9	45 kW or equivalent soft starter	ea	
2.4.10	55 kW or equivalent soft starter	ea	
2.4.11	75 kW or equivalent soft starter	ea	
2.4.12	90 kW or equivalent soft starter	ea	
2.4.13	110 kW or equivalent soft starter	ea	
2.4.14	132 kW or equivalent soft starter	ea	
2.4.15	160 kW or equivalent soft starter	ea	
2.4.16	220 kW or equivalent soft starter	ea	
2.4.17	250 kW or equivalent soft starter	ea	
2.4.18	315 kW or equivalent soft starter	ea	
2.4.19	355 kW equivalent soft starter	ea	
2.4.20	400 kW or equivalent soft starter	ea	

2.	Motor Control and Drives	Unit	Rate/Price ZAR (excl.Vat) R c
2.5.1	WEG Soft starter SSW900 460 V 3Ø with 3C3 conformal coating or equivalent.		
2.5.1.1	5.5 kW SSW900A0024T5E2 or equivalent soft starter	ea	
2.5.1.2	11 kW SSW900B0045T5E2 or equivalent soft starter	ea	
2.5.1.3	15 kW SSW900B0061T5E2 or equivalent soft starter	ea	
2.5.1.4	22 kW SSW900B0045T5E2 or equivalent soft starter	ea	
2.5.1.5	30 kW SSW900B0061T5E2 or equivalent soft starter	ea	
2.5.1.6	37 kW SSW900C0130T5E2 or equivalent soft starter	ea	
2.5.1.7	45 kW SSW900C0171T5E2 or equivalent soft starter	ea	
2.5.1.8	55 kW SSW900B0105T5E2 or equivalent soft starter	ea	
2.5.1.9	75 kW SSW900C0130T5E2 or equivalent soft starter	ea	
2.5.1.10	90 kW SSW900C0171T5E2 or equivalent soft starter	ea	
2.5.1.11	110 kW SSW900C0200T5E2 or equivalent soft starter	ea	
2.5.1.12	150 kW SSW900E0480T5Ex1 or equivalent soft starter	ea	
2.5.1.13	185 kW SSW900E0604T5Ex1 or equivalent soft starter	ea	
2.5.1.14	260 kW SSW900E0480T5Ex1 or equivalent soft starter	ea	
2.5.1.15	330 kW SSW900E0604T5Ex1 or equivalent soft starter	ea	
2.5.1.16	370 kW SSW900E0670T5Ex1 or equivalent soft starter	ea	
2.5.2	Solcon iStart Soft starter 460 V 3Ø with conformal coating or equivalent.	Unit	Rate/Price ZAR (excl.Vat) R c
2.5.2.1	1.5KW - 7.5KW or equivalent soft starter	ea	
2.5.2.2	11KW - 18.5KW or equivalent soft starter	ea	
2.5.2.3	22KW or equivalent soft starter	ea	
2.5.2.4	37KW or equivalent soft starter	ea	
2.5.2.5	45 KW or equivalent soft starter	ea	
2.5.2.6	55KW or equivalent soft starter	ea	
2.5.2.7	75kW or equivalent soft starter	ea	
2.5.2.8	90kW or equivalent soft starter	ea	
2.5.2.9	110KW or equivalent soft starter	ea	
2.5.2.10	132KW or equivalent soft starter	ea	
2.5.2.11	160KW or equivalent soft starter	ea	
2.5.2.12	185KW or equivalent soft starter	ea	
2.5.2.13	220KW or equivalent soft starter	ea	
2.5.2.14	280KW or equivalent soft starter	ea	
2.5.3	Solid state or compact Soft starter ADXN and ADX series 400 V 3Ø 240 V control or equivalent.	Unit	Rate/Price ZAR (excl.Vat) R c
2.5.3.1	2.2 kW ADXNB or equivalent compact soft starter	ea	
2.5.3.2	5.5 kW ADXNB or equivalent compact soft starter	ea	
2.5.3.3	7.5 kW ADXNB or equivalent compact soft starter	ea	
2.5.3.4	11 kW ADXNB or equivalent compact soft starter	ea	
2.5.3.5	15 kW ADXNB or equivalent compact soft starter	ea	
2.5.3.6	5.5 kW ADXNP or equivalent compact soft starter	ea	
2.5.3.7	7.5kW ADXNP or equivalent compact soft starter	ea	
2.5.3.8	11 kW ADXNP or equivalent compact soft starter	ea	
2.5.3.9	15 kW ADXNP or equivalent compact soft starter	ea	

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2.5.3.10	18.5 kW ADXNP or equivalent compact soft starter	ea	
2.5.3.11	22 kW ADXNP or equivalent compact soft starter	ea	
2.5.3.12	7.5 kW ADX or equivalent compact soft starter	ea	
2.5.3.13	15 kW ADX or equivalent compact soft starter	ea	
2.5.3.14	30 kW ADX or equivalent compact soft starter	ea	
2.5.3.15	37 kW ADX or equivalent compact soft starter	ea	
2.5.3.16	45 kW ADX or equivalent compact soft starter	ea	
2.5.3.17	55 kW ADX or equivalent compact soft starter	ea	
	Allow for the provisional sum for the selection, supply, delivery to site and installation for any Electronic Soft Starter or maintenance and service parts and optional extras not listed in the schedule. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment clause 4.16	Provisional Sum	R300 000.00 Incl VAT
2.5.4	Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

2.	Motor Control and Drives	Unit	Rate/Price ZAR (excl.Vat) R c
2.6	Variable Speed Drive (VSD) or Variable Frequency Drive (VFD) has the same meaning. It is referred to differently in some parts of the world and manufacturers. with 3C3 conformal coating or equivalent. Yaskawa VSD or equivalent.		
2.6.1	VFD YASKAWA GA500 230V 1Ø (ND) or equivalent..	Unit	
2.6.1.1	1.1 kW - 2.2 kW VFD or equivalent	ea	
2.6.1.2	3.0 kW - 4.0 kW VFD or equivalent	ea	
2.6.2	VFD YASKAWA GA500 480V 3Ø (ND) or equivalent..	Unit	
2.6.2.1	7.5 HP, 11.9 ampere VFD with built in EMC filter or equivalent	ea	
2.6.2.2	10 HP, 17.5 ampere VFD with built in EMC filter or equivalent	ea	
2.6.2.3	7.5 HP, 11.9 ampere VFD with built in EMC filter or equivalent	ea	
2.6.2.4	15 HP, 23.4 ampere VFD with built in EMC filter or equivalent	ea	
2.6.2.5	20 HP, 31 ampere VFD with built in EMC filter or equivalent	ea	
2.6.2.6	25 HP, 38 ampere VFD with built in EMC filter or equivalent	ea	
2.6.2.7	30 HP, 44 ampere VFD with built in EMC filter or equivalent	ea	
2.6.2.8	40 HP, 60 ampere VFD with built in EMC filter or equivalent	ea	
2.6.3	VFD YASKAWA GA700 400V 3Ø (ND) or equivalent. Part numbers below given as a specification to all of the listed brands.	Unit	Rate/Price ZAR (excl.Vat) R c
2.6.3.1	1.5 kW - 3 kW VFD or equivalent	ea	
2.6.3.2	4 kW - 7.5 kW VFD or equivalent	ea	
2.6.3.3	11KW VFD or equivalent	ea	
2.6.3.4	18.5 kW VFD or equivalent	ea	
2.6.3.5	22 kW VFD or equivalent	ea	
2.6.3.6	30 kW VFD or equivalent	ea	
2.6.3.7	37 kW VFD or equivalent	ea	
2.6.3.8	45 kW VFD or equivalent	ea	
2.6.3.9	55 kW VFD or equivalent	ea	
2.6.3.10	75 kW VFD or equivalent	ea	
2.6.3.11	90 kW VFD or equivalent	ea	
2.6.3.12	110 kW VFD or equivalent	ea	
2.6.3.13	132 kW VFD or equivalent	ea	
2.6.3.14	160 kW VFD or equivalent	ea	
2.6.3.15	200 kW VFD or equivalent	ea	
2.6.3.16	220 kW VFD or equivalent	ea	
2.6.3.17	250 kW VFD or equivalent	ea	
2.6.3.18	315 kW VFD or equivalent	ea	
2.6.3.19	355 kW VFD or equivalent	ea	

2.6.4	Delta VSD CP2000 series 400V 3Ø (ND) or equivalent. with 3C3 conformal coating or equivalent.		Rate/Price ZAR
			(excl.Vat) R c
2.6.4.1	5.5 kW - VFD055CP4E A/B/S -21 or equivalent	ea	
2.6.4.2	7.5 kW VFD075CP4E A/B/S -21 or equivalent	ea	
2.6.4.3	11 kW VFD110CP4E A/B/S -21 or equivalent	ea	
2.6.4.4	18.5kW VFD185CP4E A/B/S -21 or equivalent	ea	
2.6.4.5	22 kW VFD220CP4E A/B/S -21 or equivalent	ea	
2.6.4.6	37 kW VFD370CP4E A/B/S -21 or equivalent	ea	
2.6.4.7	45 kW VFD450CP4E A/B/S -21 or equivalent	ea	
2.6.4.8	55 kW VFD550CP4E A/B/S -21 or equivalent	ea	
2.6.4.9	75 kW VFD750CP4E A/B/S -21 or equivalent	ea	
2.6.4.10	90 kW VFD900CP4E A/B/S -21 or equivalent	ea	
2.6.4.11	110 KW VFD1100CP4E A/B/S -21 or equivalent	ea	
2.6.4.12	132 KW VFD1320CP4E A/B/S -21 or equivalent	ea	
2.6.4.13	160 KW VFD1600CP4E A/B/S -21 or equivalent	ea	
2.6.4.14	185 KW VFD1850CP4E A/B/S -21 or equivalent	ea	
2.6.4.15	220 KW VFD2200CP4E A/B/S -21 or equivalent	ea	
2.6.4.16	280 KW VFD2800CP4E A/B/S -21 or equivalent	ea	
2.6.4.17	315 KW VFD3150CP4E A/B/S -21 or equivalent	ea	
2.6.4.18	355 KW VFD3550CP4E A/B/S -21 or equivalent	ea	
2.6.4.19	450 KW VFD4500CP4E A/B/S -21 or equivalent	ea	
2.6.4.20	500 KW VFD5000CP4E A/B/S -21 or equivalent	ea	

2.6.5	Delta VSD C2000 series 400V 3Ø (ND) or equivalent. with 3C3 conformal coating or equivalent.		Rate/Price ZAR
			(excl.Vat) R c
2.6.5.1	3.7 kW - 5.5 kW, VFD - 037 - 055 ME/MS/E or equivalent	ea	
2.6.5.2	7.5 kW - 11 kW, VFD - 075 - 110 ME/MS/E or equivalent	ea	
2.6.5.3	15 kW - 18.5 kW, VFD - 150 - 185 ME/MS/E or equivalent	ea	
2.6.5.4	22 kW VFD - 220 - ME/MS/E or equivalent	ea	
2.6.5.5	30 kW VFD - 300 - ME/MS/E or equivalent	ea	
2.6.5.6	37 kW VFD - 370 - ME/MS/E or equivalent	ea	
2.6.5.7	45 kW VFD – 450 - ME/MS/E or equivalent	ea	
2.6.5.8	55 kW VFD – 550 - ME/MS/E or equivalent	ea	
2.6.5.9	75 kW VFD – 750 - ME/MS/E or equivalent	ea	
2.6.5.10	90 kW VFD – 900- ME/MS/E or equivalent	ea	
2.6.5.11	110 kW VFD – 1110 - ME/MS/E or equivalent	ea	
2.6.5.12	132 kW VFD – 1320 - ME/MS/E or equivalent	ea	
2.6.5.13	160 kW VFD – 1600 - ME/MS/E or equivalent	ea	
2.6.5.14	185 kW VFD - 1850 ME/MS/E or equivalent	ea	
2.6.5.15	220 kW VFD – 2200 - ME/MS/E or equivalent	ea	
2.6.5.16	280 kW VFD – 2800 - ME/MS/E or equivalent	ea	
2.6.5.17	315 kW VFD – 3150 - ME/MS/E or equivalent	ea	
2.6.5.18	355 kW VFD – 3550 - ME/MS/E or equivalent	ea	
2.6.5.19	450 kW VFD – 4500 - ME/MS/E or equivalent	ea	

2.6.6	Schneider Altivar process ATV630 ATV650 Variable speed drives for pumps and fans from 2.2 kW to 310 kW 400/480V 3Ø (ND) with intergrated category C3 EMC filter or equivalent. with 3C3 conformal coating or equivalent.	Unit	Rate/Price
			ZAR (excl.Vat) R c
2.6.6.1	2.2 kW VFD or equivalent	ea	
2.6.6.2	5.5 kW VFD or equivalent	ea	
2.6.6.3	7.5 kW VFD or equivalent	ea	
2.6.6.4	11 kW VFD or equivalent	ea	
2.6.6.5	18.5 kW VFD or equivalent	ea	
2.6.6.6	22 kW VFD or equivalent	ea	
2.6.6.7	37 kW VFD or equivalent	ea	
2.6.6.8	55 kW VFD or equivalent	ea	
2.6.6.9	75 kW VFD or equivalent	ea	
2.6.6.10	90 kW VFD or equivalent	ea	
2.6.6.11	110 kW VFD or equivalent	ea	
2.6.6.12	132 kW VFD or equivalent	ea	
2.6.6.13	160 kW VFD or equivalent	ea	
2.6.6.14	220 kW VFD or equivalent	ea	
2.6.6.15	250 kW VFD or equivalent	ea	
2.6.6.16	310 kW VFD or equivalent	ea	
2.6.7	WEG CFW 11 380 - 480V 3Ø (ND) with Class 3C3 with 3C3 conformal coating or equivalent.	Unit	Rate/Price
			ZAR (excl.Vat) R c
2.6.7.1	5.5KW VFD CFW11 0013 or equivalent	ea	
2.6.7.2	15 KW VFD CFW11 0031 or equivalent	ea	
2.6.7.3	30 KW VFD CFW11 0058 or equivalent	ea	
2.6.7.4	45KW VFD CFW11 0088 or equivalent	ea	
2.6.7.5	75kW VFD CFW11 0142 or equivalent	ea	
2.6.7.6	110KW VFD CFW11 0211 or equivalent	ea	
2.6.7.7	132KW VFD CFW11 0242 or equivalent	ea	
2.6.7.8	160 kW VFD CFW11 0312 or equivalent	ea	
2.6.7.9	250 kW VFD CFW11 0477 or equivalent	ea	
2.6.7.10	315 kW VFD CFW11 0601 or equivalent	ea	
2.6.7.11	370 kW VFD CFW11 0720 or equivalent	ea	
2.6.7.12	450 kW VFD CFW11 0795 or equivalent	ea	

2.6.8	WEG CFW 500 380 - 480VAC 3Ø (ND) with Class 3C3 conformal coating or equivalent.		Rate/Price ZAR (excl.Vat) R c
2.6.8.1	3.0 kW CFW500A06P1T4NB VFD or equivalent	ea	
2.6.8.2	5.5 kW CFW500B10P0T4DB VFD or equivalent	ea	
2.6.8.3	7.5 kW CFW500C16P0T4DB VFD or equivalent	ea	
2.6.8.4	15 kW CFW500D31P0T4DB VFD or equivalent	ea	
2.6.8.5	22 kW CFW500E49P0T4DB VFD or equivalent	ea	
2.6.8.6	60 kW CFW500F0105T4D VFD or equivalent	ea	
2.6.8.7	75 kW CFW500F0105T4D VFD or equivalent	ea	
2.6.9	WEG CFW 700 380 - 480VAC 3Ø (ND) with Class 3C3 conformal coating or equivalent.		Rate/Price ZAR (excl.Vat) R c
2.6.9.1	3.0 kW CFW700A07P0T4 VFD or equivalent	ea	
2.6.9.2	5.5 kW CFW700A13P5T4 VFD or equivalent	ea	
2.6.9.3	7.5 kW CFW700B17P0T4 VFD or equivalent	ea	
2.6.9.4	15 kW CFW700B31P0T4 VFD or equivalent	ea	
2.6.9.5	22 kW CFW700C45P0T4 VFD or equivalent	ea	
2.6.9.6	45 kW CFW700D88P0T4 VFD or equivalent	ea	
2.6.9.7	55 kW CFW700E0105T4 VFD or equivalent	ea	
2.6.9.8	75 kW CFW700E0142T4VFD or equivalent	ea	
2.6.9.9	90 kW CFW700E0180T4 VFD or equivalent	ea	
2.6.9.10	110 kW CFW700E0211T4 VFD or equivalent	ea	
2.6.9.11	Allow for the provisional sum for the selection, supply, delivery to site and installation for any Variable Speed Drive or maintenance and service parts and optional extras not listed in the schedule. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment clause 4.16	Provisional Sum	R300 000.00 Incl VAT
	Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

2.6.10	Medium Voltage Variable Speed Drive or equivalent. If prices for these items cannot be sourced before tender closure, indicate this in a covering letter and they may not be part of the tender evaluation and award.	Unit	Rate/Price ZAR (excl.Vat) R c
2.6.10.1	Medium Voltage VFD 450kW, 100 amp, IP 40 air cooled, 3.3kV Yaskawa Model code: CIMR-MV2AC5CBIOOEIAB, motor size 450kW, 96 amp or equivalent	ea	
2.6.10.2	Medium Voltage VFD 1500kW, 300 amp, IP 40 air cooled 3.3kV Yaskawa Model code: CIMR-MV2AC5CB330EIAB, motor size 1500 kW, 330 amp or equivalent	ea	
2.6.10.3	Medium Voltage VFD 630kW, 140 amp, IP 40 air cooled 3.3kV Yaskawa Model code: CIMR-MV2AC5CB140EIAB , motor size 500 kW, 110 amp or equivalent	ea	
2.6.10.4	Medium Voltage VFD 630kW, 140 amp, 3300 Volt, DELTA MVF23AA140NNSS or equivalent	ea	
2.6.10.5	Allow for the provisional sum for the selection, supply, delivery to site and installation for any Variable Speed Drive or maintenance and service parts and optional extras not listed in the schedule. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment) clause 4.16	Provisional Sum	R300 000.00 Incl VAT
	Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

2.6.11	Variable Speed Drive replacement parts and components installed in Water and Sanitation Equivalent VFD components will have to be equal and compatible in all respects to ensure it is fit for purpose and compatible with existing VFD's installed in City of Cape Town	Unit	Rate/Price ZAR (excl.Vat) R c
2.6.11.1	Medium Voltage Drive 1500kW , 3.3kV Yaskawa MV1000 Model code: CIMR-MV2AC5CB330EIAB Power Cell Unit or equivalent	ea	
2.6.11.2	Medium Voltage Drive 1500kW , 3.3kV Yaskawa MV1000 Model code: CIMR-MV2AC5CB330EIAB Cooling fan (Power cell section) or equivalent	ea	
2.6.11.3	Medium Voltage Drive 1500kW , 3.3kV Yaskawa MV1000 Model code: CIMR-MV2AC5CB330EIAB Cooling fan (Transformer section) or equivalent	ea	
2.6.11.4	Medium Voltage Drive 450kW , 3.3kV Yaskawa Model code: CIMR-MV2AC5CBI00EIAB Power Cell Unit or equivalent	ea	
2.6.11.5	Medium Voltage Drive 450kW , 3.3kV Yaskawa Model code: CIMR-MV2AC5CBI00EIAB Cooling fan (Power cell section) or equivalent	ea	
2.6.11.6	Medium Voltage Drive 450kW , 3.3kV Yaskawa Model code: CIMR-MV2AC5CBI00EIAB Cooling fan (Transformer section) or equivalent	ea	
2.6.11.7	Medium Voltage Drive 630kW , 3.3kV Yaskawa MV1000 Model code: CIMR-MV2AC5CB140EIAB Power Cell Unit or equivalent	ea	
2.6.11.8	Medium Voltage Drive 630kW , 3.3kV Yaskawa MV1000 Model code: CIMR-MV2AC5CB140EIAB Cooling fan (Power cell section) or equivalent	ea	
2.6.11.9	Medium Voltage Drive 630kW , 3.3kV Yaskawa MV1000 Model code: CIMR-MV2AC5CBI40EIAB Cooling fan (Transformer section) or equivalent	ea	
2.6.11.10	Medium Voltage Drive 3.3kV Yaskawa FS Drive-MV1000 330A 1500kW , power cell unit, output current 330 amp max, model JESD-MV2C12330 Power Cell Unit or equivalent	ea	

2.6.11	Variable Speed Drive replacement parts and components.	Unit	Rate/Price ZAR (excl.Vat) R c
2.6.11.11	PT100 Thermostat (330A CCT): Alarm 150degC; Trip 160degC Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.12	PT100 Thermostat (100A CCT): Alarm 155degC; Trip 160degC Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.13	Thermostat 1 & 2 (330A CCT): Open at 130degC Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.14	Thermostat 1 & 2 (100A CCT): Open at 150degC Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.15	Fan fault detect board (330A CCT): 14PCB Model: JEBC-61703-1, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.16	Fan fault detect board (100A CCT): 14PCB Model: JEBC-61703-0, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.17	Medium Voltage Variable Speed Drive 3.3kV, 50 Hz cooling fan FS Drive MV1000 Yaskawa (330A CCT); 3.4A S3G500-AM56-21 or equivalent	ea	
2.6.11.18	Medium Voltage Variable Speed Drive 3.3kV, 50 Hz cooling fan FS Drive MV1000 Yaskawa (330A CCT); 2.3A S3G400-KC22-51 or equivalent	ea	
2.6.11.19	Medium Voltage Variable Speed Drive 3.3kV, 50 Hz cooling fan FS Drive MV1000 Yaskawa (100A CCT); 1.3A S3G250-BC54-12 or equivalent	ea	
2.6.11.20	1PCB Control board Model: JEBC-61304-1, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.21	1PCB Control board: DI 24V 5mA, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.22	1PCB Control board: DO 24V 50mA, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.23	10PCB Isolation board (Output Voltage Detect) Model: JEBC-61701, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.24	11PCB Relay board: Digital Inputs & Outputs Model: JEBC-61913, JEBC-61913-1, JEBC-61913-2, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.25	Diode: 1N59272B,G, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.26	Resistor: 1.2Mohm 5W R142-5W-1.2M-0.5, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.27	Circuit Breaker [CB1]{300A CCT}: Ex9BN: 40A 2P, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.28	Circuit Breaker [CB1]{100A CCT}: Ex9BN: 20A 2P, Yaskawa FS Drive-MV1000 or equivalent	ea	

2.6.11	Variable Speed Drive replacement parts and components.	Unit	Rate/Price ZAR (excl.Vat) R c
2.6.11.29	Circuit Breaker [CB2&CB3]{300A CCT}: Ex9BN: 16A 2P, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.30	Circuit Breaker [CB2]{100A CCT}: Ex9BN: 10A 2P, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.31	Circuit Breaker [CB4]: Ex9BN: 6A 2P, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.32	Line Filter [FL1]: Model: RSEN-2006, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.33	Line Filter [FL11]: Model: RSEN-2021, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.34	RELAY/CONTACTOR [51]: DC24V Model: SK06L-E10, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.35	RELAY Aux [K11, K12, K13, K14, K21, K22, K23]: 11Pin DC24V, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.36	Power Cell control Board [A1, B1, C1, A2, B2, C2], Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.37	Power Cell Control Board [A1, B1, C1, A2, B2, C2], Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.38	Power supply 1: DC +/- 15V & +5V; 3A, 1A, 0.3A Model: LDC30F- 2- CY, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.39	Power supply 2: DC24V 2.2A Model: PBA50F- 24- C, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.40	Ethernet Interface: 4PCB (RJ45) Model: SI-EM3.M, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.41	Comms Interface converter: Ethernet to RJ45 Connection: 4PCB Model: SI-EM3.M, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.42	DOP Digital operator RS-232C [JVOP-180], Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.43	USB Copy Unit [JVOP-181], Yaskawa FS Drive-MV1000	ea	
2.6.11.44	RJ-45 Communications Cable 1m, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.45	8PCB Panel board: USB Interface Model: JEBC-61611, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.46	Battery: 3V 2000mAh Model: CR6L-CN014S, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.47	COIL [RY2]: Run/Stop Model: RU42S-CR-A200, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.48	Capacitor Resistor Arrangement Model: XX51; DCR2-10A25C, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.49	COIL [RY1]: VFD Primary Power Off Command Model: SR-T5SA 3A2B AC200V, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.50	COIL [RY3]: VFD Ready Model: RU42S-CR-A200, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.51	TRANSDUCER U1: Transformer Temperature Detection THM/V Model: M2RS-44-M2/UL, Yaskawa FS Drive-MV1000 or equivalent	ea	

2.6.11	Variable Speed Drive replacement parts and components.	Unit	Rate/Price ZAR (excl.Vat) R c
2.6.11.52	TRANSDUCER: U2 Module In: 220Vac; Out1: 4~20mA; Out2: 0~10Vdc Model: M2VS-A4-M2/UL, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.53	TRANSDUCER: SPEED REFERENCE DC4~20mA/0~50Hz, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.54	TRANSDUCER: U4 Module In: 220Vac; Out1: 0~10V; Out2: 4~20mA Model: M2VS-4A-M2/UL, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.55	TRANSDUCER: OUTPUT FREQUENCY DC4~20mA/0~50Hz, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.56	TRANSDUCER: U5 Module In: 220Vac; Out1: 0~10V; Out2: 4~20mA Model: M2VS-4A-M2/UL, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.57	TRANSDUCER: OUTPUT CURRENT DC4-20mA/0-330A, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.58	TRANSDUCER: OUTPUT CURRENT DC4-20mA/0-100A, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.59	TRANSDUCER: OUTPUT CURRENT DC4-20mA/0-140A, Yaskawa FS Drive-MV1000 or equivalent	ea	
2.6.11.60	Medium Voltage Variable Speed Drive 3.3kV, 50 Hz Current detection resistor board FS Drive MV1000 Yaskawa; JEB-61902-1 or JEB-61902-2 or JEB-61902-3 or JEB- 61902-4 or JEB-61902-5 or JEB-61902-6 or JEB-61902-7 or JEB-61902-8 or equivalent	ea	
2.6.11.61	Medium Voltage Variable Speed Drive 3.3kV, 50 Hz power cell FS Drive MV1000 Yaskawa; 35 amp – 100 amp, JESD- MV2C12035 - JESD-MV2C12100 or equivalent	ea	
2.6.11.62	Medium Voltage Variable Speed Drive 3.3kV, 50 Hz power cell FS Drive MV1000 Yaskawa; 140 amp – 330 amp JESD- MV2C12140 - JESD-MV2C12330 or equivalent	ea	
2.6.11.63	Medium Voltage Variable Speed Drive 3.3kV, 50 Hz power cell FS Drive MV1000 Yaskawa; 400 amp – 630 amp JESD- MV2C12400 - JESD-MV2C12630 or equivalent	ea	
2.6.11.64	Medium Voltage Variable Speed Drive 3.3kV, 50 Hz power cell FS Drive MV1000 Yaskawa; 520 amp – 630 amp JESD- MV2C12520 - JESD-MV2C12630 or equivalent	ea	
2.6.11.65	ROTRON Caraval Fan 115V,550 CFM (FN2), Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.66	200 KVAR Capacitor, 3300V/50Hz, 35A, Type 41554330, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD, Ducati or equivalent	ea	
2.6.11.67	300 KVAR Capacitor, 3300V/50Hz, 110A, Bioriphaso/tf 300/3.3/T Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.68	0.1UF NCL SNUBBER CAPACITOR, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.69	IGCT POWER SUPPLY, Input Voltage: +50Vdc/10A, Output Voltage, 6x 20Vdc/3A Each, ModelGT/HVI-P4668-06, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	

2.6.11	Variable Speed Drive replacement parts and components.	Unit	Rate/Price ZAR (excl.Vat) R c
2.6.11.70	AC/DC POWER SUPPLY, Input Voltage: 100~240V, 50Hz, 23A; Output Power: 1500.8W, 2x 56V Outputs, 26.8A Output Current Model: PM33398B-6-1-3-E, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD, Pioneer Magnetics, Penbro Kelnic or equivalent	ea	
2.6.11.71	3 HP COOLING FAN (FN1), 380V, 50Hz, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.72	BATTERY 3V 4-PIN FOR CIB BOARD, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.73	BATTERY 3V 2 PIN FOR DCB BOARD, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.74	PKGD CUSTOMER CIB BOARD ASSY, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.75	PKG SNUBR RES AS 400W 17.5-OHM, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.76	PKG SNUBR RES ASSY 600W 15-OHM, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.77	400A, 6500V SGCT ASSEMBLY - 2 DEVICES MATCHED SET, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.78	1203-USB Drive Interface Converter Cable: 5Vdc 130mA OR 12Vdc 120mA Allen Bradley or equivalent	ea	
2.6.11.79	PKGD CUSTOMER OIB BOARD ASSY Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.80	PKGD CUSTOMER XIO BOARD ASSY Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.81	Contactactor 9A Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.82	Contactactor 10A Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.83	Mini Contactactor 9A Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.84	Auxiliary Contact Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.85	Manual Starter Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.86	Supplementary Protector, 1 Pole, 7A Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.87	Supplementary Protector, 1 Pole, 15A Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.88	Supplementary Protector, 2 Pole, 7A Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.89	Supplementary Protector, 2 Pole, 15A Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	

2.6.11	Variable Speed Drive replacement parts and components.	Unit	Rate/Price ZAR (excl.Vat) R c
2.6.11.90	R-C Surge Suppressor, 110-240Vac Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.91	CIB RS485 Adaptor, 20-COMM-H Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.92	Metal Oxide Varistor 150V Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.93	2E Primary CPT Fuse, 4.8kV Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.94	9R Clip-On Power Fuse, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.95	Cabinet Space Heater, 240Vac 150W Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.96	Control Transformer, 3300/110V, 2000VA, 50Hz Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.97	1Pole Fuse Block Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.98	Contact Cartridge 20A Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.99	Control Relay 2NO, 2NC Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.100	MCS Relay 3NO, 1NC Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.101	Zero Sequence Current Transformer (3.25" Window), 120A, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.102	Main Cooling Fan Transformer, 3300/380V 3kVa, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.103	AC Line Reactor, 120A, 5.3mH, 3300V/50Hz & 4160/60Hz Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.104	3E Primary CPT Fuse, 4.8kV Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.105	Stego 03504.0-00 Receptacle, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.106	Current transformer- Input Sensing Current, 1000:1 Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.107	Extended Lead Suppressor, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.108	S&S Complete Test Switch With English Nameplate, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.109	Metal Oxide Varistor, BB Ser. V242BB60, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.110	Motor for Fan 380V, 3HP Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.111	Hall Effect Current Sensor, 2500:1, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.112	Washable Door Filter, size- 53.5 x 76.95 cm, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11	Variable Speed Drive replacement parts and components.	Unit	Rate/Price ZAR (excl.Vat) R c
2.6.11.113	Push-Button- Red Extended Head Push Button, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.114	Push-Button- Push-Pull E-STOP, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.115	Push-Button- Green Flush Head, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.116	Selector Switch Unit, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.117	Pilot Light - Amber, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	

2.6.11.118	Pilot Light - Clear, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.119	Pilot Light - Green, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.120	Pilot Light - Red, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.121	Potentiometer Unit, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.122	Metal Oxide Varistor Assembly, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.123	Holding Coil, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.124	Closing Coil, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.125	Molded Isolator Switch Assembly, 400A, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.126	Auxiliary Switch Housing Assembly, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.127	Vacuum Contactor, 400A, Model: 1502-V4DBDA-1, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.128	Capacitor with Integral Resistor, 1.0uF, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.129	Metal Oxide Varistor, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.130	Fuse, 250V, 5A, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.131	Clamp Head Assembly, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.132	Temperature Sensor Cable Assembly, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11	Variable Speed Drive replacement parts and components.	Unit	Rate/Price ZAR (excl.Vat) R c
2.6.11.133	Connector & Ribbon Cable Kit, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.134	Test Kit - (1) External I/O Board, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.135	Fibreglass Filter, Size: 432 x 795MM Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.136	Low Voltage Control Circuit Fuse, 2A, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.137	Diode, 1N4005, 600V, 1A Max, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.138	iNyogel Grease 759G 1 Oz Pkg for isolating switch, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.139	Fuse Extractor (Clip On Power Fuse), Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.140	Fibre Optic Cable-5M, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.141	6M Duplex Fibre Optic Cable, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.142	6.5M Duplex Fibre Optic Cable, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.143	7M Duplex Fibre Optic Cable, Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	
2.6.11.144	2E Primary CPT Fuse A480T2E, 4.8kV int. Rating 50,000A Allen Bradley PowerFlex 7000 MV 3.3 kV VSD or equivalent	ea	

2.6.11.145	Allow for the provisional sum for the selection, supply, delivery to site and installation for Variable Speed Drive maintenance and service parts and components and optional extras not listed in the schedule. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment) clause 4.16	Provisional Sum	R300 000.00 Incl VAT
	Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

2.7	Motor Control and Drives	Unit	Rate/Price ZAR (excl.Vat) R c
2.7.1	400 V LV Star-Delta Starters (Lovato, ABB and Schneider) or equivalent Enclosed IP65 star -delta starters		
2.7.1.1	7.5kW 6.3 - 10A enclosed star-delta starter 450 300 220, Complete with Start, stop/reset pushbuttons, Thermal overload relay (phase failure sensitive), Integral control terminals for ease of wiring, Enclosed star-delta starters (IP65), With mounted on-load isolator, Pad lockable in OFF position, door interlocking in ON position, pilot light "trip" or "run" indication incorporated into pushbuttons, Fully assembled and wired with mounted star-delta timer and thermal overload relay	ea	
2.7.1.2	11.0kW 9 - 14A enclosed star-delta starter 450 300 220, Complete with Start, stop/reset pushbuttons, Thermal overload relay (phase failure sensitive), Integral control terminals for ease of wiring, Enclosed star-delta starters (IP65), With mounted on-load isolator, Pad lockable in OFF position, door interlocking in ON position, pilot light "trip" or "run" indication incorporated into pushbuttons, Fully assembled and wired with mounted star-delta timer and thermal overload relay	ea	
2.7.1.3	15.0kW 13 - 18A enclosed star-delta starter 450 300 220, Complete with Start, stop/reset pushbuttons, Thermal overload relay (phase failure sensitive), Integral control terminals for ease of wiring, Enclosed star-delta starters (IP65), With mounted on-load isolator, Pad lockable in OFF position, door interlocking in ON position, pilot light "trip" or "run" indication incorporated into pushbuttons, Fully assembled and wired with mounted star-delta timer and thermal overload relay	ea	
2.7.1.4	22.0kW 24 - 32A enclosed star-delta starter 450 300 220, Complete with Start, stop/reset pushbuttons, Thermal overload relay (phase failure sensitive), Integral control terminals for ease of wiring, Enclosed star-delta starters (IP65), With mounted on-load isolator, Pad lockable in OFF position, door interlocking in ON position, pilot light "trip" or "run" indication incorporated into pushbuttons, Fully assembled and wired with mounted star-delta timer and thermal overload relay	ea	

2.7.2	Medium Voltage Direct On-Line Motor Starter Panels or equivalent. If prices for these items cannot be sourced before tender closure, indicate this in a covering letter and they may not be part of the tender evaluation and award.	Unit	Rate/Price ZAR (excl.Vat) R c
2.7.2.1	Medium Voltage Direct On-Line Motor Starter Panel, 17.5kV (3300V_Rated), 50Hz, 95kV (3300V_Impulse), 38kV (Rated Power Frequency 50Hz), 400A (Rated Current), 31.5kA (Rated Short Time Current), 80kA (Rated Peak Current), 3s (Short Circuit Duration), ALFR (Internal Arc Classification), 31.5kA (Arc Test Current), 1s (Arc Test current Duration), Aux Voltage 30Vdc, Including, Multicore Protection and Metering CT's (10P10 & 0.5FS5) 100/5 15VA, Multicore (Metering and Protection) Voltage Transformer 3300/√3//110V/√3(x2) (cl.0.5 50VA & CI3P 50VA) & Rated Vacuum Contactor, Model: ZS1 Unigear or ABB	ea	
2.7.2.2	Medium Voltage Direct On-Line Motor Starter Panel, 17.5kV (3300V_Rated), 50Hz, 95kV (3300V_Impulse), 38kV (Rated Power Frequency_50 Hz), 400A (Rated Current), 31.5kA (Rated Short Time Current), 80kA (Rated Peak Current), 3s (Short Circuit Duration), ALFR (Internal Arc Classification), 31.5kA (Arc Test Current), 1s (Arc Test current Duration), Aux Voltage 110Vdc, Including, Multicore Protection and Metering CT's (10P10 & 0.5FS5) 100/5 15VA, Multicore (Metering and Protection) Voltage Transformer 3300/√3//110V/√3(x2) (cl.0.5 50VA & CI3P 50VA) & Rated Vacuum Contactor, Model: ZS1 Unigear or ABB	ea	
2.7.2.3	Medium Voltage Direct Incomer Panel, 17.5kV (3300V_Rated), 50Hz, 95kV (3300V_Impulse), 38kV (Rated Power Frequency_50 Hz), 400A (Rated Current), 31.5kA (Rated Short Time Current), 80kA (Rated Peak Current), 3s (Short Circuit Duration), ALFR (Internal Arc Classification), 31.5kA (Arc Test Current), 1s (Arc Test current Duration) including Cable Live-Kuvag Indicator Model: ZS1 Unigear or ABB	ea	
2.7.3	Medium Voltage Direct On-Line Motor Starter Panels Replacement Parts and components. If prices for these items cannot be sourced before tender closure, indicate this in a covering letter and they may not be part of the tender evaluation and award.	Unit	Rate/Price ZAR (excl.Vat) R c
2.7.3.1	Medium Voltage Vacuum Contactor, 12kV (3300V_Rated), 50Hz, 75kV (V_Lighting Impulse Withstand), 28kV (Rated Power Frequency Withstand_V), 400A (Rated Current), Altitude Class <1000m, Mass 52kg, Auxiliary Voltage 30V, ZS1-compatibility Model: V-VSC12/P SCO, Unigear or ABB	ea	
2.7.3.2	Medium Voltage Vacuum Contactor, 12kV (3300V_Rated), 50Hz, 75kV (V_Lighting Impulse Withstand), 28kV (Rated Power Frequency Withstand_V), 400A (Rated Current), Altitude Class <1000m, Mass 52kg, Auxiliary Voltage 110V, ZS1-compatibility Model: V-VSC12/P SCO, Unigear or ABB	ea	
2.7.3.3	Medium Voltage- Voltage Transformer, Multicore (Metering and Protection) Voltage Transformer 3300/√3//110V/√3(x2) (cl.0.5 50VA & CI3P 50VA), 12/28/76kV 400VA, 40-65°C, IEC 60044-2, ZS1-compatibility Model: TJP4.0, Unigear or ABB	ea	

2.8	Auxiliary parts	Unit	Rate/Price ZAR (excl.Vat) R c
2.8.1	Clip-on screw-on auxiliary contact blocks for contactors lth/690V Ui Lovato, Hagar, Schneider, Cbi and ABB or equivalent		
2.8.1.1	Top (centre) auxiliary contact block screw 2NO	ea	
2.8.1.2	Top (centre) auxiliary contact block screw 1NO + 1NC	ea	
2.8.1.3	Top (centre) auxiliary contact block screw 2NC	ea	
2.8.1.4	Top (centre) auxiliary contact block screw 2NO + 2NC	ea	
2.8.1.5	Top (centre) auxiliary contact block screw 2NO + 1NC	ea	
2.8.1.6	Top (centre) auxiliary contact block screw 1NO + 2NC	ea	
2.8.1.7	Top (side) auxiliary contact block screw 1NO	ea	
2.8.1.8	Top (side) auxiliary contact block screw 1NC	ea	
2.8.1.9	Top (side) auxiliary contact block push-on 2NO	ea	
2.8.1.10	Top (side) auxiliary contact block push-on 2NC	ea	
2.8.2	Clip-on screw-on auxiliary contact blocks for contactors lth/690V Ui Lovato, Hagar, Schneider, Cbi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
2.8.2.1	Side auxiliary (up to 4 per contactor) 1NO + 1NC	ea	
2.8.2.2	Side auxiliary (up to 4 per contactor) 2NO + 1NC	ea	
2.8.2.3	On-delay timer contact block 60sec 1NO + 1NC	ea	
2.8.2.4	Delay-on de-energisation timer contact block 60sec 1NO + 1NC	ea	
2.8.3	Motor protection CB, Auxiliary contacts Lovato, Hagar, Schneider, Cbi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
2.8.3.1	1NO + 1NC side mounting auxiliary contact block	ea	
2.8.3.2	2NO side mounting auxiliary contact block	ea	
2.8.3.3	2NO front mounting auxiliary contact block	ea	
2.8.3.4	1NO + 1NC side mounting auxiliary contact block	ea	
2.8.3.5	2NO side mounting auxiliary contact block	ea	
2.8.3.6	1NO + 1NC front mounting auxiliary contact block	ea	

2.8.3	Motor protection CB, Shunt trip releases equal or similar to Lovato, Hagar, Schneider, Cbi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
2.8.3.7	24 VAC side mounting shunt trip release unit	ea	
2.8.3.8	110 VAC side mounting shunt trip release unit	ea	
2.8.3.9	230 VAC side mounting shunt trip release unit	ea	
2.8.3.10	400 VAC side mounting shunt trip release unit	ea	
2.8.3.11	24 VAC side mounting shunt trip release unit	ea	
2.8.3.12	110 VAC side mounting shunt trip release unit	ea	
2.8.3.13	230 VAC side mounting shunt trip release unit	ea	
2.8.3.14	400 VAC side mounting shunt trip release unit	ea	
2.8.4	Motor protection CB, Under voltage releases equal or similar to Lovato, Hagar, Schneider, Cbi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
2.8.4.1	230 VAC side mounting under voltage release	ea	
2.8.4.2	400 VAC side mounting under voltage release	ea	
2.8.4.3	230 VAC side mounting under voltage release	ea	
2.8.4.4	400 VAC side mounting under voltage release	ea	
2.8.5	Motor protection CB, Under voltage releases equal or similar to Lovato, Hagar, Schneider, Cbi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
2.8.5.1	Red/yellow door interlock handle (IP65) +200 mm shaft	ea	
2.8.5.2	Red/yellow door interlock handle (IP65) +300 mm shaft	ea	
2.8.5.3	Support optional shaft support	ea	

			Rate/Price ZAR (excl.Vat) R c
2.8.6	Process equipment and accessories or equivalent	Unit	
2.8.6.1	Ultrasonic level relay, din rail mount, 110 - 240 Volt, AC, 50 Hz, with 5 digital relay output, IP 55 enclosed unit. Equivalent to a Emerson Mowbray MCU 900 or equivalent	ea	
2.8.6.2	MCU 900 ultrasonic level relay, 110 - 240 Volt, AC, 50 Hz, with 5 digital relay output, panel mount. Equivalent to a Emerson Mowbray or Rosemount type or equivalent	ea	
2.8.6.3	Ultrasonic level control relay sensor with standard 20 meter lead. MSP 900 SH-A or equivalent	ea	
2.8.6.4	Ultrasonic level relay, 110 - 240 Volt, SC, 50 Hz, with 5 digital relay output. E&H FMU90 or equivalent	ea	
2.8.6.5	Ultrasonic level control sensor transducer with 10 meter lead E&H FDU90 or equivalent	ea	
2.8.6.6	Ultrasonic level control sensor transducer with 10 meter lead E&H FDU91 or equivalent	ea	
2.8.6.7	Pressure switch, 0.2-16 BAR rated pressure, 220 Volt, 50-60 Hz. Equivalent to a Burkett pressure switch, ID # 0641072, Model 280-A-13.0.0-B-MS or equivalent	ea	
2.8.6.8	Water pressure switch, 0 - 10 BAR rated pressure, 10(5)A/250 VAC. Or equivalent t to a DCM10	ea	
2.8.6.9	Vibration transducer type, P2 NN, 24V DC power supply. or equivalent to a IQ4	ea	
2.8.6.10	Power supply, single phase din rail mount 230VAV/24VDC, 5 amp output or equivalent	ea	
2.8.6.11	Battery charger, 222VA, 12VDC Output, 6 amp. Or equivalent to a Lovato, BCE0612	ea	
2.8.6.12	Battery charger, 317VA, 24VDC Output, 5 amp. Or equivalent to a BCE0524	ea	
2.8.6.13	Universal process indicator, part number L3DPM4001-3001M, 115 - 240 Volts supply, 2 Alarms digital output, 4-20mA analogue output. Or equivalent t to a DPM 4001	ea	
2.8.6.14	Solenoid coil for valve body, 24V DC, 12 Watt coil inrush current. Or equivalent t to a Fantini Cosmi, M20-M23.	ea	
2.8.6.15	Temperature controller, 240V, 50Hz, relay output, universal sensor input. (DELTA DTA4848-RO) or equivalent	ea	
2.8.6.16	Temperature probe, PT100, 5 x 50mm, 3 meter cable. (PT 100 SJ301/P505P/30) or equivalent	ea	
2.8.6.17	Thermostat, heating/cooling, IP20 contacts, din rail mountable, 15A switch capacity. (Fandis TRT-10A230V-NO/NC) or equivalent	ea	
2.8.6.18	Multi-function, multi range timer, multi voltage, 10A 250VAC contact rating, din mountable. Or equivalent to an electro DMFT	ea	

			Rate/Price ZAR (excl.Vat) R c
2.8.6	Process equipment and accessories or equivalent.	Unit	
2.8.6.19	Voltage window comparator and phase failure relay, multi voltage, 10A 250VAC contact rating, din mountable. Or Equivalent to an electro DVW3N	ea	
2.8.6.20	Float switch with differential for clear water, 10A 250VAC contact rating, 10 meter lead. (MATIC micro start/C) or equivalent	ea	
2.8.6.21	Phase failure/reversal relay, 110 - 400 Volt, type DPF and DPF/K or equivalent	ea	
2.8.6.22	Delta Electronics, Electro, temperature controller Series DTA, including DTA 4848R0, DTA 9696R0, DTA 4848C0 or equivalent	ea	
2.8.6.23	Signal isolator, type DSI, input signal options 0-10V, 4-20mA and 0-20mA	ea	
2.8.6.24	Multi-function timer, plug in type, multi voltage, 10A 250VAC contact rating, din mountable. T2M or equivalent	ea	
2.8.6.25	Star Delta function timer, plug in type, multi voltage, 10A 250VAC contact rating, din mountable. TNE3 or equivalent	ea	
2.8.6.26	Liquid level control relay, plug in type, multi voltage, 10A 250VAC contact rating, din mountable. LV1 or equivalent	ea	
2.8.6.27	Plug in type control relay. Including the following types multi voltage, 10A 250VAC contact rating; Unequal repeating, forward reverse, delay on energising capacitive level control, 3 pump sequence relay, flip flop, temperature, thermistor alarm module, multi-start attempt, flasher, power supply, phase failure sequence, under/over voltage, frequency monitor, current monitor, voltage monitor, pump protection for single and three phase or equivalent	ea	
2.8.6.28	Single line insulated stainless steel probe for conductive liquids, SN1 or equivalent	ea	
2.8.6.29	Three probe holder including three 1 meter long stainless steel electrode rods or equivalent	ea	
2.8.6.30	Mercury submerged float switch, turbulent and sewerage water, 10 amp, 250Volt contact rating, 20 meter lead, model HG, 10 amp resistive loads or equivalent	ea	
2.8.6.31	Mercury submerged float switch, turbulent and sewerage water, 10 amp, 250Volt contact rating, 13 meter lead, model MC, 10 amp resistive, 4 amp conductive loads or equivalent	ea	
2.8.6.32	Float switch with differential for clear water, 10A 250VAC contact rating, 20 meter lead. (MATIC micro start/C) or equivalent	ea	

3.	Power Supply, Distribution and Protection Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.1	Miniature Circuit breakers		
	MV series 4.5kA B curve (3-5 In)		
3.1.1	4.5kA miniature circuit breaker 6A - 40A single pole	ea	
	MJN series 6kA C curve (5-10 In) or equivalent. Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
	1+N 6kA miniature circuit breaker 6A - 40A		
	MN series 6kA C curve (5-10 In) Lovato, Hagar, Schneider, CBI and ABB or equivalent		
3.1.2	6kA miniature circuit breaker 6A - 40A	ea	
3.1.3	6kA miniature circuit breaker 50A-63A	ea	
3.1.4	Two pole 6kA miniature circuit breaker 6A-40A	ea	
3.1.5	Two pole 6kA miniature circuit breaker 50A-63A	ea	
3.1.6	Three pole 6kA miniature circuit breaker 6A- 40A	ea	
3.1.7	Three pole 6kA miniature circuit breaker 50A- 63A	ea	
	NF / HLF series 10kA C curve (5-10 In) or equivalent.. Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.1.8	Single pole 10kA miniature circuit breaker 1A - 3A	ea	
3.1.9	Single pole 10kA miniature circuit breaker 6A - 20A	ea	
3.1.10	Single pole 10kA miniature circuit breaker 25A - 32A	ea	
3.1.11	Single pole 10kA miniature circuit breaker 40A - 63A	ea	
	NF / HLF series 10kA C curve (5-10 In) Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.1.12	Single pole 10kA miniature circuit breaker 80A	ea	
3.1.13	Single pole 10kA miniature circuit breaker 100A	ea	
3.1.14	Single pole 10kA miniature circuit breaker 125A	ea	
3.1.15	Two pole 10kA miniature circuit breaker 2A - 3A	ea	
3.1.16	Two pole 10kA miniature circuit breaker 6A - 20A	ea	
3.1.17	Two pole 10kA miniature circuit breaker 25A - 40A	ea	
3.1.18	Two pole 10kA miniature circuit breaker 50A - 63A	ea	
3.1.19	Two pole 10kA miniature circuit breaker 80A -100A	ea	
3.1.20	Two pole 10kA miniature circuit breaker 125A	ea	
3.1.21	Three pole 10kA miniature circuit breaker 2A - 3A	ea	
3.1.22	Three pole 10kA miniature circuit breaker 6A - 20A	ea	
3.1.23	Three pole 10kA miniature circuit breaker 25A - 40A	ea	
3.1.24	Three pole 10kA miniature circuit breaker 50A - 63A	ea	
3.1.25	Three pole 10kA miniature circuit breaker 80A	ea	
3.1.26	Three pole 10kA miniature circuit breaker 100A	ea	
3.1.27	Three pole 10kA miniature circuit breaker 125A	ea	

	NF / HLF series 10kA C curve (5-10 In) Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.1.28	Four pole 10kA miniature circuit breaker 6A - 20A	ea	
3.1.29	Four pole 10kA miniature circuit breaker 25A - 40A	ea	
3.1.30	Four pole 10kA miniature circuit breaker 50A - 63A	ea	
3.1.31	Four pole 10kA miniature circuit breaker 80A	ea	
3.1.32	Four pole 10kA miniature circuit breaker 100A	ea	
3.1.33	Four pole 10kA miniature circuit breaker 125A	ea	
	NCN / HMC series 15kA C curve (5-10 In) Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.1.34	Single pole 15kA miniature circuit breaker 6A - 20A	ea	
3.1.35	Single pole 15kA miniature circuit breaker 25A - 63A	ea	
3.1.36	Single pole 15kA miniature circuit breaker 80A - 125A	ea	
3.1.37	Two pole 15kA miniature circuit breaker 6A-20A	ea	
3.1.38	Two pole 15kA miniature circuit breaker 25A-63A	ea	
3.1.39	Two pole 15kA miniature circuit breaker 80A-125A	ea	
3.1.40	Three pole 15kA miniature circuit breaker 6A - 20A	ea	
3.1.41	Three pole 15kA miniature circuit breaker 25 - 63A	ea	
3.1.42	Three pole 15kA miniature circuit breaker 80A	ea	
	NCN / HMC series 15kA C curve (5-10 In) Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.1.43	Three pole 15kA miniature circuit breaker 100	ea	
3.1.44	Three pole 15kA miniature circuit breaker 125A	ea	
3.1.45	Four pole 15kA miniature circuit breaker 6A - 25A	ea	
3.1.46	Four pole 15kA miniature circuit breaker 32A - 40A	ea	
3.1.47	Four pole 15kA miniature circuit breaker 50A - 63A	ea	
3.1.48	Four pole 15kA miniature circuit breaker 80A	ea	
3.1.49	Four pole 15kA miniature circuit breaker 100A	ea	
3.1.50	Four pole 15kA miniature circuit breaker 125A	ea	
	NRN series 15-25kA C curve (5-10 In) Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.1.51	Single pole 25kA miniature circuit breaker 6A - 25A	ea	
3.1.52	Single pole 25kA miniature circuit breaker 32A - 63A	ea	
3.1.53	Two pole 25kA miniature circuit breaker 6A - 32A	ea	
3.1.54	Two pole 25kA miniature circuit breaker 40A - 63A	ea	
3.1.55	Three pole 25kA miniature circuit breaker 6A-32A	ea	
3.1.56	Three pole 25kA miniature circuit breaker 40A - 63A	ea	
3.1.57	Four pole 25kA miniature circuit breaker 6A - 20A	ea	

	NRN series 15-25kA C curve (5-10 In) Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.1.58	Four pole 25kA miniature circuit breaker 25A - 40A	ea	
3.1.59	Four pole 25kA miniature circuit breaker 50A - 63A	ea	
3.1.60	Auxiliaries and tripping devices for MCBs and RCDs 1NO + 1NC 6A 230 VAC auxiliary contact block	ea	
3.1.61	Indication of main contact status MZ202 1NO + 1NC 6A 230 VAC alarm contact block	ea	
3.1.62	Indicates a fault overcurrent or short circuit MZ203 230 - 415 VAC shunt trip device	ea	
3.1.63	Permits remote tripping of the device MZ204 24 - 48 VAC / 12 - 48 VDC shunt trip device	ea	
3.1.64	Permits remote tripping of the device MZ206 230 VAC under voltage release	ea	
3.2	Earth Leakage protection Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.2.1	63A 30 mA 2 pole earth leakage device	ea	
3.2.2	63A 30 mA 3 pole earth leakage device	ea	
3.2.3	63A 30 mA 4 pole earth leakage device	ea	
3.2.4	63A 300 mA 2 pole earth leakage device	ea	
3.2.5	63A 300 mA 3 pole earth leakage device	ea	
3.2.6	63A 300 mA 4 pole earth leakage device	ea	
3.2.7	125A 30 mA 2 pole earth leakage device	ea	
3.2.8	125A 30 mA 3 pole earth leakage device	ea	
3.2.9	125A 30 mA 4 pole earth leakage device	ea	
3.2.10	125A 30 mA 2 pole earth leakage device	ea	
3.2.11	125A 30 mA 3 pole earth leakage device	ea	
3.2.12	125A 30 mA 4 pole earth leakage device	ea	
3.2.13	25A 30 mA 2 pole earth leakage device	ea	
3.2.14	40A 30 mA 2 pole earth leakage device	ea	
3.2.15	63A 30 mA 2 pole earth leakage device	ea	
3.2.16	100A 30 mA 2 pole earth leakage device	ea	
3.2.17	63A 30 mA 4 pole earth leakage device	ea	
3.2.18	100A 30 mA 4 pole earth leakage device	ea	
3.2.19	63A 100 mA 2 pole earth leakage device	ea	
3.2.20	63A 300 mA 2 pole earth leakage device	ea	
3.2.21	100A 300 mA 2 pole earth leakage device	ea	
3.2.22	63A 300 mA 4 pole earth leakage device	ea	
3.2.23	100A 300 mA 4 pole earth leakage device	ea	
3.2.24	16A 30 mA 2 pole earth leakage + MCB	ea	
3.2.25	20A 30 mA 2 pole earth leakage + MCB	ea	
3.2.26	25A 30 mA 2 pole earth leakage + MCB	ea	
3.2.27	32A 30 mA 2 pole earth leakage + MCB	ea	
3.2.28	40A 30 mA 2 pole earth leakage + MCB	ea	
3.2.29	220/240V 30 mA 4 pole earth leakage relay	ea	
3.2.30	220/240V 300 mA 4 pole earth leakage relay	ea	

3.2	Earth Leakage protection Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.2.31	30 mm round hole standard torroid (DIN rail mountable)	ea	
3.2.32	70 mm round hole standard torroid chassis mount	ea	
3.2.33	105 mm round hole standard torroid chassis mount	ea	
3.2.34	210 mm round hole standard torroid chassis mount	ea	
3.2.35	70 x 175 mm rectangular hole standard torroid chassis mount	ea	
3.3	Modular isolation SBN Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.3.1	32A on - off 1 pole modular isolator switch	ea	
3.3.2	63A on - off 1 pole modular isolator switch	ea	
3.3.3	100A on - off 1 pole modular isolator switch	ea	
3.3.4	125A on - off 1 pole modular isolator switch	ea	
3.3.5	32A on - off 2 pole modular isolator switch	ea	
3.3.6	63A on - off 2 pole modular isolator switch	ea	
3.3.7	100A on - off 2 pole modular isolator switch	ea	
3.3.8	125A on - off 2 pole modular isolator switch	ea	
3.3	Modular isolation SBN Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.3.9	32A on - off 3 pole modular isolator switch	ea	
3.3.10	63A on - off 3 pole modular isolator switch	ea	
3.3.11	100A on - off 3 pole modular isolator switch	ea	
3.3.12	125A on - off 3 pole modular isolator switch	ea	
3.3.13	32A on - off 4 pole modular isolator switch	ea	
3.3.14	63A on - off 4 pole modular isolator switch	ea	
3.3.15	100A on - off 4 pole modular isolator switch	ea	
3.3.16	125A on - off 4 pole modular isolator switch	ea	
3.4	Modular relays ERC Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.4.1	16A – 230 VAC modular standard contactor 2NO	ea	
3.4.2	16A – 230 VAC modular standard contactor 1NO+1NC 1	ea	
3.4.3	16A 1.7kW 230 VAC modular standard contactor 4NO 2	ea	
3.4.4	16A 1.7kW 230 VAC modular standard contactor 2NO+2NC	ea	
3.4.5	25A – 230 VAC modular standard contactor 2NO	ea	
3.4.6	25A – 230 VAC modular standard contactor 2NO	ea	
3.4.7	25A – 230 VAC modular standard contactor 2NC	ea	
3.4.8	25A – 230 VAC modular standard contactor 1NO+1NC	ea	
3.4.9	25A 2.6kW 230 VAC modular standard contactor 4NO	ea	
3.4.10	25A 2.6kW 230 VAC modular standard contactor 2NO+2NC	ea	
3.4.11	40A 7.8kW 230 VAC modular standard contactor 2NO	ea	
3.4.12	40A 7.8kW 230 VAC modular standard contactor 2NO	ea	
3.4.13	40A 7.8kW 230 VAC modular standard contactor 2NC	ea	

	Modular relays or equivalent ERC Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.4.14	40A 7.8kW 230 VAC modular standard contactor 4NO	ea	
3.4.15	40A 7.8kW 230 VAC modular standard contactor 2NO+2NC	ea	
3.4.16	63A 10kW 230 VAC modular standard contactor 2NO	ea	
3.4.17	63A 10kW 230 VAC modular standard contactor 2NO	ea	
3.4.18	63A 10kW 230 VAC modular standard contactor 4NO	ea	
3.4.19	63A 10kW 230 VAC modular standard contactor 4NC	ea	
3.4.20	63A 10kW 230 VAC modular standard contactor 2NO+2NC	ea	
3.4.21	63A 10kW 12 VDC low noise modular contactor 4NO	ea	
3.4.22	25A – 24 VDC low noise modular contactor 2NO	ea	
3.4.23	25A 2.6kW 24 VDC low noise modular contactor 4NO	ea	
3.4.24	40A 7.8kW 24 VDC low noise modular contactor 4NO	ea	
3.4.25	63A 10kW 24 VDC low noise modular contactor 4NO	ea	
3.4.26	25A – 230 VAC low noise modular contactor 2NO	ea	
3.4.27	25A 2.6kW 230 VAC low noise modular contactor 4NO	ea	
3.4.28	40A 7.8kW 230 VAC low noise modular contactor 4NO	ea	
3.4.29	63A 10kW 230 VAC low noise modular contactor 4NO	ea	
3.5	Moulded Case circuit breaker or equivalent HHA, HHB, HND, HNE Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.5.1	25kA 3 pole moulded case CB x160 16A - 100A	ea	
3.5.2	25kA 3 pole moulded case CB x160 125A	ea	
3.5.3	25kA 3 pole moulded case CB x160 160A	ea	
3.5.4	25kA 3 pole moulded case CB x250 200A - 250A	ea	
3.5.5	50kA 3 pole moulded case CB h400e 320A - 400A	ea	
3.5.6	50kA 3 pole moulded case CB h800e 500A - 800A	ea	
3.5.7	40kA 3 pole moulded case CB x160 16A - 25A	ea	
3.5.8	40kA 3 pole moulded case CB x160 25A - 40A	ea	
3.5.9	40kA 3 pole moulded case CB x160 40A - 63A	ea	
3.5.10	40kA 3 pole moulded case CB x160 63A - 100A	ea	
3.5.11	40kA 3 pole moulded case CB x160 80A - 125A	ea	
3.5.12	40kA 3 pole moulded case CB x160 101A - 160A	ea	
3.5.13	40kA 4 pole moulded case CB x160 16A - 25A	ea	
3.5.14	40kA 4 pole moulded case CB x160 25A - 40A	ea	
3.5.15	40kA 4 pole moulded case CB x160 40A - 63A	ea	
3.5.16	40kA 4 pole moulded case CB x160 63A - 100A	ea	
3.5.17	40kA 4 pole moulded case CB x160 80A - 125A	ea	
3.5.18	40kA 4 pole moulded case CB x160 101A - 160A	ea	
3.5.19	40kA 3 pole moulded case CB x250 160A - 250A	ea	
3.5.20	40kA 4 pole moulded case CB x250 160A - 250A	ea	
3.5.21	50kA 3 pole moulded case CB h400 252A - 400A	ea	
3.5.22	50kA 4 pole moulded case CB h400 252A - 400A	ea	

	Moulded Case circuit breaker or equivalent HHA, HHB, HND, HNE Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.5.23	50kA 3 pole moulded case CB h630 252A - 630A	ea	
3.5.24	50kA 3 pole moulded case CB h1000 320A - 800A	ea	
3.5.25	50kA 3 pole moulded case CB h1000 400A - 1000A	ea	
3.5.26	50kA 3 pole moulded case CB h1600 500A - 1250A	ea	
3.5.27	50kA 3 pole moulded case CB h1600 640 - 1600A	ea	
3.5.28	50kA 4 pole moulded case CB h630 252 - 630A	ea	
3.5.29	50kA 4 pole moulded case CB h1000 320 - 800A	ea	
3.5.30	50kA 4 pole moulded case CB h1000 400 - 1000A	ea	
3.5.31	50kA 4 pole moulded case CB h1600 500 - 1250A	ea	
3.5.32	50kA 4 pole moulded case CB h1600 640 - 1600A	ea	
3.5.33	65kA 3 pole moulded case circuit breaker h250 40 - 63A	ea	
3.5.34	65kA 3 pole moulded case circuit breaker h250 63 - 100A	ea	
3.5.35	65kA 3 pole moulded case circuit breaker h250 100 - 160A	ea	
3.5.36	65kA 3 pole moulded case circuit breaker h250 160 - 250A	ea	
3.5.37	70kA 3 pole moulded case circuit breaker h630 160 - 400A	ea	
3.5.38	70kA 3 pole moulded case circuit breaker h630 252 - 630A	ea	
3.5.39	70kA 3 pole moulded case circuit breaker h1000 320 - 800A	ea	
3.5.40	70kA 3 pole moulded case circuit breaker h1000 400 - 1000A	ea	
	Moulded Case circuit breaker or equivalent HHA, HHB, HND, HNE, HEE, HCF, HEF, HCA, HCB, HCD, HCE, HCF Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.5.41	70kA 3 pole moulded case circuit breaker h1600 500 - 1250A	ea	
3.5.42	70kA 3 pole moulded case circuit breaker h1600 640 - 1600A	ea	
3.5.43	3 pole load break switch (isolator) x160 125A	ea	
3.5.44	3 pole load break switch (isolator) x160 160A	ea	
3.5.45	3 pole load break switch (isolator) x250 250A	ea	
3.5.46	3 pole load break switch (isolator) h400 400A	ea	
3.5.47	3 pole load break switch (isolator) h630 630A	ea	
3.5.48	3 pole load break switch (isolator) h1000 800A	ea	
3.5.49	3 pole load break switch (isolator) h1000 1000A	ea	
3.5.50	3 pole load break switch (isolator) h1600 1250A	ea	
3.5.51	3 pole load break switch (isolator) h1600 1600A	ea	
3.5.52	4 pole load break switch (isolator) x160 125A	ea	
3.5.53	4 pole load break switch (isolator) x160 160A	ea	
3.5.54	4 pole load break switch (isolator) x250 250A	ea	
3.5.55	4 pole load break switch (isolator) h400 400A	ea	
3.5.56	4 pole load break switch (isolator) h630 630A	ea	
3.5.57	4 pole load break switch (isolator) h1000 800A	ea	
3.5.58	4 pole load break switch (isolator) h1000 1000A	ea	
3.5.59	4 pole load break switch (isolator) h1600 1250A	ea	
3.5.60	4 pole load break switch (isolator) h1600 1600A	ea	
3.5.61	1NO + 1NC auxiliary contact for circuit breakers x160-250	ea	
3.5.62	2NO + 2NC auxiliary contact for circuit breakers h400e	ea	
3.5.63	2NO + 2NC auxiliary contact for circuit breakers h800e	ea	

	Moulded Case circuit breaker or equivalent HHA, HHB, HND, HNE, HEE, HCF, HEF, HCA, HCB, HCD, HCE, HCF Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.5.64	1NO + 1NC auxiliary contact for circuit breakers h250-1600	ea	
3.5.65	1NO + 1NC alarm contact for circuit breakers x160-250	ea	
3.5.66	1NO + 1NC alarm contact for circuit breakers h400e	ea	
3.5.67	1NO + 1NC alarm contact for circuit breakers h800e	ea	
3.5.68	1NO + 1NC alarm contact for circuit breakers h250-1600	ea	
3.5.69	shunt trip device for circuit breakers x160-250	ea	
3.5.70	shunt trip device for circuit breakers h400e	ea	
3.5.71	shunt trip device for circuit breakers h800e	ea	
3.5.72	shunt trip device for circuit breakers h250-1600	ea	
3.5.73	direct mount front mount rotary handle for circuit breakers x160	ea	
3.5.74	direct mount front mount rotary handle for circuit breakers x250	ea	
3.5.75	direct mount front mount rotary handle for circuit breakers h250	ea	
3.5.76	direct mount front mount rotary handle for circuit breakers h400/630	ea	
3.5.77	direct mount front mount rotary handle for circuit breakers h1000	ea	
3.5.78	direct mount front mount rotary handle for circuit breakers h1600	ea	
3.5.79	vary-depth 200 mm door interlocking rotary handle and shaft x160	ea	
3.5.80	vary-depth 200 mm door interlocking rotary handle and shaft x250	ea	
3.5.81	vary-depth door interlocking rotary handle and shaft h250	ea	
3.6.	Moulded Case circuit breaker or equivalent HXD00*P, HXE00*P, HXXC00*H, HXA030H, HXB030H, HXC. Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.6.1	vary-depth door interlocking rotary handle and shaft h400/630	ea	
3.6.2	HXE031H vary-depth door interlocking rotary handle and shaft h1000	ea	
3.6.3	HXF031H vary-depth door interlocking rotary handle and shaft h1600	ea	
3.6.4	HXB042H 230 VAC motor operator for remote operation of MCCB x250	ea	
3.6.5	HXD042H 230 VAC motor operator for remote operation of MCCB h400/630	ea	
3.6.6	HXE042H 230 VAC motor operator for remote operation of MCCB h1000	ea	
3.6.7	HXF042H 230 VAC motor operator for remote operation of MCCB h1600	ea	
3.6.8	HYA033H DIN rail mounting adaptor x160	ea	
3.6.9	HYB001H (set of 3) 150 mm ² collar terminals for cables x250	ea	
3.6.10	HYD003H (set of 3) 240 mm ² collar terminals for cables h400/630	ea	
3.6.11	HYA014H (3 pole) spreader link extended terminals x160	ea	
3.6.12	HYB011H (3 pole) spreader link extended terminals x250	ea	
3.6.13	HYC011H (3 pole) spreader link extended terminals h250	ea	
3.6.14	HYD014H (3 pole) spreader link extended terminals h400/630	ea	
3.6.15	HYA027H (3 pole) terminal shrouds x160	ea	
3.6.16	HYB021H (3 pole) extended terminal shrouds x250	ea	
3.6.17	HYC021H (3 pole) extended terminal shrouds h250	ea	

3.7	Moulded Case circuit breaker or equivalent HYB, HYC, HYD, HYE. Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.7.1	(3 pole) extended terminal shrouds h400/630	ea	
3.7.2	(3 pole) extended terminal shrouds h1000	ea	
3.7.3	(3 per set) spare interphase barriers x160	ea	
3.7.4	(3 per set) spare interphase barriers x250	ea	
3.7.5	(3 per set) spare interphase barriers h250	ea	
3.7.6	120 mm² 19.0 mm M8 contained palm cable lug (ea) x/h250	ea	
3.7.7	150 mm² 19.0 mm M8 contained palm cable lug (ea) x/h250	ea	
3.7.8	185 mm² 24.5 mm M10 contained palm cable lug (ea) 250/400/630	ea	
3.7.9	240 mm² 31.0 mm M10 contained palm cable lug (ea) h400/630	ea	
3.8	Air Circuit Breaker or equivalent MTZ Lovato, Hagar, Schneider, CBi and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.8.1	42kA rms 630A Air circuit breaker	ea	
3.8.2	50kA rms 630A Air circuit breaker	ea	
3.8.3	66kA rms 630A Air circuit breaker	ea	
3.8.4	150kA rms 630A Air circuit breaker	ea	
3.8.5	42kA rms 800A Air circuit breaker	ea	
3.8.6	50kA rms 800A Air circuit breaker	ea	
3.8.7	66kA rms 800A Air circuit breaker	ea	
3.8.8	150kA rms 800A Air circuit breaker	ea	
3.8.9	42kA rms 1000A Air circuit breaker	ea	
3.8.10	50kA rms 1000A Air circuit breaker	ea	
3.8.11	66kA rms 1000A Air circuit breaker	ea	
3.8.12	150kA rms 1000A Air circuit breaker	ea	
3.8.13	42kA rms 1250A Air circuit breaker	ea	
3.8.14	50kA rms 1250A Air circuit breaker	ea	
3.8.15	66kA rms 1250A Air circuit breaker	ea	
3.8.16	42kA rms 1600A Air circuit breaker	ea	
3.8.17	50kA rms 1600A Air circuit breaker	ea	
3.8.18	66kA rms 1600A Air circuit breaker	ea	
3.8.19	42kA rms 800A Air circuit breaker	ea	
3.8.20	66kA rms 800A Air circuit breaker	ea	
3.8.21	100kA rms 800A Air circuit breaker	ea	
3.8.22	150kA rms 800A Air circuit breaker	ea	
3.8.23	42kA rms 1000A Air circuit breaker	ea	
3.8.24	66kA rms 1000A Air circuit breaker	ea	
3.8.25	100kA rms 1000A Air circuit breaker	ea	
3.8.26	150kA rms 1000A Air circuit breaker	ea	
3.8.27	42kA rms 1250A Air circuit breaker	ea	
3.8.28	66kA rms 1250A Air circuit breaker	ea	
3.8.29	100kA rms 1250A Air circuit breaker	ea	
3.8.30	150kA rms 1250A Air circuit breaker	ea	
3.8.31	MTZ2 42kA rms 1600A Air circuit breaker	ea	
3.8.32	MTZ2 66kA rms 1600A Air circuit breaker	ea	

	Air Circuit Breaker or equivalent MTZ Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.8.33	MTZ2 100kA rms 1600A Air circuit breaker	ea	
3.8.34	MTZ2 150kA rms 1600A Air circuit breaker	ea	
3.8.35	MTZ2 42kA rms 2000A Air circuit breaker	ea	
3.8.36	MTZ2 66kA rms 2000A Air circuit breaker	ea	
3.8.37	MTZ2 100kA rms 2000A Air circuit breaker	ea	
3.8.38	MTZ2 150kA rms 2000A Air circuit breaker	ea	
3.8.39	MTZ2 66kA rms 2500A Air circuit breaker	ea	
3.8.40	MTZ2 100kA rms 2500A Air circuit breaker	ea	
3.8.41	MTZ2 150kA rms 2500A Air circuit breaker	ea	
3.8.42	MTZ2 66kA rms 3200A Air circuit breaker	ea	
3.8.43	MTZ2 100kA rms 3200A Air circuit breaker	ea	
3.8.44	MTZ2 150kA rms 3200A Air circuit breaker	ea	
3.8.45	MTZ1 Cradle for 630 - 1600A Air circuit breaker	ea	
3.8.46	MTZ2 Cradle for 800 - 3200A Air circuit breaker	ea	
3.9	Isolators or equivalent GA Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.9.1	3-pole load-break switch 16A 7.5kW	ea	
3.9.2	3-pole load-break switch 25A 11.0kW	ea	
3.9.3	3-pole load-break switch 32A 15.0kW	ea	
3.9.4	3-pole load-break switch 40A 18.5kW	ea	
3.9.5	3-pole load-break switch 63A 22.0kW	ea	
3.9.6	3-pole load-break switch 63A 30.0kW	ea	
3.9.7	3-pole load-break switch 80A 45.0kW	ea	
3.9.8	3-pole load-break switch 125A 55.0kW	ea	
3.9.9	3-pole load-break switch 160A 55.0kW	ea	
3.9.10	3-pole load-break switch 25A 11.0kW	ea	
3.9.11	3-pole load-break switch 40A 18.5kW	ea	
3.9.12	3-pole load-break switch 80A 45.0kW	ea	
3.9.13	3-pole load-break switch 125A 55.0kW	ea	
3.9.14	3-pole enclosed load-break switch 16A 7.5kW	ea	
3.9.15	3-pole enclosed load-break switch 25A 11.0kW	ea	
3.9.16	3-pole enclosed load-break switch 32A 15.0kW	ea	
3.9.17	3-pole enclosed load-break switch 160 40A 18.5kW	ea	
3.9.18	3-pole enclosed load-break switch 63A 22.0kW	ea	
3.9.19	3-pole enclosed load-break switch 63A 30.0kW	ea	
3.9.20	3-pole enclosed load-break switch 80A 45.0kW	ea	
3.9.21	3-pole enclosed load-break switch 125A 55.0kW	ea	
3.9.22	3-pole enclosed load-break switch 160A 55.0kW	ea	

	Isolators or equivalent GAZ, GAX Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.9.23	ET6 3-pole enclosed changeover switch 25A 11.0kW	ea	
3.9.24	ET6 3-pole enclosed changeover switch 40A 18.5kW	ea	
3.9.25	ET6 3-pole enclosed changeover switch 63A 30.0kW	ea	
3.9.26	ET6 3-pole enclosed changeover switch 80A 45.0kW	ea	
3.9.27	ET6 3-pole enclosed changeover switch 125A 55.0kW	ea	
3.9.28	attachable 4th pole for above switches GA016-40A 40A	ea	
3.9.29	attachable 4th pole for above switches GA063SA 63A	ea	
3.9.30	attachable 4th pole for above switches GA063-125A 125A	ea	
3.9.31	attachable 4th pole for above switches GA160A 160A	ea	
3.9.32	attachable early-make 4th pole for above switches GA016-40A	ea	
3.9.33	attachable early-make 4th pole for above switches GA016-63SA	ea	
3.9.34	attachable early-make 4th pole for above switches GA063-125A	ea	
3.9.35	attachable 4th pole for above switches GA016-40C	ea	
3.9.36	attachable 4th pole for above switches GA080-125C	ea	
3.9.37	attachable early-make 4th pole for above switches GA016-40C	ea	
3.9.38	attachable early-make 4th pole for above switches GA080-125C	ea	
3.9.39	parallel attachment for combining 2 switches (6/8 pole) GA016-40A	ea	
3.9.40	parallel attachment for combining 2 switches (6/8 pole) GA063-125A	ea	
3.9.41	red/yellow door interlocking handle 65mm2 (screw fixing) GA016-160A/C	ea	
3.9.42	red/yellow door interlocking handle 65 mm2 (ring fix Ø 22 mm) GA016-160A/C	ea	
3.9.43	red/yellow as above - defeatable 65 mm2 (ring fix Ø 22 mm) GA016-160A	ea	
3.9.44	red/yellow door interlocking handle 48mm2 (screw fixing) GA016-40A/C	ea	
3.9.45	* red/yellow door interlocking pistol grip handle - defeatable GA063-160A	ea	
3.9.46	adaptor to accommodate 7 mm2 shaft required for handles GAX66/66B	ea	
3.9.47	200 mm 5 mm2 extension shaft for switches GA016-160A	ea	
3.9.48	300 mm 5 mm2 extension shaft for switches GA016-160A	ea	
3.9.49	200 mm 7 mm2 extension shaft for switches GA063-160A	ea	
3.9.50	300 mm 7 mm2 extension shaft for switches GA063-160A	ea	
3.9.51	1NO + 1NC auxiliary for DIN rail mounting switches GA016-160A	ea	
3.9.52	1NO + 1NC auxiliary for direct door mount switches GA016-125C	ea	
3.9.53	1NO auxiliary for DIN rail mount switches (early-break) GA016-40A	ea	
3.9.54	1NO aux for direct door mount switches (early-break) GA063-160A	ea	
3.9.55	changeover mechanism interlock for 2 switches GA016-40A	ea	
3.9.56	changeover mechanism interlock for 2 switches GA063-160A	ea	
3.9.57	black door interlocking handle (I-O-II) for above changeover mechanisms	ea	
3.9.58	63A empty enclosure with handle and extension shaft	ea	
3.9.59	160A empty enclosure with handle and extension shaft	ea	
3.9.60	40A attachable 4th pole for above switches GA016-40A	ea	
3.9.61	63A attachable 4th pole for above switches GA063A	ea	
3.9.62	125A attachable 4th pole for above switches GA080-125A	ea	
3.9.63	160A attachable 4th pole for above switches GA080-160A	ea	
3.9.64	40A attachable early-make 4th pole for above GA016-40A	ea	

	Isolators or equivalent GAZ, GAX Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.9.65	125A attachable early-make 4th pole for above GA063-125A	ea	
3.9.66	1 pole terminal protection shroud (set of 2 pcs) GA016-40A/C	ea	
3.9.67	1 pole terminal protection shroud (set of 2 pcs) GA063-160A/C	ea	
3.9.68	3 pole terminal protection shroud (set of 2 pcs) GA016-40A/C	ea	
3.9.69	3 pole terminal protection shroud (set of 2 pcs) GA063-160A/C	ea	
3.9.70	10 x 38 3ph fuse holder (attaches onto switches) GA016A - 032A	ea	

3.10	Change over switches. SOCOME, Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.10.1	2200 30** 3 M1 load break switch 16A 7.5kW - 40A 22kW	ea	
3.10.2	2200 30** 3 M1 load break switch 63A 30kW - 80A 37kW	ea	
3.10.3	2200 30** 3 M1 load break switch 100A 45kW - 125A 55kW	ea	
3.10.4	2200 3016 3 MV load break switch 160A 75.0kW	ea	
3.10.5	2200 4016 4 MV load break switch 160A 75.0kW	ea	
3.10.6	2600 30** 3 load break switch 125A 63kW - 160A 80kW	ea	
3.10.7	load break switch 200A 100kW - 315A 160kW	ea	
3.10.8	3 load break switch 400A 220kW	ea	
3.10.9	3 load break switch 630A 280kW	ea	
3.10.10	3 load break switch 800A 450kW	ea	
3.10.11	3 load break switch 1000A 560kW	ea	
3.10.12	3 load break switch 1250A 710kW	ea	
3.10.13	3 load break switch 1600A 710kW	ea	
3.10.14	4 load break switch 250A 132kW	ea	
3.10.15	26AC 4040 4 load break switch 400A 220kW	ea	
3.10.16	4 load break switch 630A 280kW	ea	
3.10.17	4 load break switch 800A 450kW	ea	
3.10.18	4 load break switch 1250A 710kW	ea	
3.10.19	2P+, 1P- 1000 VDC photovoltaic switch 25A	ea	
3.10.20	21PV 4754 2P+, 2P- 1000 VDC photovoltaic switch 40A	ea	
3.10.21	1P+, 1P- 1000 VDC photovoltaic switch 100A - 160A	ea	
3.10.22	26PV 20** 1P+, 1P- 1000 VDC photovoltaic switch 250A - 315A	ea	
3.10.23	2P+, 2P- 1000 VDC photovoltaic switch 400A	ea	
3.10.24	2P+, 2P- 1000 VDC photovoltaic switch 500A	ea	
3.10.25	2P+, 2P- 1000 VDC photovoltaic switch 630A	ea	
3.10.26	2P+, 2P- 1500 VDC photovoltaic switch 275A - 400A	ea	
3.10.27	2P+, 2P- 1500 VDC photovoltaic switch 500A	ea	
3.10.28	4P+, 4P- 1500 VDC photovoltaic switch 630A	ea	
3.10.29	3 pole motorised load break switch 160A 75kW	ea	
3.10.30	3 pole motorised load break switch 250A 132kW	ea	
3.10.31	3 pole motorised load break switch 400A 220kW	ea	
3.10.32	3 pole motorised load break switch 630A 280kW	ea	
3.10.33	3 pole motorised load break switch 800A 450kW	ea	
3.10.34	3 pole motorised load break switch 1000A 560kW	ea	

3.10	Change over switches. SOCOMEK, Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.10.35	3 pole motorised load break switch 1250A 710kW	ea	
3.10.36	3 pole motorised load break switch 1600A 710kW	ea	
3.10.37	4 pole motorised load break switch 630A 280kW	ea	
3.10.38	4 pole motorised load break switch 800A 450kW	ea	
3.10.39	4 pole motorised load break switch 1000A 560kW	ea	
3.10.40	4 pole motorised load break switch 1250A 710kW	ea	
3.10.41	3 pole modular changeover switch 16A - 40A	ea	
3.10.42	3 pole modular changeover switch 63A - 80A	ea	
3.10.43	100A 3 pole modular changeover switch 100A - 125A	ea	
3.10.44	4 pole modular changeover switch 100A	ea	
3.10.45	4 pole modular changeover switch 125A	ea	
3.10.46	3 pole manual changeover switch 160A	ea	
3.10.47	3 pole manual changeover switch 200A	ea	
3.10.48	3 pole manual changeover switch 250A	ea	
3.10.49	3 pole manual changeover switch 400A	ea	
3.10.50	3 pole manual changeover switch 630A	ea	
3.10.51	3 pole manual changeover switch 800A	ea	
3.10.52	3 pole manual changeover switch 1000A	ea	
3.10.53	3 pole manual changeover switch 1250A	ea	
3.10.54	3 pole manual changeover switch 1600A	ea	
3.10.55	4 pole manual changeover switch 160A	ea	
3.10.56	4 pole manual changeover switch 250A	ea	
3.10.57	4 pole manual changeover switch 400A - 630A	ea	
3.10.58	4 pole manual changeover switch 800A	ea	
3.10.59	4 pole manual changeover switch 1250A	ea	
3.10.60	4 pole manual changeover switch 1600A	ea	
3.10.61	3 pole manually operated bypass switch 160A	ea	
3.10.62	3 pole manually operated bypass switch 200A	ea	
3.10.63	3 pole manually operated bypass switch 250A	ea	
3.10.64	3 pole manually operated bypass switch 400A	ea	
3.10.65	3 pole manually operated bypass switch 630A	ea	
3.10.66	3 pole manually operated bypass switch 800A	ea	
3.10.67	3 pole manually operated bypass switch 1250A	ea	
3.10.68	3 pole manually operated bypass switch 1600A	ea	
3.10.69	4 pole manually operated bypass switch 160A	ea	
3.10.70	4 pole manually operated bypass switch 250A	ea	
3.10.71	4 pole manually operated bypass switch 400A	ea	
3.10.72	4 pole manually operated bypass switch 630A	ea	
3.10.73	4 pole manually operated bypass switch 800A	ea	
3.10.74	4 pole manually operated bypass switch 1250A	ea	
3.10.75	4 pole manually operated bypass switch 1600A	ea	
3.10.76	4 pole 230 VAC motorised changeover switch 40A - 63A	ea	
3.10.77	4 pole 230 VAC motorised changeover switch 80A	ea	
3.10.78	4 pole 230 VAC motorised changeover switch 100A	ea	

3.10	Change over switches. SOCOMEK, Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.10.88	4 pole 230 VAC motorised changeover switch 125A	ea	
3.10.89	4 pole 2x230 VAC motorised changeover switch 40A	ea	
3.10.90	4 pole 2x230 VAC motorised changeover switch 63A	ea	
3.10.91	4 pole 2x230 VAC motorised changeover switch 80A	ea	
3.10.92	4 pole 2x230 VAC motorised changeover switch 100A	ea	
3.10.93	4 pole 2x230 VAC motorised changeover switch 125A	ea	
3.10.94	2 pole 230 VAC motorised changeover switch 63A	ea	
3.10.95	2 pole 230 VAC motorised changeover switch 80A	ea	
3.10.96	4 pole 230 VAC motorised changeover switch 63A	ea	
3.10.97	4 pole 230 VAC motorised changeover switch 80A	ea	
3.10.98	4 pole 230 VAC motorised changeover switch 100A	ea	
3.10.99	4 pole 230 VAC motorised changeover switch 125A	ea	
3.10.100	4 pole 230 VAC motorised changeover switch 160A	ea	
3.10.101	2 pole 230 VAC automatic changeover switch 40A - 80A	ea	
3.10.102	4 pole 230 VAC automatic changeover switch 63A - 100A	ea	
3.10.103	4 pole 230 VAC automatic changeover switch 125A	ea	
3.10.104	4 pole 231 VAC automatic changeover switch 160A	ea	
3.10.105	4 pole 230 VAC automatic changeover switch 63A	ea	
3.10.106	4 pole 230 VAC automatic changeover switch 80A	ea	
3.10.107	4 pole 230 VAC automatic changeover switch 100A	ea	
3.10.108	4 pole 230 VAC automatic changeover switch 125A	ea	
3.10.109	4 pole 230 VAC automatic changeover switch 160A	ea	
3.10.110	3 pole motorised changeover switch 160A	ea	
3.10.111	3 pole motorised changeover switch 250A	ea	
3.10.112	3 pole motorised changeover switch 400A	ea	
3.10.113	3 pole motorised changeover switch 630A	ea	
3.10.114	3 pole motorised changeover switch 800A	ea	
3.10.115	3 pole motorised changeover switch 1000A	ea	
3.10.116	3 pole motorised changeover switch 1250A	ea	
3.10.117	3 pole motorised changeover switch 1600A	ea	
3.10.118	3 pole motorised changeover switch 2000A	ea	
3.10.119	3 pole motorised changeover switch 2500A	ea	
3.10.120	3 pole motorised changeover switch 3200A	ea	
3.10.121	4 pole motorised changeover switch 160A	ea	
3.10.122	4 pole motorised changeover switch 250A	ea	
3.10.123	4 pole motorised changeover switch 400A	ea	
3.10.124	4 pole motorised changeover switch 630A	ea	
3.10.125	4 pole motorised changeover switch 800A	ea	
3.10.126	4 pole motorised changeover switch 1000A	ea	
3.10.127	4 pole motorised changeover switch 1250A	ea	
3.10.128	4 pole motorised changeover switch 1600A	ea	
3.10.129	4 pole motorised changeover switch 2000A	ea	

3.10	Change over switches. SOCOMEK, Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.10.130	4 pole motorised changeover switch 2500A	ea	
3.10.131	4 pole motorised changeover switch 3200A	ea	
3.10.132	3 pole automatic changeover switch 160A	ea	
3.10.133	3 pole automatic changeover switch 250A	ea	
3.10.134	3 pole automatic changeover switch 400A	ea	
3.10.135	3 pole automatic changeover switch 630A	ea	
3.10.136	3 pole automatic changeover switch 800A	ea	
3.10.137	3 pole automatic changeover switch 1000A	ea	
3.10.138	3 pole automatic changeover switch 1250A	ea	
3.10.139	3 pole automatic changeover switch 1600A	ea	
3.10.140	4 pole automatic changeover switch 160A	ea	
3.10.141	4 pole automatic changeover switch 250A	ea	
3.10.142	4 pole automatic changeover switch 400A	ea	
3.10.143	4 pole automatic changeover switch 630A	ea	
3.10.144	4 pole automatic changeover switch 800A	ea	
3.10.145	4 pole automatic changeover switch 1000A	ea	
3.10.146	4 pole automatic changeover switch 1250A	ea	
3.10.147	4 pole automatic changeover switch 1600A	ea	
3.10.148	polycarb 3 pole enclosed ch/over switch 25A - 40A	ea	
3.10.149	polycarb 3 pole enclosed ch/over switch 63A - 100A	ea	
3.10.150	polycarb 3 pole enclosed ch/over switch 125A	ea	
3.10.151	metal 3 pole enclosed changeover switch 40A	ea	
3.10.152	metal 3 pole enclosed changeover switch 63A	ea	
3.10.153	metal 3 pole enclosed changeover switch 100A	ea	
3.10.154	metal 3 pole enclosed changeover switch 125A	ea	
3.10.155	metal 3 pole enclosed changeover switch 160A	ea	
3.10.156	metal 3 pole enclosed changeover switch 250A	ea	
3.10.157	metal 3 pole enclosed changeover switch 400A	ea	
3.10.158	metal 3 pole enclosed changeover switch 630A	ea	
3.10.159	metal 3 pole enclosed changeover switch 800A	ea	
3.10.160	metal 3 pole enclosed changeover switch 1250A	ea	
3.10.161	metal 3 pole enclosed changeover switch 1600A	ea	
3.10.162	metal 4 pole enclosed changeover switch 160A	ea	
3.10.163	metal 4 pole enclosed changeover switch 250A	ea	
3.10.164	metal 4 pole enclosed changeover switch 400A	ea	
3.10.165	metal 4 pole enclosed changeover switch 630A	ea	
3.10.166	metal 4 pole enclosed changeover switch 800A	ea	
3.10.167	metal 4 pole enclosed changeover switch 1250A	ea	
3.10.168	metal 4 pole enclosed changeover switch 1600A	ea	
3.10.169	2 pole automatic changeover panel 40A 230 VAC	ea	
3.10.170	2 pole automatic changeover panel 63A 230 VAC	ea	
3.10.171	2 pole automatic changeover panel 80A 230 VAC	ea	
3.10.172	4 pole automatic changeover panel 80A 230 VAC	ea	
3.10.173	4 pole automatic changeover panel 100A 230 VAC	ea	
3.10.174	4 pole automatic changeover panel 125A 230 VAC	ea	

3.10	Change over switches. SOCOME, Lovato, Hagar, Schneider, CBI and ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.10.175	4 pole automatic changeover panel 160A 231 VAC	ea	
3.10.176	3 pole automatic changeover panel 250A 230 VAC	ea	
3.10.177	3 pole automatic changeover panel 400A 230 VAC	ea	
3.10.178	3 pole automatic changeover panel 630A 230 VAC	ea	
3.10.179	3 pole automatic changeover panel 800A 230 VAC	ea	
3.10.180	3 pole automatic changeover panel 1000A 230 VAC	ea	
3.10.181	3 pole automatic changeover panel 1250A 230 VAC	ea	
3.10.182	3 pole automatic changeover panel 1600A 230 VAC	ea	
3.10.183	4 pole automatic changeover panel 250A 230 VAC	ea	
3.10.184	4 pole automatic changeover panel 400A 230 VAC	ea	
3.10.185	4 pole automatic changeover panel 630A 230 VAC	ea	
3.10.186	4 pole automatic changeover panel 800A 230 VAC	ea	
3.10.187	4 pole automatic changeover panel 1000A 230 VAC	ea	
3.10.188	4 pole automatic changeover panel 1250A 230 VAC	ea	
3.10.189	4 pole automatic changeover panel 1600A 230 VAC	ea	
3.10.190	3-pole enclosed load-break switch 20A 7.5kW - 63A 22kW	ea	
3.10.191	4-pole enclosed load-break switch 20A 7.5kW - 63A 22kW	ea	
3.10.192	3 -pole enclosed load break switch 40A 18.5kW	ea	
3.10.193	3 -pole enclosed load break switch 63A 30kW	ea	
3.10.194	3 -pole enclosed load break switch 125A 63kW	ea	
3.10.195	3 -pole enclosed load break switch 160A 80kW	ea	
3.10.196	3 -pole enclosed load break switch 250A 132kW	ea	
3.10.197	3 -pole enclosed load break switch 400A 220kW	ea	
3.10.198	3 -pole enclosed load break switch 630A 280kW	ea	
3.10.199	3 -pole enclosed load break switch 800A 450kW	ea	
3.10.200	3 -pole enclosed load break switch 1000A 560kW	ea	
3.10.201	3 -pole enclosed load break switch 1250A 710kW	ea	
3.10.202	4 -pole enclosed load break switch 160A 80kW	ea	
3.10.203	4 -pole enclosed load break switch 250A 132kW	ea	
3.10.204	4 -pole enclosed load break switch 400A 220kW	ea	
3.10.205	4 -pole enclosed load break switch 630A 280kW	ea	
3.10.206	4 -pole enclosed load break switch 800A 450kW	ea	
3.10.207	4 -pole enclosed load break switch 1250A 710kW	ea	
3.10.208	3 -pole enclosed 1way safety switch 80A 15/25kW	ea	
3.10.209	3 -pole enclosed 1way safety switch 125A 25/55kW	ea	
3.10.210	3 -pole enclosed 1way safety switch 200A 63/90kW	ea	
3.10.211	3 -pole enclosed 1way safety switch 400A 160kW	ea	
3.10.212	3 -pole enclosed 1way safety switch 630A 270kW	ea	
3.10.213	Allow for the provisional sum for the selection, supply, delivery to site and installation of circuit breakers, parts, maintenance parts and components not listed in the schedule. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment) clause 4.16	Provisional Sum	R300 000.00 Incl VAT
	Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

3.11	Power Supplies WAGO, Lovato, Phoenix or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.11.1	Din rail 85 - 264 VAC 24 VDC (adj) 75W 3.2A	ea	
3.11.2	Din rail 85 - 264 VAC 24 VDC (adj) 120W 5A	ea	
3.11.3	Din rail 85 - 264 VAC 24 VDC (adj) 240W 10A	ea	
3.11.4	Din rail 85 - 264 VAC 24 VDC (adj) 480W 20A	ea	
3.11.5	Din rail 85 - 264 VAC 12 VDC (adj) 30W 2.5A	ea	
3.11.6	Din rail 85 - 264 VAC 12 VDC (adj) 60W 5A	ea	
3.11.7	Din rail 85 - 264 VAC 12 VDC (adj) 100W 8.3A	ea	
3.11.8	Modular din rail mount 90 - 264 VAC 24 VDC 120W 5A	ea	
3.11.9	Modular din rail mount 90 - 264 VAC 24 VDC 240W 10A	ea	
3.11.10	Modular din rail mount 90 - 264 VAC 24 VDC 300W 12.5A	ea	

3.12	Transformers WAGO, Lovato, Phoenix or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
3.12.1	240V-400V Control and safety or isolating transformers 40VA 12-24V	ea	
3.12.2	240V-400V Control and safety or isolating transformers 63VA 12-24V	ea	
3.12.3	240V-400V Control and safety or isolating transformers 100VA 12-24V	ea	
3.12.4	240V-400V Control and safety or isolating transformers 200VA 12-24V	ea	
3.12.5	240V-400V Control and safety or isolating transformers 320VA 12-24V	ea	
3.12.6	240V-400V Control and safety or isolating transformers 400VA 12-24V	ea	
3.12.7	240V-400V Control and safety or isolating transformers 630VA 12-24V	ea	
3.12.8	240V-400V Control and safety or isolating transformers 800VA 12-24V	ea	
3.12.9	240V-400V Control and safety or isolating transformers 1000VA 12-24V	ea	
3.12.10	240V-400V Control and safety or isolating transformers 1250VA 12-24V	ea	
3.12.11	240V-400V Control and safety or isolating transformers 40VA 115-230V	ea	
3.12.12	240V-400V Control and safety or isolating transformers 63VA 115-230V	ea	
3.12.13	240V-400V Control and safety or isolating transformers 100VA 115-230V	ea	
3.12.14	240V-400V Control and safety or isolating transformers 200VA 115-230V	ea	
3.12.15	240V-400V Control and safety or isolating transformers 320VA 115-230V	ea	
3.12.16	240V-400V Control and safety or isolating transformers 400VA 115-230V	ea	
3.12.17	240V-400V Control and safety or isolating transformers 630VA 115-230V	ea	
3.12.18	240V-400V Control and safety or isolating transformers 800VA 115-230V	ea	
3.12.19	240V-400V Control and safety or isolating transformers 1000VA 115-230V	ea	
3.12.20	240V-400V Control and safety or isolating transformers 1250VA 115-230V	ea	

3.13	Uninterruptable Power Supplies (UPS) and Solar PV Components and power supply systems	Unit	Rate/Price ZAR (excl.Vat) R c
3.13.1	Standby Battery for telemetry RTU, 13 Volt DC minimum rating of 8 Ah rechargeable, maintenance free, valve regulated, Lithium Iron Phosphate (LiFePO) battery, Dimensions: L= 180 mm, W=80 mm, H = 160 mm or nearest equivalent	ea	
3.13.2	1000 VA Uninterruptable Power Supply On-line (UPS) Tower	ea	
3.13.3	2000 VA Uninterruptable Power Supply On-line (UPS) Tower	ea	
3.13.4	3000 VA Uninterruptable Power Supply On-line (UPS) Tower	ea	
3.13.5	3000 VA Uninterruptable Power Supply On-line (UPS) Rack Mount	ea	
3.13.6	Battery Pack extension for 2.2 - 3 kVa - BB SEP 72-A3 (6 X 7Ah) Rack and Tower or equivalent	ea	
3.13.7	Battery Pack extension for 2.2 - 3 kVa - BB SEP 72-A5 (6 X 9Ah) Rack and Tower or equivalent	ea	
3.13.8	Battery Pack extension for 2.2 - 3 kVa (2 X 6 X 7Ah) Rack and Tower	ea	
3.13.9	Battery Pack extension 2.2 - 3 KVa (2 X 6 X 9Ah) Rack mount and Tower or equivalent	ea	
3.13.10	Battery Pack extension 2.2 - 3 kVa (15 x 7Ah) Rack mount and Tower or equivalent	ea	
3.13.11	Battery Pack extension 2.2 - 3 kVa 6000 (15 x 9Ah) Rack mount and Tower or equivalent	ea	
3.13.12	Battery Pack extension STW 10000 (20 X 7Ah) or equivalent	ea	
3.13.13	Battery Pack extension STW 10000 (20 X 9Ah) or equivalent	ea	
3.13.14	Battery Pack extension 10000 - BB STW 240-A3 (20 x 7Ah) or equivalent	ea	
3.13.15	Battery Pack extension 10000 - BB STW 240-A5 (20 x 9Ah) or equivalent	ea	
3.13.16	Battery Pack extension 10000 - BB STW 240-M1 (2 x 20 x 7Ah) or equivalent	ea	
3.13.17	Battery Pack extension 10000 - BB STW 240-M4 (2 x 20 x 9Ah) or equivalent	ea	
3.13.18	5000 VA, 4000 Watt, 220 - 240 V Nominal Input Voltage, 220 -240 VAC Nominal Output Voltage or equivalent	ea	
3.13.19	6000 VA, 4800 Watt, 220 - 240 V Nominal Input Voltage, 220 -240 VAC Nominal Output Voltage or equivalent	ea	
3.13.20	6500 VA, 5200 Watt, 220 - 240 V Nominal Input Voltage, 220 -240 VAC Single Phase, 380 - 400 -415 Three Phase Nominal Output Voltage or equivalent	ea	
3.13.21	8000 VA, 6400 Watt, 220 - 240 V Nominal Input Voltage, 220 -240 VAC Single Phase, 380 - 400 -415 Three Phase Nominal Output Voltage or equivalent	ea	
3.13.22	10000 VA, 8000 Watt, 220 - 240 V Nominal Input Voltage, 220 -240 VAC Single Phase, 380 - 400 -415 Three Phase Nominal Output Voltage or equivalent	ea	
3.13.23	10000 VA / 10000 W Watt, Input Voltage 220-230-240Vac (1W+N+PE) OR 380-400-415 (3W+N+PE), Output Voltage 220-230-240Vac Selectable, 50/60Hz selectable, Waveform Sinusoidal, Unity Power Factor, True Online Tower UPS with internal batteries and LCD Display, Tower or equivalent	ea	
3.13.24	10000 VA / 10000 W Watt, Input Voltage 220-230-240Vac (1W+N+PE) OR 400-415-420 (3W+N+PE), Output Voltage 220-230-240Vac Selectable, 50/60Hz selectable, Waveform Sinusoidal, Unity Power Factor, True Online Tower UPS with internal batteries and LCD Display, Tower or equivalent	ea	
3.13.25	UPS Network Card, Remote UPS Online Monitoring, Tower or equivalent	ea	

3.13	Payment reference to specification	Uninterruptable Power Supplies (UPS) and Solar PV Components and power supply systems	Unit	Rate/Price ZAR (excl.Vat) R c
3.13.26	(13) SPECIFICATION Clauses 3.2.9.4	5.0 kW single phase solar system rooftop mount on tile or IBR sheet metal, system 1	Sum	
3.13.27	(13) SPECIFICATION Clauses 3.2.9.4	8 kW single phase solar system rooftop mount on tile or IBR sheet metal, system 2	Sum	
3.13.28	(13) SPECIFICATION Clauses 3.2.9.4	12 kW single phase solar system rooftop mount on tile or IBR sheet metal, system 3	Sum	
3.13.29	(13) SPECIFICATION Clauses 3.2.9.4	5.0 kW three phase grid tied hybrid inverter battery back-up system, system 4	Sum	
3.13.30	(13) SPECIFICATION Clauses 3.2.9.4	8 kW three phase grid tied hybrid inverter battery back-up system, system 5	Sum	
3.13.31	(13) SPECIFICATION Clauses 3.2.9.4	12 kW three phase grid tied hybrid inverter battery back-up system, system 6	Sum	
3.13.32	(13) SPECIFICATION Clauses 3.2.9.4	5 kW 48V single phase grid tied hybrid Inverter SS or equivalent	ea	
3.13.33	(13) SPECIFICATION Clauses 3.2.9.4	8 kW 48 V single phase grid tied hybrid Inverter Sunsync or equivalent	ea	
3.13.34	(13) SPECIFICATION Clauses 3.2.9.4	12 kW 48 V single phase grid tied hybrid Inverter Sunsync or equivalent	ea	
3.13.35	(13) SPECIFICATION Clauses 3.2.9.4	16 kW 48 V single phase grid tied hybrid Inverter Sunsync or equivalent	ea	
3.13.36	(13) SPECIFICATION	5 kW 48 V three phase grid tied hybrid Inverter Sunsync or equivalent	ea	
3.13.37	(13) SPECIFICATION Clauses 3.2.9.4	8 kW 48 V three phase grid tied hybrid Inverter Sunsync or equivalent	ea	
3.13.38	(13) SPECIFICATION Clauses 3.2.9.4	12 kW 48 V three phase grid tied hybrid Inverter Sunsync or equivalent	ea	
3.13.39	(13) SPECIFICATION Clauses 3.2.9.4	50 kW HV three phase hybrid inverter Sunsync or equivalent	ea	
3.13.40	(13) SPECIFICATION Clauses 3.2.9.4	30 kW HPS30 ATESS 400 Volt 3 phase 43 Ampere, HV hybrid Inverter	ea	
3.13.41	(13) SPECIFICATION Clauses 3.2.9.4	50 kW HPS50 ATESS 400 Volt 3 phase 72 Ampere HV hybrid Inverter or equivalent	ea	
3.13.42	(13) SPECIFICATION Clauses 3.2.9.4	100 kW HPS100 ATESS 400 Volt 3 phase 144 Ampere HV hybrid Inverter or equivalent	ea	
3.13.43	(13) SPECIFICATION Clauses 3.2.9.4	120 kW HPS120 ATESS 400 Volt 3 phase 173 Ampere HV hybrid Inverter or equivalent	ea	
3.13.44	(13) SPECIFICATION Clauses 3.2.9.4	150 kW HPS150 ATESS 400 Volt 3 phase 173 Ampere HV hybrid Inverter or equivalent	ea	

3.13.45	(13) SPECIFICATION Clauses 3.2.9.4	2.4 kWh Lithium-ion/LiFePO4 battery	ea	
3.13.46	(13) SPECIFICATION Clauses 3.2.9.4	3.55 kWh Lithium-ion/LiFePO4 battery	ea	
3.13.47	(13) SPECIFICATION Clauses 3.2.9.4	5.12-5.32 kWh 48V - 51.4V Lithium-ion/LiFePO4 battery SUNSYNC or equivalent	ea	
3.13.48	(13) SPECIFICATION Clauses 3.2.9.4	10.65 kWh 48V - 51.4V Lithium-ion/LiFePO4 battery SUNSYNC or equivalent	ea	
3.13.49	(13) SPECIFICATION Clauses 3.2.9.4	15.97 kWh 51.2V Lithium-ion/LiFePO4 battery SUNSYNC or equivalent	ea	
3.13.50	(13) SPECIFICATION Clauses 3.2.9.4	5 kWh total capacity/4 kWh 52V Lithium-ion/LiFePO4 battery Freedom Won LiTE or equivalent	ea	
3.13.51	(13) SPECIFICATION Clauses 3.2.9.4	10 kWh total capacity/8 kWh 52V Lithium-ion/LiFePO4 battery Freedom Won LiTE or equivalent	ea	
3.13.52	(13) SPECIFICATION Clauses 3.2.9.4	15 kWh total capacity/12 kWh 52V Lithium-ion/LiFePO4 battery Freedom Won LiTE or equivalent	ea	
3.13.53	(13) SPECIFICATION Clauses 3.2.9.4	20 kWh total capacity/16 kWh 52V Lithium-ion/LiFePO4 battery Freedom Won LiTE or equivalent	ea	
3.13.54	(13) SPECIFICATION Clauses 3.2.9.4	30 kWh total capacity/24 kWh 52V Lithium-ion/LiFePO4 battery Freedom Won LiTE or equivalent	ea	
3.13.55	(13) SPECIFICATION Clauses 3.2.9.4	30 kWh total capacity/24 kWh 52V Lithium-ion/LiFePO4 battery Freedom Won LiTE or equivalent	ea	
3.13.56	(13) SPECIFICATION Clauses 3.2.9.4	40 kWh total capacity/32 kWh 52V Lithium-ion/LiFePO4 battery Freedom Won LiTE or equivalent	ea	
3.13.57	(13) SPECIFICATION Clauses 3.2.9.4	60 kWh total capacity/48 kWh 52V Lithium-ion/LiFePO4 battery Freedom Won LiTE or equivalent	ea	
3.13.58	(13) SPECIFICATION Clauses 3.2.9.4	80 kWh total capacity/64 kWh 52V Lithium-ion/LiFePO4 battery Freedom Won LiTE or equivalent	ea	
3.13.59	(13) SPECIFICATION Clauses 3.2.9.4	80 kWh total capacity/64 kWh 400V HV Lithium-ion/LiFePO4 battery Freedom Won LiTE or equivalent	ea	
3.13.60	(13) SPECIFICATION Clauses 3.2.9.4	375 Watt solar panel Super High Power Polycrystalline or Monocrystalline	ea	
3.13.61	(13) SPECIFICATION Clauses 3.2.9.4	445 Watt solar panel Super High Power Polycrystalline or Monocrystalline	ea	
3.13.62	(13) SPECIFICATION Clauses 3.2.9.4	545 Watt solar panel Super High Power Polycrystalline or Monocrystalline	ea	
3.13.63	(13) SPECIFICATION Clauses 3.2.9.4	DC Combiner box and lightning protector complete	ea	
3.13.64	(13) SPECIFICATION Clauses 3.2.9.4	Main surge protector and isolator	ea	
3.13.65	(13) SPECIFICATION Clauses 3.2.9.4	3kW Single Phase String Inverter	ea	

3.13.66	(13) SPECIFICATION Clauses 3.2.9.4	5kW Single Phase String Inverter	ea	
3.13.67	(13) SPECIFICATION Clauses 3.2.9.4	10kW Three Phase String Inverter	ea	
3.13.68	(13) SPECIFICATION Clauses 3.2.9.4	55kW Three Phase String Inverter	ea	
3.13.69	Allow for the provisional sum for the selection, supply, delivery to site and installation for Uninterruptable Power Supplies (UPS), PV and hybrid solar inverter battery power supply system accessories or maintenance parts not listed in the schedule. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment) clause 4.16		Provisional Sum	R300 000.00 Incl VAT
	Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)		%	

4.	Control and Signalling		
4.1	Push buttons and selector switches Part numbers given as a specification to all of the listed brands Lovato, Schneider Electric, ABB or equivalent.	Unit	Rate/Price ZAR (excl.Vat) R c
4.1.1	Pushbuttons Actuator		
4.1.1.1	Flush momentary pushbutton actuator spring return LPC B10*(black, green. Red,yellow,blue) or equivalent	ea	
4.1.1.2	Extended head pushbutton actuator spring return LPC B20* (black, green. Red,yellow,blue) or equivalent	ea	
4.1.2	Pushbutton actuators (with symbols)		
4.1.2.1	flush momentary pushbutton actuator spring return LPC B11**(red, green, black, blue) or equivalent	ea	
4.1.2.2	extended head pushbutton actuator spring return LPC B2104 red O or equivalent	ea	
4.1.3	Alternate Action Pushbutton actuators (push on-push off)		
4.1.3.1	flush alternate action p/ push off pushbuttons LPC Q10*(black, green, red, yellow, blue) or equivalent	ea	
4.1.3.2	flush alternate action p/ push off pushbuttons LPC Q20*(black, green, red, yellow, blue) or equivalent	ea	
4.1.4	Mushroom head actuator alternate		
4.1.4.1	Ø40 mm mushroom pushbutton actuators spring return LPC B6144 red or equivalent	ea	
4.1.4.2	Ø60 mm mushroom pushbutton actuator spring return LPC B6164 red or equivalent	ea	
4.1.4.3	Ø40 mm latching mushroom pushbutton twist release LPC B6344 red or equivalent	ea	
4.1.4.4	Ø30 mm latching mushroom pushbutton actuator twist release LPC B6634 red or equivalent	ea	
4.1.4.5	Ø40 mm latching mushroom pushbutton actuator twist release LPC B6644 red or equivalent	ea	
4.1.4.6	Ø40 mm latching mushroom pushbutton actuator pull release LPC B6744 red or equivalent	ea	
4.1.4.7	Ø40 mm latching mushroom pushbutton actuator key release LPC B6844 red or equivalent	ea	
4.1.5	Multi pushbutton actuators		
	Double-touch pushbutton actuators		
4.1.5.1	double touch pushbutton actuator (flush) spring return LPC B7113 green/red or equivalent	ea	
4.1.5.2	double touch pushbutton actuator (flush) spring return LPC B7191 black/black ↑↓ or equivalent	ea	
4.1.5.3	double touch pushbutton actuator (flush) spring return LPC B71S02 green/green + – or equivalent	ea	
4.1.5.4	double touch pushbutton actuator (flush) spring return LPC B7223 green/red I-O or equivalent	ea	
4.1.5.5	double touch pushbutton actuator (flush) spring return LPC BL7223 green/red I-O or equivalent	ea	
	Triple -touch pushbutton actuators (red extended stop button)		
4.1.5.6	triple-touch pushbutton actuator spring return LPC B7345 green/red I-STOP-II or equivalent	ea	
4.1.5.7	touch pushbutton actuator spring return LPC B7355 green/red↑-STOP-↓	ea	
4.1.5.8	triple-touch pushbutton actuator spring return LPC B7365 green/red ←-STOP-→ or equivalent	ea	
4.1.5.9	triple-touch pushbutton actuator spring return LPC B7375 green/red ↙-STOP-↘ - or equivalent	ea	

	Platinum series Ø22 mm pushbuttons and selector switches		
4.1.6	Selector switch actuators	Unit	Rate/Price ZAR (excl.Vat) R c
4.1.6.1	selector switch actuator – 153.00 LPC S120 black 2 position O - I or equivalent	ea	
4.1.6.2	selector switch actuator from Right LPC S121 black 2 position O - I or equivalent	ea	
4.1.6.3	selector switch actuator I - O - II LPC S130 black 3 position I - O - II or equivalent	ea	
4.1.6.4	selector switch actuator from(L+R, Left, Right) LPC S13* black 3 position I - O - II or equivalent	ea	
4.1.7	Lever Selector switch actuators		
4.1.7.1	lever selector actuator O - LPC S220 black 2 position O - I or equivalent	ea	
4.1.7.2	lever selector actuator from Right LPC S221 black 2 position O - I or equivalent	ea	
4.1.7.3	lever selector actuator I - O - II LPC S230 black 3 position I - O - II or equivalent	ea	
4.1.7.4	lever selector actuator from (L+R,Left,Right) LPC S23* black 3 position I - O - II or equivalent	ea	
4.1.8	Key Selector switch actuators		
4.1.8.1	key switch actuator LPC S32*black 2 pos (O-I) (Left, L+R) or equivalent	ea	
4.1.8.2	Left key switch actuator from Right LPC S340 black 2 pos (O-I) or equivalent	ea	
4.1.8.3	switch actuator LPC S33* black 3 pos (I-O-II) (Centre key, L+C+R, Left, Right) or equivalent	ea	
4.1.8.4	Centre key switch actuator from (Right,L+R) LPC S3** black 3 pos (I-O-II) or equivalent	ea	
4.1.9	Mechanical reset pushbuttons (fine depth adjustment from face of button)		
4.1.9.1	mechanical reset button (adj. length) 0-150 mm LPC R100* (black, Red, Blue) or equivalent	ea	
4.1.9.2	mechanical reset button (adj. length) 0-150 mm LPC R1196 blue (RESET) or equivalent	ea	
4.1.10	Pulse-tone monoblock buzzer Ø22 mm continuous or pulse tone (10 cm)		
4.1.10.1	panel mount acoustic buzzer 90dB LPC ZSB black 18 - 30 VAC/DC (IP40) or equivalent	ea	
4.1.10.2	panel mount acoustic buzzer 90dB LPC ZSM black 185 - 265 VAC (IP40) or equivalent	ea	
4.1.10.3	panel mount acoustic buzzer 80dB LPC ZSMIP black 185 - 265 VAC (IP65) or equivalent	ea	
4.1.11	USB and RJ45 communication interfaces Ø22 mm IP65 (with cap closed)		
4.1.11.1	black USB panel mount communication interface (A-A,A-B) LPC D0* or equivalent	ea	
4.1.11.2	black RJ45 panel mount communication interface Ethernet LPC D06 or equivalent	ea	
4.1.12	Contact blocks and support for control devices		
4.1.12.1	1 x NO standard green screw term. contact block for control devices LPX C10 or equivalent t	ea	
4.1.12.2	1 x NC standard red screw term. contact block for control devices LPX C01 or equivalent	ea	
4.1.12.3	1 x NO early make green screw term. contact block for control devices LPX C10A or equivalent	ea	

	Contact blocks and support for control devices	Unit	Rate/Price ZAR (excl.Vat) R c
	1 x NC late break red screw term. contact block for control devices LPX C01D or equivalent	ea	
4.1.12.5	1 x NO standard push-in term. contact block for control devices LPX CS10 or equivalent	ea	
4.1.12.6	1 x NC standard push-in term. contact block for control devices LPX CS01 or equivalent	ea	
4.1.13	Pilot light heads Platinum series illuminated Ø22 mm control devices		
4.1.13.1	pilot light head only(green,red,yellow,blue,t/parent) illuminated Ø22 mm or equivalent	ea	

4.1	Push buttons and selector switches Lovato, Schneider Electric, ABB or equivalent.	Unit	Rate/Price ZAR (excl.Vat) R c
4.1.14	Flush illuminated pushbutton actuators		
4.1.14.1	pushbutton actuator spring return (green, red, yellow, blue) illuminated flush momentary or equivalent	ea	
	Alternate action pushbutton actuators (push on - push off)		
4.1.14.2	push button actuator alternate (green, red, yellow, blue) illuminated flush alternate action or equivalent	ea	
4.1.15	Extended head illuminated pushbutton actuators		
4.1.15.1	pushbutton actuator spring return LPC BL20* (green, red, yellow, blue, transparent) illuminated extended head or equivalent	ea	
	Alternate action pushbutton actuators (push on - push off)		
4.1.15.2	illuminated extended head alternate action actuator alternate (green, red, yellow, blue, transparent) or equivalent	ea	
4.1.16	illuminated selector switch actuators spring return		
4.1.16.1	2 position illuminated selector switch actuator O - I (green, red, yellow, blue, white) or equivalent	ea	
4.1.16.2	2 position illuminated selector switch actuator from Right (green, red,yellow,blue,white) or equivalent	ea	
4.1.16.3	3 position illuminated selector switch actuator I - O – II (green, red, yellow, blue, white) or equivalent	ea	
4.1.16.4	3 position illuminated selector switch actuator from L+R (green, red, yellow, blue, white) or equivalent	ea	
4.1.17	illuminated mushroom head pushbutton actuators		
4.1.17.1	red illuminated Ø40 mm mushroom head actuator spring return	ea	
4.1.17.2	red illuminated Ø40 mm latching m/room head actuator twist release	ea	
4.1.18	Support for contact blocks and LED modules - clips onto control devices		
4.1.18.1	contact block support / mounting adaptor for 3 contact blocks	ea	
4.1.19	LED modules (steady light) (screw type)		
4.1.19.1	green, red, yellow, blue, white) 12 - 30 VAC/DC LED integrated steady lamp module	ea	
4.1.19.2	85 - 140 VAC LED integrated steady lamp module	ea	
4.1.19.3	(green, red, yellow, blue, white) 185 - 265 VAC LED integrated steady lamp module	ea	

		Unit	Rate/Price ZAR ZAR (excl.Vat) R c
4.1.20	LED modules (steady light) (push-in type)		
4.1.20.1	(green, red, yellow, blue, white) 12 - 30 VAC/DC LED integrated steady lamp module	ea	
4.1.20.2	LPX LPSM* (green, red, yellow, blue, white) 185 - 265 VAC LED integrated steady lamp module or equivalent	ea	
4.1.21	LED modules (flashing light) (screw type)		
4.1.21.1	12 - 30 VAC/DC LED integrated flashing lamp module	ea	
4.1.21.2	85 - 140 VAC LED integrated flashing lamp module	ea	
4.1.21.3	185 - 265 VAC LED integrated flashing lamp module	ea	
4.1.22	Monoblock LED pilot lights Ø22 mm mounting		
4.1.22.1	LPM LB* (orange, green, red, yellow, blue, transparent) 24 VAC/DC 66/67/69K monoblock LED pilot light or equivalent	ea	
4.1.22.2	(orange, green, red, yellow, blue, transparent) 230 VAC 66/67/69K monoblock LED pilot light or equivalent	ea	

	Monoblock buzzer - continuous or pulse tone		
4.1.23	Push buttons and selector switches Lovato, Schneider Electric, ABB or equivalent.	Unit	Rate/Price ZAR (excl.Vat) R c
4.1.23.1	black buzzer 9 - 15 VAC/DC IP40 p/mount 90db/10 cm	ea	
4.1.23.2	buzzer black 18 - 30 VAC/DC IP40 p/mount 90db/10 cm	ea	
4.1.23.3	black 185 - 265 VAC/DC IP40 p/mount 90db/10 cm buzzer	ea	
4.1.23.4	black 9 - 15 VAC/DC 66/67/69K p/mount 70db/10 cm buzzer	ea	
4.1.23.5	black 18 - 30 VAC/DC 66/67/69K p/mount 70db/10 cm buzzer	ea	
4.1.23.6	black 185 - 265 VAC/DC 66/67/69K p/mount 70db/10 cm buzzer	ea	
4.1.24	Legend plates and labels for Ø22 mm actuators		
4.1.24.1	legend holder for AU109 labels 12 mm (H) AU100 black holder	ea	
4.1.24.2	engrave able clip-in label for above holder 12 mm (H) AU109 silver or equivalent	ea	
4.1.24.3	engraved label (provide required engraving) 12 mm (H) AU109EN silver or equivalent	ea	
4.1.24.4	legend holder for AU108 labels 15 mm (H) AU105 black holder or equivalent	ea	
4.1.24.5	clip-in label for legend holder 15 mm (H) AU108 silver engrave able or equivalent	ea	
4.1.24.6	silver engraved label (provide required engraving) 15 mm (H)	ea	
	Emergency labels (to be mounted behind mushroom pushbuttons)		
4.1.24.7	yellow "emergency stop" plastic label/disc for pushbuttons Ø90 mm LPX AU113 or equivalent	ea	
4.1.24.8	yellow "emergency stop" plastic label/disc for pushbuttons Ø60 mm LPX AU115 or equivalent	ea	
	Shrouds - to prevent inadvertent operation of pushbutton		
4.1.24.9	yellow padlock able shroud for latching mushroom pushbutton LPX AU158 or equivalent	ea	
4.1.24.10	yellow half shroud to prevent inadvertent operation of pushbutton LPX AU159 or equivalent	ea	
4.1.25	Control device accessories		
4.1.25.1	A130 grey Ø22 mm hole blanking plug (threaded)	ea	
4.1.25.2	black action plug for using central position on actuators	ea	
4.1.25.3	black spare rod (150 mm) for mechanical reset pushbuttons	ea	
4.1.25.4	silver (key No. 455) spare (key only) replacement for key switches	ea	
4.1.25.5	silver special (key only) for switches with different keys	ea	
4.1.25.6	black spare plastic threaded nut for actuator fixing plastic actuators	ea	
4.1.25.7	silver replacement ring (steel) with teeth to avoid turning when mounted	ea	
4.1.25.8	black reduction ring to mount Ø22 mm through Ø30 mm hole	ea	
4.1.25.9	black socket spanner for actuator fixing ring tightening	ea	
	Rubber boots for flush pushbutton actuators		
4.1.25.10	boot rubber protection boot for flush pushbutton actuators(black, green, red, yellow, blue, transparent)	ea	
4.1.25.11	boot for double/triple push button actuators transparent boot rubber protection	ea	
4.1.26	DIN rail mount adaptor for control devices		
4.1.26.1	DIN grey DIN rail mounting adaptor for Ø22 mm pushbuttons	ea	

	Complete pushbutton stations		
4.1.27	1 hole pushbutton stations	Unit	Rate/Price ZAR (excl.Vat) R c
4.1.27.1	green 1 x NO grey flush pushbutton station (72h X 72W X56D)	ea	
4.1.27.2	red 1 x NC grey extended pushbutton station (72h X 72W X56D)	ea	
4.1.27.3	red 1 x NC yellow spring ret mushroom station (72h X 72W X56D)	ea	
4.1.27.4	red 1 x NC yellow latch mushroom twist release (72h X 72W X56D)	ea	
	2 hole pushbutton stations Push buttons and selector switches Lovato, Schneider Electric, ABB or equivalent.		
4.1.27.5	green 1 x NO grey flush pushbutton station red 1 x NC grey extended pushbutton station (117h X 72W 56D)	ea	
4.1.27.6	green 1 x NO grey green 1 x NO grey red 1 x NC grey latch mushroom twist release (151h X 72W 56D)	ea	
	3 hole pushbutton stations Push buttons and selector switches Lovato, Schneider Electric, ABB or equivalent		
4.1.27.7	green 1 x NO grey flush pushbutton red 1 x NC grey extended pushbutton green 1 x NO grey flush pushbutton (151h X 72W 56D)	ea	
4.1.28	Empty enclosures (without actuators and contact blocks) IP66, IP67, IP69K		
4.1.28.1	1 hole 1 yellow empty polycarb pushbutton station (72H X 72W X 56D)	ea	
4.1.28.2	1 hole 1 grey empty polycarb pushbutton station (72H X 72W X 56D)	ea	
4.1.28.3	2 hole 1 grey empty polycarb pushbutton station (117H X 72W X 56D)	ea	
4.1.28.4	3 hole 1 grey empty polycarb pushbutton station (151H X 72W X 56D)	ea	
4.1.28.5	4 hole 1 grey empty polycarb pushbutton station (186H X 72W X 56D)	ea	
4.1.28.6	5 hole 1 grey empty polycarb pushbutton station (220H X 72W X 56D)	ea	
4.1.28.7	6 hole 1 grey empty polycarb pushbutton station (256H X 72W X 56D)	ea	
4.1.29	Base mounting contact blocks and indicating modules for above stations		
4.1.29.1	green 1 x NO base mount screw terminal contact block for above stations	ea	
4.1.29.2	red 1 x NC base mount screw terminal contact block for above stations	ea	
4.1.29.3	12-30 VAC/DC base mount LED integrated lamp module for above stations	ea	
4.1.29.4	185-265 VAC base mount LED integrated lamp module for above stations	ea	
4.1.30	Metallic control stations (without actuators and contact blocks) IP66, IP67		
4.1.30.1	1 hole 1 yellow industrial metal pushbutton station 80 80 73 or equivalent	ea	
4.1.30.2	1 hole 1 yellow p/button station (with half shroud) 80 80 73 or equivalent	ea	
4.1.30.3	1 hole 1 grey industrial metal pushbutton station 80 80 73 or equivalent	ea	
4.1.30.4	2 hole 1 grey industrial metal pushbutton station 130 80 73 or equivalent	ea	
4.1.30.5	3 hole 1 grey industrial metal pushbutton station 170 80 73 or equivalent	ea	
4.1.30.6	4 hole 1 grey industrial metal pushbutton station 170 80 73 or equivalent	ea	
4.1.30.7	5 hole 1 grey industrial metal pushbutton station 230 80 73 or equivalent	ea	
4.1.30.8	6 hole 1 grey industrial metal pushbutton station 230 80 73 or equivalent	ea	
4.1.30.9	8 hole 2 x 4 grey industrial metal pushbutton station 160 160 90 or equivalent	ea	

	Metallic control stations (without actuators and contact blocks) IP66, IP67	Unit	Rate/Price ZAR (excl.Vat) R c
4.1.30.10	12 hole 3 x 4 grey industrial metal pushbutton station 170 190 90 or equivalent	ea	
4.1.30.11	16 hole 4 x 4 grey industrial metal pushbutton station 190 250 90 or equivalent	ea	
	Empty metallic housings (without any holes) IP66, IP67	Unit	Rate/Price ZAR (excl.Vat) R c
4.1.30.12	grey empty aluminium alloy housing only 80 80 73 or equivalent	ea	
4.1.30.13	grey empty aluminium alloy housing only 130 80 73 or equivalent	ea	
4.1.30.14	grey empty aluminium alloy housing only 170 80 73 or equivalent	ea	
4.1.30.15	grey empty aluminium alloy housing only 160 160 90 or equivalent	ea	
4.1.30.16	grey empty aluminium alloy housing only 170 190 90 or equivalent	ea	
4.1.30.17	grey empty aluminium alloy housing only 190 250 90 or equivalent	ea	

	Push buttons and selector switches		Rate/Price ZAR (excl.Vat)
4.1	Lovato, Schneider Electric, ABB or equivalent.	Unit	R c
	Metallic series IP65 (contact block and support to be ordered separately)		
4.1.31	Pushbutton actuators		
4.1.31.1	(black, green, red, yellow, blue) flush momentary action pushbutton actuator spring return	ea	
4.1.31.2	red extended momentary action pushbutton actuator spring return	ea	
4.1.31.3	(black, green, red, yellow, blue) extended alternate action (push on-push off) actuator alternate	ea	
4.1.32	Mushroom head pushbutton actuators		
4.1.32.1	red Ø40 mm mushroom head pushbutton actuator spring return	ea	
4.1.32.2	red Ø60 mm mushroom head pushbutton actuator spring return	ea	
4.1.32.3	red Ø40 mm latching mushroom head p/button actuator twist release	ea	
4.1.32.4	red Ø40 mm latching mushroom head p/button actuator key release	ea	
4.1.33	Selector switch actuators spring return		
4.1.33.1	black 2 position O - I selector switch actuator –	ea	
4.1.33.2	black 2 position O - I selector switch actuator from R	ea	
4.1.33.3	black 3 position I - O - II selector switch actuator –	ea	
4.1.33.4	black 3 position I - O - II selector switch actuator from (L+R, R)	ea	
4.1.34	Key switch actuators key release spring return		
4.1.34.1	black 2 position((O-I) Left,(O-I) L+R) key switch actuator	ea	
4.1.34.2	black 2 position (O-I) Left key switch actuator from Right	ea	
4.1.34.3	black 2 position (O-I) Left key switch actuator from Right	ea	
4.1.34.4	black 3 position (I-O-II) (Centre, L +C+R) key switch actuator	ea	
4.1.34.5	black 3 position (I-O-II) Centre key switch actuator from L+R	ea	
4.1.35	Illuminated control and signalling devices		
4.1.35.1	illuminated pilot light head (with diffuser) (green, red, yellow, blue, transparent)	ea	
	Illuminated pushbuttons (with side visibility)		
4.1.35.2	extended momentary action illuminated actuator spring return (green, red, yellow, blue, transparent)	ea	
	Illuminated alternate action pushbutton actuators (push "ON" - push "OFF")		
4.1.35.3	extended alternate action illuminated actuator alternate (green, red, yellow, blue, transparent)	ea	
	Illuminated selector switch actuators		
4.1.35.4	green 2 position illuminated selector switch actuator O - I	ea	
4.1.35.5	red 2 position illuminated selector switch actuator O - I	ea	
4.1.35.6	green 3 position illuminated selector switch actuator I - O - II	ea	
4.1.35.7	3-way contact block support for metal series actuators	ea	
4.1.35.8	1 x NO standard green contact block for control devices	ea	
4.1.35.9	1 x NO early make green contact block for control devices	ea	
4.1.35.10	1 x NC standard red contact block for control devices	ea	
4.1.35.11	1 x NC late break red contact block for control devices	ea	
4.1.35.12	action plug black using central pos. on actuators	ea	
4.1.36	Legend plates and labels for Ø22 mm LM2T metallic actuators		
4.1.36.1	black holder legend holder for LM2TAU206 labels 12 mm (H) or equivalent	ea	
4.1.36.2	silver engrave able adhesive label insert for above holder 12 mm (H)	ea	

	Push buttons and selector switches		Rate/Price ZAR (excl.Vat)
4.1	Lovato, SOCOMEC, Schneider Electric, ABB or equivalent.	Unit	R c
4.1.36.3	silver engraved label (provide required engraving) 12 mm (H)	ea	
4.1.36.4	black holder legend holder for LM2TAU108 labels 15 mm (H) or equivalent	ea	
4.1.36.5	silver engrave able clip-in label insert for above holder 15 mm (H)	ea	
4.1.36.6	silver engraved label (provide required engraving) 15 mm (H)	ea	
	Emergency labels (to be mounted behind mushroom pushbuttons)		
4.1.36.7	yellow "emergency stop" plastic label/disc for pushbuttons Ø90 mm	ea	
4.1.36.8	yellow "emergency stop" plastic label/disc for pushbuttons Ø60 mm	ea	
	GX series - Rotary cam switches		
4.1.37	ON/OFF switches		
4.1.37.1	1 pole 16 A 5.5 kW on-off switch (O-I)	ea	
4.1.37.2	2 pole 16 A 5.5 kW on-off switch (O-I)	ea	
4.1.37.3	3 pole 16 A 5.5 kW on-off switch (O-I)	ea	
4.1.37.4	4 pole 16 A 5.5 kW on-off switch (O-I)	ea	
4.1.37.5	1 pole 20 A 7.5 kW on-off switch (O-I)	ea	
4.1.37.6	2 pole 20 A 7.5 kW on-off switch (O-I)	ea	
4.1.37.7	3 pole 20 A 7.5 kW on-off switch (O-I)	ea	
4.1.37.8	4 pole 20 A 7.5 kW on-off switch (O-I)	ea	
4.1.37.9	1 pole 32 A 15 kW on-off switch (O-I)	ea	
4.1.37.10	2 pole 32 A 15 kW on-off switch (O-I)	ea	
4.1.37.11	3 pole 32 A 15 kW on-off switch (O-I)	ea	
4.1.37.12	4 pole 32 A 15 kW on-off switch (O-I)	ea	
4.1.37.13	1 pole 40 A 18.5 kW on-off switch (O-I)	ea	
4.1.37.14	2 pole 40 A 18.5 kW on-off switch (O-I)	ea	
4.1.37.15	3 pole 40 A 18.5 kW on-off switch (O-I)	ea	
4.1.37.16	4 pole 40 A 18.5 kW on-off switch (O-I)	ea	
	ON/OFF isolators with padlock able red/yellow operating handle		
4.1.37.17	3 pole 16A 5.5kW main isolator (O-I)	ea	
4.1.37.18	4 pole 16A 5.5kW main isolator (O-I)	ea	
4.1.37.19	3 pole 32A 15kW main isolator (O-I)	ea	
4.1.37.20	4 pole 32A 15kW main isolator (O-I)	ea	
4.1.38	Changeover switches with "OFF" position		
4.1.38.1	1 pole 16 A 5.5 kW changeover switch (I-O-II)	ea	
4.1.38.2	2 pole 16 A 5.5 kW changeover switch (I-O-II)	ea	
4.1.38.3	3 pole 16 A 5.5 kW changeover switch (I-O-II)	ea	
4.1.38.4	4 pole 16 A 5.5 kW changeover switch (I-O-II)	ea	
4.1.38.5	1 pole 20 A 7.5 kW changeover switch (I-O-II)	ea	
4.1.38.6	2 pole 20 A 7.5 kW changeover switch (I-O-II)	ea	
4.1.38.7	3 pole 20 A 7.5 kW changeover switch (I-O-II)	ea	
4.1.38.8	4 pole 20 A 7.5 kW changeover switch (I-O-II)	ea	
4.1.38.9	1 pole 32 A 15 kW changeover switch (I-O-II)	ea	
4.1.38.10	2 pole 32 A 15 kW changeover switch (I-O-II)	ea	
4.1.38.11	3 pole 32 A 15 kW changeover switch (I-O-II)	ea	
4.1.38.12	4 pole 32 A 15 kW changeover switch (I-O-II)	ea	
4.1.38.13	1 pole 40 A 18.5 kW changeover switch (I-O-II)	ea	
4.1.38.14	2 pole 40 A 18.5 kW changeover switch (I-O-II)	ea	

	Push buttons and selector switches		Rate/Price ZAR (excl.Vat)
4.1	Lovato, SOCOMEC, Schneider Electric, ABB or equivalent.	Unit	R c
4.1.38.15	3 pole 40 A 18.5 kW changeover switch (I-O-II)	ea	
4.1.38.16	4 pole 40 A 18.5 kW changeover switch (I-O-II)	ea	
	Changeover switches without "OFF" position		
4.1.38.17	1 pole 16 A 5.5 kW changeover switch (I-II)	ea	
4.1.38.18	2 pole 16 A 5.5 kW changeover switch (I-II)	ea	
4.1.38.19	3 pole 16 A 5.5 kW changeover switch (I-II)	ea	
4.1.38.20	4 pole 16 A 5.5 kW changeover switch (I-II)	ea	
4.1.38.21	1 pole 20 A 7.5 kW changeover switch (I-II)	ea	
4.1.38.22	2 pole 20 A 7.5 kW changeover switch (I-II)	ea	
4.1.38.23	3 pole 20 A 7.5 kW changeover switch (I-II)	ea	
4.1.38.24	4 pole 20 A 7.5 kW changeover switch (I-II)	ea	
4.1.38.25	1 pole 32 A 15 kW changeover switch (I-II)	ea	
4.1.38.26	2 pole 32 A 15 kW changeover switch (I-II)	ea	
4.1.38.27	3 pole 32 A 15 kW changeover switch (I-II)	ea	
4.1.38.28	4 pole 32 A 15 kW changeover switch (I-II)	ea	
4.1.39	Voltmeter selector switches		
4.1.39.1	16 A voltmeter selector switch ph-ph + off	ea	
4.1.39.2	16 A voltmeter selector switch ph-ph/ph-n + off	ea	
4.1.40	Ammeter selector switches		
4.1.40.1	16 A ammeter selector switch direct reading	ea	
4.1.40.2	16 A ammeter selector switch for 3 CT's	ea	
4.1.41	Accessories for GX series cam switches		
4.1.41.1	48 x 60 mm front plate with legend for GX switches 16/20A	ea	
4.1.41.2	65 x 80 mm front plate with legend for GX switches 32/40A	ea	
4.1.42	ON-OFF switches		
4.1.42.1	16A 7.5 kW 1 pole on-off rotary cam switch (O-I)	ea	
4.1.42.2	16A 7.5 kW 2 pole on-off rotary cam switch (O-I)	ea	
4.1.42.3	16A 7.5 kW 3 pole on-off rotary cam switch (O-I)	ea	
4.1.42.4	25A 11 kW 1 pole on-off rotary cam switch (O-I)	ea	
4.1.42.5	25A 11 kW 2 pole on-off rotary cam switch (O-I)	ea	
4.1.42.6	25A 11 kW 3 pole on-off rotary cam switch (O-I)	ea	
4.1.42.7	32A 11 kW 1 pole on-off rotary cam switch (O-I)	ea	
4.1.42.8	32A 11 kW 3 pole on-off rotary cam switch (O-I)	ea	
4.1.43	Change-over switches (with "OFF" position)		
4.1.43.1	16A 7.5 kW 1 pole changeover rotary cam switch (I-O-II)	ea	
4.1.43.2	16A 7.5 kW 2 pole changeover rotary cam switch (I-O-II)	ea	
4.1.43.3	16A 7.5 kW 3 pole changeover rotary cam switch (I-O-II)	ea	
4.1.43.4	25A 11 kW 1 pole changeover rotary cam switch (I-O-II)	ea	
4.1.43.5	25A 11 kW 2 pole changeover rotary cam switch (I-O-II)	ea	
4.1.43.6	25A 11 kW 3 pole changeover rotary cam switch (I-O-II)	ea	
4.1.43.7	32A 11 kW 1 pole changeover rotary cam switch (I-O-II)	ea	
4.1.43.8	32A 11 kW 2 pole changeover rotary cam switch (I-O-II)	ea	
4.1.43.9	32A 11 kW 3 pole changeover rotary cam switch (I-O-II)	ea	
4.1.44	2 to 5 way switches with (with "OFF" position)		
	2-way switches with OFF		
4.1.44.1	16A 7.5 kW 1 pole 2-contact rotary cam switch (O-I-II)	ea	

	Push buttons and selector switches		Rate/Price ZAR (excl.Vat)
4.1	Lovato, SOCOMEC, Schneider Electric, ABB or equivalent.	Unit	R c
4.1.44.2	16A 7.5 kW 2 pole 4-contact rotary cam switch (O-I-II)	ea	
4.1.44.3	16A 7.5 kW 3 pole 6-contact rotary cam switch (O-I-II)	ea	
4.1.44.4	25A 11 kW 1 pole 2-contact rotary cam switch (O-I-II)	ea	
4.1.44.5	25A 11 kW 2 pole 4-contact rotary cam switch (O-I-II)	ea	
4.1.44.6	25A 11 kW 3 pole 6-contact rotary cam switch (O-I-II)	ea	
4.1.44.7	32A 11 kW 1 pole 2-contact rotary cam switch (O-I-II)	ea	
4.1.44.8	32A 11 kW 2 pole 4-contact rotary cam switch (O-I-II)	ea	
4.1.44.9	32A 11 kW 3 pole 6-contact rotary cam switch (O-I-II)	ea	
	3-way switches with OFF		
4.1.44.10	16A 7.5 kW 1 pole 3-contact rotary cam switch O-I-2-3	ea	
4.1.44.11	25A 11 kW 1 pole 3-contact rotary cam switch O-I-2-3	ea	
	4-way switches with OFF		
4.1.44.12	16A 7.5 kW 1 pole 4-contact rotary cam switch O-I-2-3-4	ea	
	5-way switches with OFF		
4.1.44.13	16A 7.5 kW 1 pole 5-contact rotary cam switch O-I-2-3-4-5	ea	
4.1.45	Binary code switches (Ideal for VSD panels up to 11 pre-set positions) (set point)		
4.1.45.1	4 pole binary cam switch (0-3)	ea	
4.1.45.2	4 pole binary cam switch (0-5)	ea	
4.1.45.3	4 pole binary cam switch (0-7)	ea	
4.1.45.4	4 pole binary cam switch (0-11)	ea	
4.1.46	Voltmeter switch, with neutral		
4.1.46.1	16A 7.5 kW voltmeter rotary cam selector switch (ph-ph/ph-N+off)	ea	
4.1.47	Ammeter switch, 3 CTs with common point		
4.1.47.1	16A 7.5 kW ammeter rotary cam selector switch (for 3 CTs)	ea	
4.1.48	Accessories for rotary cam switches		
4.1.48.1	48 mm aluminium engraved or blank legend plate insert with legend holder included with lettering specified	ea	
4.1.49	Ø16 mm LED pilot lights (high brightness) Lens: Ø19 x 10 - Body: L 24 mm		
4.1.49.1	(red, green, yellow, blue, white) 24 VAC/DC Ø16 mm panel mount LED pilot light	ea	
4.1.49.2	(red, green, yellow, blue, white) 110 VAC/DC Ø16 mm panel mount LED pilot light	ea	
4.1.49.3	(red, green, yellow, blue, white) 220 VAC/DC Ø16 mm panel mount LED pilot light	ea	
	Self-flashing LED pilot light and electronic buzzer Lens: Ø19 x 10 - Body: L 41.5 mm		
4.1.49.4	red 24 VAC/DC Ø16 mm self-flash LED p/light + buzzer	ea	
4.1.49.5	red 220 VAC Ø16 mm self-flash LED p/light + buzzer	ea	
4.1.50	Ø22 mm LED pilot lights (high brightness) - 4 LEDs Lens: Ø29 x 13 mm - Body: L 39 mm		
4.1.50.1	(red, green, yellow, blue, white) 12 VAC/DC Ø22 mm panel mount LED pilot light	ea	
4.1.50.2	(red, green, yellow, blue, white) 24 VAC/DC Ø22 mm panel mount LED pilot light	ea	

Push buttons and selector switches		Unit	Rate/Price ZAR (excl.Vat) R c
4.1	Lovato, Schneider Electric, ABB or equivalent.		
4.1.50.3	(red, green, yellow, blue, white) 110 VAC/DC Ø22 mm panel mount LED pilot light	ea	
4.1.50.4	(red, green, yellow, blue, white) 220 VAC/DC Ø22 mm panel mount LED pilot light	ea	
4.1.50.5	(red, green, yellow, blue, white) 380 VAC Ø22 mm panel mount LED pilot light	ea	
4.1.51	Ø22 mm Dual colour LED pilot light (IP63) Lens: Ø29 x 13 mm - Body: L 54 mm		
4.1.51.1	red/grn 24 VAC/DC Ø22 mm panel mount LED pilot light	ea	
4.1.51.2	red/grn 110 VAC/DC Ø22 mm panel mount LED pilot light	ea	
4.1.51.3	red/grn 220 VAC Ø22 mm panel mount LED pilot light	ea	
	Self-flashing LED pilot light intermittent flashing (2 Hz)		
4.1.51.4	red 24 VAC/DC Ø22 mm self-flashing LED pilot light	ea	
4.1.51.5	red 220 VAC Ø22 mm self-flashing LED pilot light	ea	
4.1.52	Ø22 mm panel mount buzzer (IP40) Lens: Ø30 x 13 - Body: L 49 mm		
4.1.52.1	black 24 VAC/DC Ø22 mm panel mount buzzer	ea	
4.1.52.2	black 220 VAC Ø22 mm panel mount buzzer	ea	
4.1.53	Combination buzzer/flashing LED pilot light		
4.1.53.1	AD22-22MR02 or equivalent red 24 VAC/DC Ø22 mm self-flash LED p/light + buzzer	ea	
4.1.53.2	red 220 VAC Ø22 mm self-flash LED p/light + buzzer	ea	
4.1.54	Ø22 mm panel mount volt/amp/Hz indicators (IP63) Lens: Ø30 x 15 mm - Body: L 31 mm		
4.1.54.1	(red, green, yellow, blue, white) 20 - 500 VAC Ø22 mm voltmeter panel indicator light	ea	
4.1.54.2	(red, green, yellow, blue, white) 5 - 60 VDC Ø22 mm voltmeter panel indicator light	ea	
4.1.54.3	(red, green, yellow, blue, white) 0 - 100A Ø22 mm ammeter panel indicator light	ea	
4.1.54.4	(red, green, yellow, blue, white) 20-500 / 0-100A Ø22 mm volt/ammeter panel indicator light	ea	
4.1.55	Ø30 mm LED pilot lights (high brightness) (IP63) Lens: Ø36.2 x 15 - Body: L 40 mm		
4.1.55.1	(red, green, yellow, blue, white) 24 VAC/DC Ø30 mm panel mount LED pilot light	ea	
4.1.55.2	(red, green, yellow, blue, white) 220 VAC/DC Ø30 mm panel mount LED pilot light	ea	
4.1.55.3	(red, green, yellow, blue, white) 380 VAC Ø30 mm panel mount LED pilot light	ea	
4.1.56	Ø30 mm panel mount buzzer (IP40) Lens: Ø36.2 x 15 - Body: L 40 mm		
	Combination buzzer/flashing LED pilot light		
4.1.56.1	red 24 VAC/DC Ø30 mm self-flash LED p/light + buzzer	ea	
4.1.56.2	red 220 VAC/DC Ø30 mm self-flash LED p/light + buzzer	ea	
4.1.57	Panel mount potentiometer Ø22 mm (IP65)		
4.1.57.1	black – 0 - 1kΩ Ø22 mm – panel mount potentiometer	ea	
4.1.57.2	black – 0 - 5kΩ Ø22 mm – panel mount potentiometer	ea	

Automatic Changeover switches and panels		Unit	Rate/Price ZAR
4.2	Lovato, Schneider Electric, ABB or equivalent.		(excl.Vat) R c
	Three-phase remotely operated motorised transfer switches, 3 or 4 poles, with positive break indication, enable the on load transfer of two three-phase power supplies via remote volt-free contacts, from an external automatic controller		
4.2.1	160 Ampere 3 pole motorised transfer switches	ea	
4.2.2	250 Ampere 3 pole motorised transfer switches	ea	
4.2.3	400 Ampere 3 pole motorised transfer switches	ea	
4.2.4	630 Ampere 3 pole motorised transfer switches	ea	
4.2.5	800 Ampere 3 pole motorised transfer switches	ea	
4.2.6	1000 Ampere 3 pole motorised transfer switches	ea	
4.2.7	160 Ampere 4 pole motorised transfer switches	ea	
4.2.8	250 Ampere 4 pole motorised transfer switches	ea	
4.2.9	400 Ampere 4 pole motorised transfer switches	ea	
4.2.10	630 Ampere 4 pole motorised transfer switches	ea	
4.2.11	800 Ampere 4 pole motorised transfer switches	ea	
4.2.12	1000 Ampere 4 pole motorised transfer switches	ea	
	Automatic changeover switches for transformer/generator applications. An integrated controller that provides all necessary functions, including monitoring the voltage and frequency of both sources, providing on-load changeover switching between two power supply sources	Unit	Rate/Price ZAR (excl.Vat) R c
4.2.13	160 Ampere 3 pole motorised transfer switches	ea	
4.2.14	250 Ampere 3 pole motorised transfer switches	ea	
4.2.15	400 Ampere 3 pole motorised transfer switches	ea	
4.2.16	630 Ampere 3 pole motorised transfer switches	ea	
4.2.17	800 Ampere 3 pole motorised transfer switches	ea	
4.2.18	1000 Ampere 3 pole motorised transfer switches	ea	
4.2.19	160 Ampere 4 pole motorised transfer switches	ea	
4.2.20	250 Ampere 4 pole motorised transfer switches	ea	
4.2.21	400 Ampere 4 pole motorised transfer switches	ea	
4.2.22	630 Ampere 4 pole motorised transfer switches	ea	

4.2.23	800 Ampere 4 pole motorised transfer switches	ea	
4.2.24	1000 Ampere 4 pole motorised transfer switches	ea	
	Fully Enclosed automatic changeover panels. All the features of the switches build into a IP65 Enclosure, with all wiring, bridging bars and fuses. For use in power systems for the safe transfer of a load supply between a normal and an alternate source	Unit	Rate/Price ZAR (excl.Vat) R c
4.2.25	63 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	
4.2.26	80 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	
4.2.27	100 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	
4.2.28	160 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	
4.2.29	250 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	
4.2.30	400 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	
4.2.31	630 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	
4.2.32	800 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	
4.2.33	1000 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	
4.2.34	1250 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	
4.2.35	1600 Ampere 4 pole fully enclosed automatic changeover switch panel	ea	

		Unit	Rate/Price ZAR (excl.Vat) R c
5.1	Metering and Energy Meters.		
5.1.1	Three phase direct connection 80A (modular design DIN rail mountable)		
5.1.1.1	DMED300T2 80A 3ph+N digital energy meter 2 4	ea	
5.1.1.2	DMED301 80A 3ph+N digital energy meter (RS485) – 4	ea	
5.1.2	Three phase CT connection .../5A (modular design DIN rail mountable)		
5.1.2.1	DMED310T2* /5A 3ph digital energy meter 2 4	ea	
5.1.2.2	DMED330 1/5A 3ph digital energy meter (RS485) – 4		
5.2	Digital multi meters, power analysis		
5.2.1	DMG100 series - LCD multi meters economical with icon LCD display		
5.2.1.1	DMG100 modular power analyser 4 3 065.00	ea	
5.2.1.2	Modular power analyser 4 3 065.00) or equivalent	ea	
5.2.2	DMG200 series - LCD multi meters with graphic backlight LCD display		
5.2.2.1	DMG200 modular power analyser 4 5	ea	
5.2.2.2	DMG210 modular power analyser with RS485 interface 4	ea	
5.2.3	DMG300 series (expandable) with graphic backlight LCD display		
5.2.3.1	DMG300* modular power analyser 4	ea	
5.2.4	DMG700 series with graphic backlight LCD display		
5.2.4.1	DMG700 panel mount analyser	ea	
5.3	Panel mount analyser		
5.3.1	Analogue panel instrument		
5.3.1.1	Ammeters AC moving iron (90degree)	ea	
5.3.1.2	1A direct reading AC ammeter 48mm X 48mm2	ea	
5.3.1.3	5-40A direct reading AC ammeter 48mm X 48mm2	ea	
5.3.1.4	1A CT operated AC ammeter 48mm X 48mm2	ea	
5.3.1.5	5A CT operated AC ammeter 48mm X 48mm2	ea	
5.3.1.6	1A direct reading AC ammeter 72mm X 72mm2	ea	
5.3.1.7	5-40A direct reading AC ammeter 72mm X 72mm2	ea	
5.3.1.8	1A CT operated AC ammeter 72mm X 72mm2	ea	
5.3.1.9	5A CT operated AC ammeter 72mm X 72mm2	ea	
5.3.1.10	1A direct reading AC ammeter 96mm X 96mm2	ea	
5.3.1.11	5-40A direct reading AC ammeter 96mm X 96mm2	ea	
5.3.1.12	1A CT operated AC ammeter 96mm X 96mm2	ea	
5.3.1.13	5A CT operated AC ammeter 96mm X 96mm2	ea	
5.3.2	Voltmeters AC moving iron and Frequency meters		
5.3.2.1	25A-60A (250,400V,500,600V) direct reading AC voltmeter 48mm X 48mm2	ea	
5.3.2.2	25A-60A (250,400V,500,600V) direct reading AC voltmeter 72mm X 72mm2	ea	
5.3.2.3	25A-60A (250,400V,500,600V) direct reading AC voltmeter 92mm X 92mm2	ea	
5.3.2.4	45-55Hz frequency (pointer type) 110-380V 72mm X 72mm2	ea	

		Unit	Rate/Price ZAR (excl.Vat) R c
5.3.3	Metering and Energy Meters.		
5.3.3.1	47-53Hz frequency (vibrating reed) 110-230V 72mm X 72mm2	ea	
5.3.3.2	47-53Hz frequency (vibrating reed) 380-500V 72mm X 72mm2	ea	
5.3.4	Metering and Energy Meters. Part numbers given as a specification to all of the listed brands.		
5.3.4.1	45-55Hz frequency (pointer type) 110-380V 96mm X 96mm2	ea	
5.3.4.2	47-53Hz frequency (vibrating reed) 110-230V 96mm X 96mm2	ea	
5.3.4.3	47-53Hz frequency (vibrating reed) 380-500V 96mm X 96mm2	ea	
	Maximum demand ammeters		
5.3.4.4	1A* /1A maximum demand ammeters 72mm X 72mm2	ea	
5.3.4.5	5A* /5A maximum demand ammeters 72mm X 72mm2	ea	
5.3.4.6	1A* /1A maximum demand ammeters 96mm X 96mm2	ea	
5.3.5	5A* /5A maximum demand ammeters 96mm X 96mm2		
5.3.5.1	Combination maximum demand ammeters	ea	
5.3.5.2	01A* /1A com.Max demand ammeters 72mm X 72mm2	ea	
5.3.5.3	05A* /5A com.Max demand ammeters 72mm X 72mm2	ea	
5.3.5.4	01A* /1A com.Max demand ammeters 96mm X 96mm2	ea	
5.3.5.5	05A* /5A com.Max demand ammeters 96mm X 96mm2		
5.3.6	Running hour meters		
5.3.6.1	AC running hour meter 24/110/230/380 VAC 48mm X 48mm2	ea	
5.3.6.2	AC running hour meter 24/110/230/380 VAC 72mm X 72mm2	ea	
5.3.6.3	AC running hour meter 24/110/230/380 VAC 96mm X 96mm2	ea	
5.3.6.4	DC running hour meter 24/110/230/380 VAC 48mm X 48mm3	ea	
5.3.6.5	DC running hour meter 24/110/230/380 VAC 72mm X 72mm3	ea	
5.3.6.6	DC running hour meter 24/110/230/380 VAC 96mm X 96mm3	ea	
5.3.7	Current transformers		
5.3.7.1	IMN1 ring type transformers 32mm	ea	
5.3.7.2	50/5A ring current transformer class 3 1.3VA 87X64X42	ea	
5.3.7.3	60/5A ring current transformer class 3 1.3VA 87X64X42	ea	
5.3.7.4	75/5A ring current transformer class 3 1.3VA 87X64X42	ea	
5.3.7.5	100/5A ring current transformer class 1 2.5VA 87X64X42	ea	
5.3.7.6	125/5A ring current transformer class 1 2.5VA 87X64X42	ea	
5.3.7.7	150/5A ring current transformer class 1 3.8VA 87X64X42	ea	
5.3.7.8	160/5A ring current transformer class 1 3.8VA 87X64X42	ea	
5.3.7.9	200/5A ring current transformer class 1 5VA 87X64X42	ea	

	250/5A ring current transformer class 1 7.5VA 87X64X42		
5.3.8	IMN2 current transformers 38mm		
5.3.8.1	Primary bar conductor 40X 12.5mm	ea	
5.3.8.2	160/5A ring current transformer class 1 10VA 99X75X42	ea	
5.3.8.3	200/5A ring current transformer class 1 10VA 99X75X42	ea	
5.3.8.4	250/5A ring current transformer class 1 10VA 99X75X42	ea	
5.3.8.5	300/5A ring current transformer class 1 15VA 99X75X42	ea	
5.3.8.6	400/5A ring current transformer class 1 25VA 99X75X42	ea	
5.3.8.7	500/5A ring current transformer class 1 30VA 99X75X42	ea	
5.3.8.8	600/5A ring current transformer class 1 30VA 99X75X42	ea	
5.4	Metering and Energy Meters.	Unit	Rate/Price ZAR (excl.Vat) R c
	IBR1 current transformer 60mm		
5.4.1	Primary bar conductor 60X 20mm	ea	
5.4.2	600/5A ring current transformer class 0.5 7.5VA 115X104X45	ea	
5.4.3	800/5A ring current transformer class 0.5 15VA 115X104X45	ea	
5.4.4	1000/5A ring current transformer class 0.5 30VA 115X104X45	ea	
	IBR3 current transformer 110mm		
	Primary bar conductor 100X 30mm		
5.4.5	1250/5A ring current transformer class 0.5 15VA 170X152X45	ea	
5.4.6	1600/5A ring current transformer class 0.5 30VA 170X152X45	ea	
5.4.7	2000/5A ring current transformer class 0.5 30VA 170X152X45	ea	
5.4.8	2500/5A ring current transformer class 0.5 30VA 170X152X45	ea	
5.4.9	3000/5A ring current transformer class 0.5 30VA 170X152X45	ea	
	IBNP primary wound current transformers		
5.4.10	5/5A primary wound CT class 0.5 5VA 111X68X43	ea	
5.4.11	10/5A primary wound CT class 0.5 5VA 111X68X43	ea	
5.4.12	15/5A primary wound CT class 0.5 5VA 111X68X43	ea	
5.4.13	20/5A primary wound CT class 0.5 5VA 111X68X43	ea	
5.4.14	25/5A primary wound CT class 0.5 5VA 111X68X43	ea	
5.4.15	30/5A primary wound CT class 0.5 5VA 111X68X43	ea	
5.4.16	40/5A primary wound CT class 0.5 5VA 111X68X43	ea	

6.	Power Quality and Controls		
	Lovato or Deep Sea or equivalent		Rate/Price ZAR (excl.Vat) R c
6.1	Part numbers given as a specification to all of the listed brands RGK600 series (IP40) 144 x 144 mm panel mounting	Unit	
6.1.1	4 6 AMF gen-set controller RGK600 or equivalent	ea	
6.1.2	4 6 AMF gen-set controller RGK601 or equivalent	ea	
6.1.3	4 6 AMF gen-set controller RGK610* or equivalent	ea	
6.1.2	RGK700 series (IP65) 180 x 240 mm panel mounting		
6.1.2.1	6 7 AMF grey gen-set controller RGK700 or equivalent	ea	
6.1.2.2	6 7 AMF black gen-set controller RGK750 or equivalent	ea	
6.1.3	RGK800 series (IP65) 180 x 240 mm panel mounting		
6.1.3.1	8 10 full featured AMF gen-set controller RGK800 or equivalent	ea	

6.1.4	Paralleling controllers for mains - mains and generator - generator		
6.1.4.1	13 10 full featured standalone gen-set controller RGK900SA or equivalent	ea	
6.1.4.2	13 10 mains-generator paralleling control RGK900 or equivalent	ea	
6.1.4.3	13 10 Mains-ATS (Automatic Transfer Switching) controller RGK900MC or equivalent	ea	
	Automatic Transfer Switch (ATS) controllers		
6.1.5	ATL100 series (econo) IP40 (no display) 54 mm DIN mounting		
6.1.5.1	2 3 single phase automatic transfer switch controller ATL100 or equivalent	ea	
6.1.6	ATL500 series (econo) IP40 (no display) 144 x 144 mm panel mounting		
6.1.6.1	2 3 3-ph+N automatic transfer switch controller ATL500 or equivalent	ea	
6.1.7	ATL600 series IP40 (with LCD display) 144 x 144 mm panel mounting		
6.1.7.1	6 7 automatic transfer switch controller for 2 sources ATL600 or equivalent	ea	
6.1.7.2	6 7 automatic transfer switch controller for 2 sources ATL601* or equivalent	ea	
6.1.7.3	ATL610* or equivalent 6 7 automatic transfer switch controller for 2 sources	ea	
6.1.8	ATL800 series IP65 (with backlit graphic LCD display) 180 x 240 mm panel mounting		
6.1.8.1	8 7 automatic transfer switch controller for 2 sources ATL800 or equivalent	ea	
6.1.9	ATL900 series IP40 180 x 240 mm panel mounting		
6.1.9.1	12 10 automatic transfer switch controller for 3 sources ATL900 or equivalent	ea	
6.1.10	Genset and power controllers Deep Sea or equivalent		
6.1.10.1	Auto Main Genset control unit Deep Sea 7320	ea	
6.1.10.2	Auto Main Genset control unit Deep Sea 7420	ea	
6.1.10.3	Auto Mains (Utility) failure control module Deep Sea 4520	ea	
6.1.10.4	Auto Mains (Utility) failure control module Deep Sea 4620	ea	

6.2	Battery chargers (DIN rail mount preference where available)		
6.2.1	Modular automatic switching battery chargers	Unit	Rate/Price ZAR (excl.Vat) R c
6.2.1.1	12V 2.5A 80 40 auto battery charger 96 90 56 1 or equivalent	ea	
6.2.1.2	12V 4.5A 150 70 auto battery charger 96 90 56 1 or equivalent	ea	
6.2.1.3	24V 1.25A 80 39 auto battery charger 96 90 56 or equivalent	ea	
6.2.1.4	24V 2.5A 150 77 auto battery charger 96 90 56 or equivalent	ea	
	Lovato or Deep Sea or equivalent RGK600 series (IP40) 144 x 144 mm panel mounting		
6.2.2	BCG series Rail mount switching battery chargers or equivalent		
6.2.2.1	12V 6A 230 97 auto battery charger 150 162 63 or equivalent	ea	
6.2.2.2	12V 12A 284 290 auto battery charger 150 213 63 or equivalent	ea	
6.2.2.3	24V 5A 364 158 auto battery charger 150 162 63 or equivalent	ea	
6.2.2.4	24V 10A 630 311 auto battery charger 150 213 63or equivalent	ea	
6.2.2.5	Vertical side mount adaptor (for space saving) for BCG0612 and BCG0524 or equivalent	ea	
6.2.3	BCE series Linear battery chargers or equivalent		
6.2.3.1	12V 3 117 – auto battery charger 93 134 100 or equivalent	ea	
6.2.3.2	12V 6 222 – auto battery charger 130 192 140 or equivalent	ea	
6.2.3.3	12V 12 400 – auto battery charger 230 192 140 or equivalent	ea	
6.2.3.4	24V 2.5 166 – auto battery charger 93 134 100 or equivalent	ea	
6.2.3.5	24V 5 317 – auto battery charger 130 192 140 or equivalent	ea	
6.2.3.6	24V 10 610 – auto battery charger 230 192 140 or equivalent	ea	
6.3	Power factor controller and equipment		
6.3.1	DCRL controllers 3, 5 and 8 step single phase CT connection		
6.3.1.1	3 step 6 step panel mount power factor controller 96 96 65 or equivalent	ea	
6.3.1.2	5 step 8 step panel mount power factor controller 96 96 65 or equivalent	ea	
6.3.1.3	8 step 14 step panel mount power factor controller 144 144 44 or equivalent	ea	
6.3.2	DCRG controllers 8 step single and three-phase CT connection		
6.3.2.1	8 step 18 step panel mount power factor controller 144 144 44 or equivalent	ea	
6.3.2.2	8 step 24 step static step power factor controller 144 144 44 or equivalent	ea	
6.3.3	Expansion modules for controllers		
	Inputs/Outputs		
6.3.3.1	2 relay to increase number of capacitor steps	ea	
6.3.3.2	3 relay to increase number of capacitor steps	ea	
6.3.3.3	4 digital – opto-isolated digital inputs	ea	
6.3.4	Capacitor switching contactors		
6.3.4.1	18A 1NO capacitor switching contactor	ea	
6.3.4.2	23A 1NO capacitor switching contactor	ea	
6.3.4.3	30A – capacitor switching contactor	ea	
	Capacitor switching contactors	Unit	Rate/Price ZAR (excl.Vat) R c

6.3.4.4	36A – capacitor switching contactor	ea	
6.3.4.5	43A – capacitor switching contactor	ea	
6.3.4.6	58A – capacitor switching contactor	ea	
6.3.4.7	75A – capacitor switching contactor	ea	
6.3.4.8	115A – capacitor switching contactor	ea	
6.3.4.9	144A – capacitor switching contactor	ea	
6.3.5	Kit to assemble BFK contactors from standard contactors		
6.3.5.1	Kit to assemble standard contactors for capacitor switching 09...38 or equivalent	ea	
6.3.5.2	Kit to assemble standard contactors for capacitor switching 50...80 or equivalent	ea	
6.3.5.3	Kit to assemble standard contactors for capacitor switching 95 ...150or equivalent	ea	
	Lovato or Deep Sea or equivalent RGK600 series (IP40) 144 x 144 mm panel mounting		
6.3.6	Thyristor switching modules (intelligent)		
6.3.6.1	22A thyristor switching module	ea	
6.3.6.2	43A thyristor switching module	ea	
6.3.6.3	72A thyristor switching module	ea	
6.3.6.4	144A thyristor switching module	ea	
6.3.7	EXP expansion modules (plug into rear of controller to add more functionality)		
	Inputs/Outputs		
6.3.7.1	2 relay to increase number of capacitor steps	ea	
6.3.7.2	3 relay to increase number of capacitor steps	ea	
6.3.7.3	4 digital – opto-isolated digital inputs	ea	
6.3.7.4	4 static opto isolated to increase static steps	ea	
6.3.7.5	2 digital 2 static opto-isolated digital inputs and static outputs	ea	
6.3.7.6	2 relay outputs rated 5A 250 VAC	ea	
6.3.7.7	2 analog – opto-isolated PT100, 0/4-20mA, 0-10V, 0...±5V	ea	
6.3.7.8	2 analog opto-isolated 0/4-20mA or 0-10V or 0...±5V	ea	
6.3.7.9	3ph (A) – + 2 x NTC for capacitor bank protection	ea	
	Communication		
6.3.7.10	USB – opto-isolated USB interface	ea	
6.3.7.11	RS232 – opto-isolated RS232 interface	ea	
6.3.7.12	RS485 – opto-isolated RS485 interface	ea	
6.3.7.13	Ethernet – opto-isolated Ethernet with web server function	ea	
6.3.7.14	Profibus – opto-isolated Profibus-DP interface	ea	

	Communication	Unit	Rate/Price ZAR (excl.Vat) R c
6.3.7.15	GSM – GPRS/GSM modem without antenna	ea	
	Accessories		
6.3.7.16	DCRL/DCRG connecting cable + EXP10 11 module	ea	
6.3.7.17	Analog modem connecting cable	ea	
6.3.7.18	controller USB dongle with connecting cable	ea	
6.3.7.19	Controller Wi-Fi dongle for programming, data download, diagnostics	ea	
6.3.7.20	GSM Quad-band antenna for EXP10 15 modem (800/900/1800/1900MHz)	ea	

Power sockets and plugs			
7.	SCAME or GEWISS or equivalent		
7.1	INDUSTRIAL PLUG AND SOCKET OUTLETS	Unit	Rate/Price ZAR (excl.Vat) R c
7.1.1	16A 2P+E (3pin) Industrial male/female plug, IP54	ea	
7.1.2	16A 3P+E (4pin) Industrial male/female plug, IP54	ea	
7.1.3	16A 3P+N+E (5pin) Industrial male/female plug, IP54	ea	
7.1.4	32A 2P+E (4pin) Industrial male/female plug, IP54	ea	
7.1.5	32A 3P+E (5pin) Industrial male/female plug, IP54	ea	
7.1.6	32A 3P+N+E (5pin) Industrial male/female plug, IP54	ea	
7.1.7	16A 2P+E (3pin) Industrial male/female plug, IP67	ea	
7.1.8	16A 3P+E (4pin) Industrial male/female plug, IP67	ea	
7.1.9	16A 3P+N+E (5pin) Industrial male/female plug, IP67	ea	
7.1.10	16A 3P+N+E (5pin) Industrial male/female plug, IP67	ea	
7.1.11	32A 3P+E (4pin) Industrial male/female plug, IP67	ea	
7.1.12	32A 3P+N+E (5pin) Industrial male/female plug, IP67	ea	
7.1.13	63A 3P+E (4pin) Industrial male/female plug, IP67	ea	
7.1.14	63A 3P+N+E (5pin) Industrial male/female plug, IP67	ea	
7.1.15	125A 3P+N+E (5pin) Industrial male/female plug, IP67	ea	
7.1.16	16A 3+N+E surface mount switch socket IP54	ea	
7.1.17	32A 3P+N+E (5pin) surface mount switch socket IP54	ea	
7.1.18	16A 3+N+E surface mount switch socket IP67	ea	
7.1.19	32A 3P+N+E (5pin) surface mount switch socket IP67	ea	
7.1.20	63A 3P+N+E (5pin) surface mount switch socket IP67	ea	
7.2	INDUSTRIAL SWITCHED SOCKETS SCAME or GEWISS or equivalent		
7.2.1	16A 2P+E (3pin) Industrial plug socket outlet, IP54	ea	
7.2.2	16A 3P+E (4pin) Industrial plug socket outlet, IP54	ea	
7.2.3	16A 3P+N+E (5pin) Industrial plug socket outlet, IP54	ea	
7.2.4	32A 2P+E (3pin) Industrial plug socket outlet, IP54	ea	
7.2.5	32A 3P+E (4pin) Industrial plug socket outlet, IP54	ea	
7.2.6	32A 3P+N+E (5pin) Industrial plug socket outlet, IP54	ea	
7.2.7	16A 2P+E (3pin) Industrial plug socket outlet, IP67	ea	
7.2.8	16A 3P+E (4pin) Industrial plug socket outlet, IP67	ea	
7.2.9	16A 3P+N+E (5pin) Industrial plug socket outlet, IP67	ea	
7.2.10	32A 2P+E (3pin) Industrial plug socket outlet, IP67	ea	
7.2.11	32A 3P+E (4pin) Industrial plug socket outlet, IP67	ea	
7.2.12	32A 3P+N+E (5pin) Industrial plug socket outlet, IP67	ea	
7.2.13	63A 3P+E (4pin) Industrial plug socket outlet, IP67	ea	
7.2.14	63A 3P+N+E (5pin) Industrial plug socket outlet, IP67	ea	
7.3	WEATHERPROOF SWITCHES & SOCKETS SCAME or GEWISS or equivalent		
7.3.1	16A 1P IP55 surface mount switch SCAME unibox	ea	
7.3.2	20A 2P IP55 surface mount switch SCAME unibox	ea	
7.3.3	16A 1P IP55 surface mount 2way switch SCAME unibox	ea	
7.3.4	16A 2X1P IP55 surface mount switch SCAME unibox	ea	
7.3.5	15A IP55 2P+E surface switch socket SCAME unibox	ea	

INDUSTRIAL PLUG AND SOCKET OUTLETS Power sockets and plugs			Rate/Price ZAR (excl.Vat)
7.3	SCAME or GEWISS or equivalent	Unit	R c
7.3.6	20A 1P IP67 surface mount switch SCAME unibox or equivalent	ea	
7.3.7	20A 2P IP67 surface mount switch SCAME unibox or equivalent	ea	
7.3.8	20A 1P IP67 surface mount 2way switch SCAME unibox or equivalent	ea	
7.3.9	20A 2X1P IP67 surface mount switch SCAME unibox or equivalent	ea	
7.3.10	15A IP67 2P+E surface switch socket SCAME unibox or equivalent	ea	

8	Timers Control Relays and Ventilation		
8.1	Miniature industrial relays (Finder, ACDC, ABB) or equivalent	Unit	Rate/Price ZAR (excl.Vat)
			R c
8.1.1	16A miniature plug-in relay 1 ch/over 12/24VAC	ea	
8.1.2	16A miniature plug-in relay 1 ch/over 110 VAC	ea	
8.1.3	16A miniature plug-in relay 1 ch/over 230 VAC	ea	
8.1.4	16A miniature plug-in relay 1 ch/over 12/24 VDC	ea	
8.1.5	16A miniature plug-in relay 1 ch/over 110 VDC	ea	
8.1.6	16A plug-in industrial power relay 3 changeover 12/24 VAC	ea	
8.1.7	16A plug-in industrial power relay 3 changeover 110 VAC	ea	
8.1.8	16A plug-in industrial power relay 3 changeover 240 VAC	ea	
8.1.9	16A plug-in industrial power relay 3 changeover 400 VAC	ea	
8.1.10	16A plug-in industrial power relay 3 changeover 12/24 VDC	ea	
8.1.11	16A plug-in industrial power relay 3 changeover 110 VDC	ea	
8.1.12	16A plug-in industrial power relay 3 changeover 220 VDC	ea	
8.1.13	12A miniature power relay 2 changeover 12/24 VAC	ea	
8.1.14	12A miniature power relay 2 changeover 110/240 VAC	ea	
8.1.15	12A miniature power relay 2 changeover 12/24 VDC	ea	
8.1.16	12A miniature power relay 2 changeover 110 VDC	ea	
8.1.17	12A miniature power relay 2 changeover 220 VDC	ea	
8.1.18	12A miniature power relay 4 changeover 12/24 VAC	ea	
8.1.19	12A miniature power relay 4 changeover 110/240 VAC	ea	
8.1.20	12A miniature power relay 4 changeover 12/24 VDC	ea	
8.1.21	12A miniature power relay 4 changeover 110 VDC	ea	
8.1.22	12A miniature power relay 4 changeover 220 VDC	ea	
8.1.23	10A miniature plug-in relay 2 changeover 12/24 VAC	ea	
8.1.24	10A miniature plug-in relay 2 changeover 110/240 VAC	ea	
8.1.25	10A miniature plug-in relay 2 changeover 12/24 VDC	ea	
8.1.26	10A miniature plug-in relay 2 changeover 110 VDC	ea	
8.1.27	10A miniature plug-in relay 2 changeover 220 VDC	ea	
8.1.28	8A miniature plug-in relay 2 ch/over 12/24 VAC	ea	
8.1.29	8A miniature plug-in relay 2 ch/over 110 VAC	ea	
8.1.30	8A miniature plug-in relay 2 ch/over 230 VAC	ea	
8.1.31	8A miniature plug-in relay 2 ch/over 12/24 VDC	ea	
8.1.32	8A miniature plug-in relay 2 ch/over 110 VDC	ea	
8.1.33	7A miniature plug-in relay 4 changeover 12/24 VAC	ea	
8.1.34	7A miniature plug-in relay 4 changeover 110 VAC	ea	
8.1.35	7A miniature plug-in relay 4 changeover 240 VAC	ea	
8.1.36	7A miniature plug-in relay 4 changeover 12/24 VDC	ea	

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8.1	Miniature industrial relays Finder, ACDC, ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
8.1.37	7A miniature plug-in relay 4 changeover 110 VDC	ea	
8.1.38	7A miniature plug-in relay 4 changeover 220 VDC	ea	
8.1.2	Other configurations: replace last two digits with following: (e.g.466180120054) (Finder, ACDC, ABB) or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
8.1.2.1	54 internal LED indicator for AC relays	ea	
8.1.2.2	74 internal LED indicator for DC relays	ea	
8.1.3	Sockets and accessories for 46 series relays, (Finder, ACDC, ABB) or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
8.1.3.1	Surface/DIN mount relay socket (push-in terminal) with retaining clip serial 4661 or equivalent	ea	
8.1.3.2	Surface/DIN mount relay socket (push-in terminal) with retaining clip serial 4652 or equivalent	ea	
8.1.3.3	DIN rail mountable support bracket for relays 4661/52 or equivalent	ea	
8.1.3.4	8 way jumper link for sockets 9701/02 or equivalent	ea	
8.1.3.5	8 way jumper link for sockets 97P1/2 or equivalent	ea	
8.1.3.6	Sheet of (48) marking tags (mounts onto retain clip or holder) 970/P1/2 or equivalent	ea	
8.1.3.7	Tag holder for relay socket 46392/PS tags (mounts directly onto socket) (10pcs) 970/P1/2 or equivalent	ea	
8.2	Modular timing devices, (Finder, ACDC, ABB) or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
8.2.1	Multi-time range, multi-voltage, on-delay modular electronic timer	ea	
8.2.2	Multi-time range, multi-voltage, multi-func. mod. elect. timer (NFC) 12 - 240 VAC/DC	ea	
8.2.3	Multi-time, multi-voltage, modular unequal repeat electronic timer 12-240 VAC/DC	ea	
8.2.4	Multi-time, multi-voltage, delay on de-energisation elect. timer 24 - 240 VAC/DC	ea	
8.2.5	Multi-time, multi-voltage, mod. star-delta elect. timer 24 - 48 VDC / 24 - 240 VAC	ea	
8.2.6	Multi-time, multi-voltage, modular star-delta elect. timer 380 - 440 VAC	ea	
8.2.7	Multi-time range, multi-voltage, multi-func. mod. elect. timer (NFC) 12 - 240 VAC/DC	ea	
8.2.8	Multi-time, multi-voltage, modular unequal repeat electronic timer 12-240 VAC/DC	ea	
8.2.9	Multi-time, multi-voltage, delay on de-energisation elect. timer 24 - 240 VAC/DC	ea	
8.2.10	Multi-time, multi-voltage, mod. star-delta elect. timer 24 - 48 VDC / 24 - 240 VAC	ea	
8.2.11	Multi-time, multi-voltage, modular star-delta elect. timer 380 - 440 VAC	ea	

Modular Level control relays		Unit	Rate/Price ZAR (excl.Vat) R c
8.3	Finder, ACDC, ABB or equivalent		
8.3.1	Liquid level control relay for “emptying” function 220 - 240 VAC	ea	
8.3.2	Liquid level control relay for “emptying” function 380 - 415 VAC	ea	
8.3.3	Multi-voltage liquid level control relay 24 - 240 VAC/DC	ea	
8.3.4	Dual-voltage liquid level control relay 24/220-240 VAC	ea	
8.3.5	Dual-voltage liquid level control relay 110-127/380-415 VAC	ea	
8.3.6	5 probe multi-function liquid level control relay 220 - 240 VAC	ea	
8.3.7	5 probe multi-function liquid level control relay 380 - 415 VAC	ea	
	Level electrodes and holders for conductive liquids, (Finder, ACDC, ABB) or equivalent		
8.3.8	1-pole insulated electrode (AISI 303 stainless steel) for LVM relays	ea	
8.3.9	Electrode holder for 3 rod probes/electrodes	ea	
8.3.10	Electrodes for above PS3S holder (1 meter length)	ea	
8.3.11	Electrode spacer disc (for extending probe length)	ea	
8.3.12	Electrode extension locknut (for extending probe length)	ea	
8.3.13	Pump priority change relay 24 - 48 VDC / 24 - 240 VAC	ea	
8.3.14	Pump priority change relay with 4 I/O 220 - 240 VAC	ea	
8.4	Electronic multifunction timer/ counter, (Finder, ACDC, ABB) or equivalent	Unit	
8.4.1	On-delay multi-range/voltage panel mount electronic timer 3/12/100/780sec	ea	
8.4.2	On-delay multi-range/voltage panel mount electronic timer 3/12/100/780min	ea	
8.4.3	On-delay multi-time range panel mount electronic timer 1s/10s/1min/10min	ea	
	Accessories for above L48 series panel mount timers (Finder, ACDC, ABB) or equivalent		
8.4.4	8 pin surface/DIN rail mounting relay socket for L48 timers (screw terminals)	ea	
8.4.5	8 pin socket for panel mounting L48 timers (rear terminals) (screw terminals)	ea	
8.4.6	Flush-mounting bracket for panel mounting above L48 timers	ea	
8.4.7	S45/604/B6/02A 1x instantaneous + 1x delay multi-range motorised timer 24 VAC or equivalent	ea	
8.4.8	1x instantaneous + 1x delay multi-range motorised timer 110 VAC	ea	
8.4.9	1x instantaneous + 1x delay multi-range motorised timer 220 VAC	ea	
8.4.10	1x instantaneous + 1x delay multi-range motorised timer p/mount 48 mm2 24 VAC	ea	
8.4.11	1x instantaneous + 1x delay multi-range motorised timer p/mount 48 mm2 110 VAC	ea	

8.4	Electronic multifunction timer/ counter Finder, ACDC, ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat) R c
8.4.12	1x instantaneous + 1x delay multi-range motorised timer panel mount 48 mm 220 VAC	ea	
8.4.13	1x instantaneous + 1x delay multi-range motorised timer panel mount 72 mm 220 VAC	ea	
8.4.14	2 pole panel mount asymmetrical flasher 240 VAC	ea	
8.4.15	Multi-range, multi-function, multi-voltage modular electronic timer 24 - 300 VAC/DC	ea	
8.4.16	Multi-range/function/voltage modular timer with pulse control 24 - 300 VAC/DC	ea	
8.4.17	Modular DIN rail mounting electronic star-delta timer 150 - 500 VAC	ea	
8.4.18	Modular DIN rail mounting electronic liquid level controller 150 - 500 VAC	ea	
8.4.19	Modular DIN rail mount 3 ph phase failure/reversal/imbalance relay 380 - 480 $\pm 25\%$	ea	
8.4.20	Modular 3ph over/under voltage monitor with ph failure/reversal 380 - 480 $\pm 25\%$	ea	
8.4.21	Modular 3ph+N over/under voltage monitor + ph failure/reversal 230 $\pm 25\%$	ea	
8.5	Temperature control devices, (Finder, ACDC, ABB) or equivalent		
8.5.1	48 x 48 econo temperature controller relay (5A AC1)	ea	
8.5.2	48 x 48 econo temperature controller 14 VDC pulse	ea	
8.5.3	48 x 48 econo temperature controller 4 - 20mA	ea	
8.5.4	48 x 96 econo temperature controller relay (5A AC1)	ea	
8.5.5	48 x 96 econo temperature controller 14 VDC pulse	ea	
8.5.6	48 x 96 econo temperature controller 4 - 20mA	ea	
8.5.7	72 x 72 econo temperature controller relay (5A AC1)	ea	
8.5.8	72 x 72 econo temperature controller 14 VDC pulse	ea	
8.5.9	96 x 96 econo temperature controller relay (5A AC1)	ea	
8.5.10	96 x 96 econo temperature controller 14 VDC pulse	ea	
8.5.11	48 x 48 advanced temperature controller relay	ea	
8.5.12	48 x 48 advanced temperature controller 14 VDC pulse see	ea	
8.5.13	48 x 96 advanced temperature controller relay output 2	ea	
8.5.14	48 x 96 advanced temperature controller 14 VDC pulse options	ea	
8.5.15	96 x 96 advanced temperature controller relay (below)	ea	
8.5.16	96 x 96 advanced temperature controller 14 VDC pulse	ea	
8.5.17	30A current transformer for heater disconnection or overcurrent detection	ea	
8.5.18	100A current transformer for heater disconnection or overcurrent detection	ea	

	Modular control and monitoring devices		Rate/Price ZAR (excl.Vat)
8.6	Finder, ACDC, ABB or equivalent	Unit	R c
8.6.1	1-240A 240 VAC 0/4 - 20mA 1 – loop monitor	ea	
8.6.2	1-P-240A 240 VAC 0/4 - 20mA 1 24 VDC PS loop monitor	ea	
8.6.3	1-T-240A 240 VAC 0/4 - 20mA 1 yes loop monitor	ea	
8.6.4	2-240A 240 VAC 0/4 - 20mA 2 – loop monitor	ea	
8.6.5	240 VAC 0/4 - 20mA 2 24 VDC PS loop monitor	ea	
8.6.6	240 VAC 0/4 - 20mA 2 – loop monitor	ea	
8.6.7	240A 240 VAC 0 - 10V** 2 yes loop monitor	ea	
8.6.8	240 VAC 0-100% 1 humidity controller	ea	
8.6.9	Humidity controller probe (3m length)	ea	
8.6.10	240A 1sec - 9999 hrs 1 – multi-function timer	ea	
8.6.11	240A 1sec - 9999 hrs 1 – running hour meter	ea	
8.6.12	240A 4 or 8 digit mode 1 – counter / freq. monitor	ea	
8.6.13	240A 240 VAC 1 - 5A 2 – AC current monitor	ea	
8.6.14	5-400A 400 VAC 1 - 5A 2 – AC current monitor	ea	
8.6.15	400A 400 VAC 0 - 500V (3ph) 1 – voltage & freq. monitor	ea	
8.6.16	400A 400 VAC 300 - 500V (3ph) 2 – voltage & freq. monitor	ea	
8.6.17	400A 400 VAC 300 - 500V (3ph) 2 – voltage & freq. monitor	ea	
8.6.18	230A 230 VAC -50 to 440°C 1 PT100 temperature controller	ea	
8.6.19	230A 230 VAC -50 to 440°C 2 PT100 temperature controller	ea	
8.6.20	240A 240 VAC 0 - 9999 2 – RPM monitor	ea	
8.7	Plug in timing devices, (Finder, ACDC, ABB) or equivalent		
8.7.1	110 VAC 1 - 4 A - C multi-range/function timer	ea	
8.7.2	230 VAC 1 - 4 A - C multi-range/function timer	ea	
8.7.3	400 VAC 1 - 4 A - C multi-range/function timer	ea	
8.7.4	12V ACDC 1 - 4 A - C multi-range/function timer	ea	
8.7.5	24V ACDC 1 - 4 A - C multi-range/function timer	ea	
8.7.6	48V ACDC 1 - 4 A - C multi-range/function timer	ea	
8.7.7	110 VAC 1 - 4 A - D multi-range/function timer	ea	
8.7.8	230 VAC 1 - 4 A - D multi-range/function timer	ea	
8.7.9	24V ACDC 1 - 4 A - D multi-range/function timer	ea	
8.7.10	230 VAC 10 off delay multi-range delay on de-energisation	ea	
8.7.11	230 VAC 30 off delay multi-range delay on de-energisation	ea	
8.7.12	400 VAC 30 off delay multi-range delay on de-energisation	ea	
8.7.13	230 VAC 60 off delay multi-range delay on de-energisation	ea	
8.7.14	24V ACDC 180 off delay multi-range delay on de-energisation	ea	
8.7.15	230 VAC 180 off delay multi-range delay on de-energisation	ea	
8.7.16	24V ACDC 360 off delay multi-range delay on de-energisation	ea	
8.7.17	230 VAC 360 off delay multi-range delay on de-energisation	ea	
8.7.18	230 VAC 10 off delay multi-range delay on de-energisation	ea	
8.7.19	230 VAC 30 off delay multi-range delay on de-energisation	ea	

8.7	Plug in timing devices Finder, ACDC, ABB or equivalent	Unit	Rate/Price ZAR (excl.Vat)	
			R	c
8.7.20	230 VAC 60 off delay multi-range delay on de-energisation	ea		
8.7.21	230 VAC 180 off delay multi-range delay on de-energisation	ea		
8.7.22	110 VAC – repeat unequal repeating timer	ea		
8.7.23	230 VAC – repeat unequal repeating timer	ea		
8.7.24	400 VAC – repeat unequal repeating timer	ea		
8.7.25	12V ACDC – repeat unequal repeating timer	ea		
8.7.26	24V ACDC – repeat unequal repeating timer	ea		
8.7.27	24V ACDC 30 star delta star delta timer	ea		
8.7.28	110 VAC 30 star delta star delta timer	ea		
8.7.29	230 VAC 30 star delta star delta timer	ea		
8.7.30	400 VAC 30 star delta star delta timer	ea		
8.7.31	24V ACDC 60 star delta star delta timer	ea		
8.7.32	230 VAC 60 star delta star delta timer	ea		
8.7.33	400 VAC 60 star delta star delta timer	ea		
8.7.34	230 VAC 180 star delta star delta timer	ea		
8.7.35	230 VAC 10 on-delay econo on-delay timer	ea		
8.7.36	400 VAC 10 on-delay econo on-delay timer	ea		
8.7.37	230 VAC 30 on-delay econo on-delay timer	ea		
8.7.38	230 VAC 60 on-delay econo on-delay timer	ea		
8.7.39	24V ACDC 180 on-delay econo on-delay timer	ea		
8.7.40	230 VAC 180 on-delay econo on-delay timer	ea		
8.7.41	24V ACDC 360 on-delay econo on-delay timer	ea		
8.7.42	230 VAC 360 on-delay econo on-delay timer	ea		
8.7.43	400 VAC 360 on-delay econo on-delay timer	ea		
8.7.44	24V ACDC 600 on-delay econo on-delay timer	ea		
8.7.45	230 VAC 600 on-delay econo on-delay timer	ea		
8.7.46	400 VAC 600 on-delay econo on-delay timer	ea		
8.7.47	525 VAC 600 on-delay econo on-delay timer	ea		
8.7.48	230 VAC 60min on-delay econo on-delay timer	ea		
8.7.49	24V ACDC 30 interval econo pulsed internal timer	ea		
8.7.50	230 VAC 30 interval econo pulsed internal timer	ea		
8.7.51	230 VAC – one-shot econo impulse relay	ea		
8.7.52	230 VAC – timer econo percentage timer	ea		
8.7.53	400 VAC – timer econo percentage timer	ea		
8.7.54	230 VAC – timer econo forward/reverse timer	ea		
8.7.55	230 VAC – timer econo two shot timer	ea		
8.7.56	95 - 240 VAC – timer econo solid state flasher	ea		

	Plug in control and monitoring devices		Rate/Price ZAR (excl.Vat)
8.8	Finder, ACDC, ABB) or equivalent	Unit	R c
8.8.1	230 VAC 0 - 1A relay over or under current monitor	ea	
8.8.2	230 VAC 0 - 5A relay over or under current monitor	ea	
8.8.3	400 VAC 0 - 5A relay over or under current monitor	ea	
8.8.4	400 VAC 0 - 5A relay over and under current monitor	ea	
8.8.5	230 VAC 40 - 400 VAC over and under voltage monitor	ea	
8.8.6	230 VAC three over and under frequency monitor	ea	
8.8.7	110 VAC three relay phase failure	ea	
8.8.8	400 VAC three relay phase failure	ea	
8.8.9	525 VAC three relay phase failure	ea	
8.8.10	400 VAC three relay phase failure with adj.for NPS	ea	
8.8.11	525 VAC three relay phase failure with adj.for NPS	ea	
8.8.12	230 VAC single over and under voltage monitor	ea	
8.8.13	110 VAC three over and under voltage monitor	ea	
8.8.14	400 VAC three over and under voltage monitor	ea	
8.8.15	525 VAC three over and under voltage monitor	ea	
8.8.16	400 VAC three +N over and under voltage monitor	ea	
8.8.17	24 VAC – level control liquid conductive controller	ea	
8.8.18	110 VAC – level control liquid conductive controller	ea	
8.8.19	230 VAC – level control liquid conductive controller	ea	
8.8.20	400 VAC – level control liquid conductive controller	ea	
8.8.21	525 VAC – level control liquid conductive controller	ea	
8.8.22	024 VDC – level control liquid conductive controller	ea	
8.8.23	230 VAC – level control DC capacitive probe controller	ea	
8.8.24	230 VAC 3 circuits relay pump sequencing relay	ea	
8.8.25	230 VAC 1-2-4-8 hrs relay single pump protection relay	ea	
8.8.26	400 VAC 1-2-4-8 hrs relay three pump protection relay	ea	
8.8.27	SN1 single line insulated stainless steel probe for conductive liquids	ea	
8.8.28	PS3S 3 electrode holder (mounts through 50.5 mm hole)	ea	
8.8.29	P1000S electrodes for PS3S holder (1 meter length)	ea	
8.8.30	FS03-3P electrode spacer disc (for extended probe length)	ea	
8.8.31	PXL extension locknut (each)	ea	

	Plug in timing devices		Rate/Price ZAR (excl.Vat)
8.9	Finder, ACDC, ABB or equivalent	Unit	R c
8.9.1	230 VAC – control two hand controller	ea	
8.9.2	230 VAC – relay pulse controlled without memory	ea	
8.9.3	230 VAC – relay mains or pulse controlled with memory	ea	
8.9.4	24 VACDC – relay mains or pulse controlled with memory	ea	
8.9.5	12 VDC – alarm control alarm signals	ea	
8.9.6	24 VDC – alarm control alarm signals	ea	
8.9.7	SU 230 VAC - 24 VDC 24VA power supply overload/short circuit protection	ea	
8.9.8	24V AC\DC – relay over/under speed	ea	
8.9.9	110 VAC – relay over/under speed	ea	
8.9.10	230 VAC – relay over/under speed	ea	
8.9.11	12 VDC – relay over/under speed	ea	
8.9.12	110 VAC 180s relay temperature controller	ea	
8.9.13	230 VAC 180s relay temperature controller	ea	

8.10	Temperature control and ventilation (Finder, ACDC, ABB) or equivalent	Unit	Rate/Price ZAR (excl.Vat)
			R c
8.10.1	Complete filter fan or equivalent, 7F2082301020, 230 V, 17 Watt, 24 m³/h, 92mm²	ea	
8.10.2	Complete filter fan or equivalent, 7F2082302055, 230 V, 28 Watt, 55 m³/h, 125mm²	ea	
8.10.3	Complete filter fan or equivalent, 7F2082303100, 230 V, 28 Watt, 100 m³/h, 177mm²	ea	
8.10.4	Complete filter fan or equivalent, FU-9801C1 P2A23, 230 VAC, 15.1 Watt, 83mm²	ea	
8.10.5	Complete filter fan or equivalent, FU-9804C1 P2A23, 230 VAC, 46.4 Watt, 175mm²	ea	
8.10.6	Complete filter fan or equivalent, FU-9806C1 P2A23, 230 VAC, 61.6 Watt, 292mm²	ea	
8.10.7	AC frame fans only or equivalent, KA8025HA2B to KA1238HA2B, 230V, 14 - 20 Watt, 80 mm² - 120 mm²	ea	
8.10.8	Panel roof mount exhaust fan 230VAC, 70 Watt, 500m³/h, 324mm²	ea	
8.10.9	AC frame fans only or equivalent, KA8025HA2B, 230V, 14 Watt, 80 mm	ea	
8.10.10	AC frame fans only or equivalent, KA8025HA2B, 230V, 14 Watt, 80 mm	ea	
8.10.11	Solar powered roof mount ventilation fan similar to RM1600 including all fittings, flashings, waterproofing, parts and installation costs. Or equivalent to Skylite concepts Solatube variant	ea	
8.10.12	Exhaust filter similar or equal FU9801A P2, 83mm² or equivalent	ea	
8.10.13	Exhaust filter similar or equal FU9804A P2, 175mm² or equivalent	ea	
8.10.14	Exhaust filter similar or equal FU9806A P2, 292mm² or equivalent	ea	
8.10.15	Exhaust filter similar or equal 7F0200001000, 92mm² or equivalent	ea	
8.10.16	Exhaust filter similar or equal 7F0200002000, 125mm² or equivalent	ea	
8.10.17	Exhaust filter similar or equal 7F0200003000, 177mm² or equivalent	ea	
8.10.18	Panel heater similar or equal 7H Series, 7H5102300050, 50 Watt, 200mA or equivalent	ea	
8.10.19	Panel heater similar or equal 7H Series, 7H51023000150, 150 Watt, 700mA or equivalent	ea	

9.	Field Switching	Unit	Rate/Price ZAR (excl.Vat) R c
9.1	Proximity sensors		
9.1.1	Proximity sensor M18 PNP 8mm detection, IP69k, 2m cable terminal XS118B3PAL2 or equivalent	ea	
9.1.2	Proximity sensor M18 NPN 8mm detection, IP69k, 2m cable terminal XS618B1NAL2 or equivalent	ea	
9.1.3	Proximity sensor M30 x 1.5 PNP 10mm detection, IP69k, 2m cable terminal XS530BLPAL2 or equivalent	ea	
9.1.4	Proximity sensor M30 x 1.5 NPN 10mm detection, IP69k, 2m cable terminal XS530B1NAL2 or equivalent	ea	
9.1.5	Proximity sensor M12 PNP 10mm detection, IP68, 2m cable terminal BI6U-M12-VP6X or equivalent	ea	
9.1.6	Proximity sensor M12 NAMUR 2mm detection, IP67, 2m cable terminal NF5002 or equivalent	ea	
9.1.7	Proximity sensor M18 NAMUR 5mm detection, IP67, 2m cable terminal NG5002 or equivalent	ea	
9.1.8	Proximity sensor M30 NAMUR 10mm detection, IP67, 2m cable terminal NI5002 or equivalent	ea	
9.1.9	Proximity sensor T-slot NO , IP67, 2.5m cable terminal SME-8-K-LED-24 or equivalent	ea	
9.1.10	LSA-M2WARNM micro-switchbox	ea	
9.1.11	LSI-Q40P-F20-CD 281998 10..65VDC;200mA Sn:20mm	ea	
9.1.11	Proximity sensor M18 PNP 8mm detection, IP69k, 2m cable terminal XS118B3PAL2 or equivalent	ea	
9.2	Photoelectrical switches		
9.2.1	Photoelectrical switch M18, 20m sensing distance, IP67 FAIH/00-0A or equivalent	ea	
9.2.2	Photoelectrical switch M18, 20m sensing distance, IP67 FAIZ/BP-0A or equivalent	ea	
9.3	Ultrasonic sensors		
9.3.1	Mobrey DMSP902SH-A /10, Range: 0.35 to 10m, Output: 4 - 20mA HART, Cable length: 10m	ea	
9.3.2	Ultrasonic level control relay sensor with standard 20 meter lead. Mobrey DMSP902SH or equivalent	ea	
9.3.3	Ultrasonic level control sensor transducer with 10 meter lead E&H FDU90 or equivalent	ea	
9.3.4	Ultrasonic level control sensor transducer with 10 meter lead E&H FDU90 or equivalent	ea	
9.3.5	Ultrasonic level control sensor transducer with 10 meter lead E&H FDU91 or equivalent	ea	
9.3.6	0.3 to 10m, Beam angle: 12°, Cable length: 10m XPS-10, Range or equivalent	ea	
9.3.7	Range: 0.3 to 10m, IP68, Cable length 5m FDU91-RG1AA or equivalent	ea	
9.3.8	Range: 0.3 to 10m, IP68, Cable length 15m FDU91-RG3AA or equivalent	ea	
9.3.9	Range: 0.4 to 20m, IP68, Cable length 5m FDU92-RG1AA or equivalent	ea	
9.3.10	Range: 0.4 to 20m, IP68, Cable length 15m FDU92-RG3AA or equivalent	ea	

9.4	Oxygen sensors		
9.4.1	Oxygen sensor Accuracy: ± 0.05 ppm Below 5 ppm, Range: 0 - 20.00 ppm, Output, Modbus, Cable length: 10 m LDO 9020000 or equivalent	ea	
9.4.2	Oxygen sensor Accuracy: ± 0.05 ppm Below 5 ppm, Range: 0 - 20.00 ppm LDO 9021100 or equivalent	ea	
9.4.3	Oxygen sensor Accuracy: ± 0.1 mg/L for 0 to 8 mg/L, Range: 0.1 to 20.0 mg/L (ppm) LDO 5811200 or equivalent	ea	
9.5	Transmitters	Unit	Rate/Price ZAR (excl.Vat) R c
9.5.1	Mobrey DMCU901 WX-A 24, wall mount, Input 4–20 mA, Output 4–20 mA, 4 relays, 24Vdc Supply	ea	
9.5.2	Mobrey DMCU901 WX-A, Wall mount, Input 4–20 mA, Output 4–20 mA, 4 relays, 220Vac Supply	ea	
9.5.3	Ultrasonic level controller, Wall mount, 110 - 240 Volt, AC, 50 Hz, with 4 digital relay output, IP 65 enclosed unit. Equivalent to a Emerson Mowbray DMCU901WX-A	ea	
9.5.4	Ultrasonic level relay, 110 - 240 Volt, SC, 50 Hz, with 5 digital relay output. E&H FMU90 or equivalent	ea	
9.5.5	Transmitter Wall mount, Input 4–20 mA, Output 4–20 mA, 6 relays, 230Vac 7ML5034-4AA01 or equivalent	ea	
9.5.6	Transmitter Wall mount, Input 4–20 mA, Output 4–20 mA, 6 relays, 12 to 30Vdc 7ML5034-4BA01 or equivalent	ea	
9.5.7	Transmitter Field mounting IP66, 1 sensor, Output: 2x0/4-20mA, 6 relays, 230Vac R21CA162AA1A or equivalent	ea	
9.5.8	Transmitter Field mounting IP66, 1 sensor, Output: 2x0/4-20mA, 6 relays, 12 to 30Vdc R21CB162AA1A or equivalent	ea	
9.5.9	Transmitter DIN rail mount IP20, 1 sensor, Output: 2x0/4-20mA, 6 relays, 230Vac R22CA162AA1A or equivalent	ea	
9.5.10	Transmitter DIN rail mount IP20, 1 sensor, Output: 2x0/4-20mA, 6 relays, 12 to 30Vdc R22CB162AA1A or equivalent	ea	
9.5.11	Transmitter Field mounting IP66, 2 sensor, Output: 2x0/4-20mA, 6 relays, 230Vac R21CA262AA1A or equivalent	ea	
9.5.12	Transmitter Field mounting IP66, 2 sensor, Output: 2x0/4-20mA, 6 relays, 12 to 30Vdc R21CB262AA1A or equivalent	ea	
9.5.13	Transmitter DIN rail mount IP20, 2 sensor, Output: 2x0/4-20mA, 6 relays, 230Vac R22CA262AA1A or equivalent	ea	
9.5.14	Transmitter DIN rail mount IP20, 2 sensor, Output: 2x0/4-20mA, 6 relays, 12 to 30Vdc R22CB262AA1A or equivalent	ea	
9.5.15	Transmitter remote mount, flow velocity, 0.1 - 10m/s, Output 4 -20mA + 24V pulsed, 230Vac DCMPU or equivalent	ea	
9.5.16	Transmitter remote mount, 1 x digital input, Output: 2 x 4 -20mA, IP66, 100 - 240 V AC SC200 LXV 404.99.00552 or equivalent	ea	
9.5.17	Transmitter remote mount, 1 x digital input, Output: 2 x 4 -20mA 2 x relay, IP66, 100 - 240 Vac CM442-AAM1A2F210A or equivalent,	ea	
9.5.18	Transmitter Panel mount, Input: 0/4 - 20mA, Output: 0/4 - 20mA 2 relay outputs, 230 Vac IQ4-PC-R2-PS-RT or equivalent	ea	
9.5.19	Transmitter Panel mount, Input: Universal, Output: 0/4 - 20mA 2 relay outputs, 24 to 230 Vac/dc RIA45-A1C1 or equivalent	ea	
9.5.20	Transmitter Panel mount, Input: Universal, Output: 0/4 - 20mA, 4 relay outputs, 24 to 230 Vac/dc RIA 452-A122A11A or equivalent	ea	
9.5.21	Transmitter LCD replacement for SC200 LXV 404.99.00552 9200700 or equivalent	ea	

9.5	Transmitters	Unit	Rate/Price ZAR (excl.Vat) R c
9.5.22	Transmitter Wall mount IP66/IP67, Input 2 x 4 -20mA + 4 x digital in, Output 3 x 4-20mA + 6 x relay out, Bluetooth 5.0, 230Vac VEGAMET 862 or equivalent	ea	
9.5.23	KIT,LCD Display P#92000700	ea	
9.5.24	T-Mass displays-Kit Display Mod 50/51/80/65>=V1.06.00 50108132	ea	
9.5.25	Inquiline CM 442 CM442-2E91/0 (CM442-AAM1A2F210A)	ea	
9.5.26	Delta Temp Controller DTB4848 PID/On-Off ,output Relay, Analog (mA/mV)	ea	
9.5.27	Profibus DP Module for sc200 Controller Model: 9173900	ea	
9.5.28	TSS hand held meter Model: LXV320.99.00002	ea	
9.5.29	ABB Transmitter Display 2600T	ea	
9.5.30	TSE controller complete seepex 14..32VDC		
9.6	Flow switch	Unit	Rate/Price ZAR (excl.Vat) R c
9.6.1	Flow switch Thermal flow, Output PNP, IP67, M12 connector VES08 or equivalent	ea	
9.6.2	Flow switch Range: 0.03 - 3m/s, Output PNP, 4-20mA, M12 connector DTT31-A1C111AE2CAB or equivalent	ea	
9.6.3	Flow switch Switching contact, IP65 Plug connector VHS05M01171R21 or equivalent	ea	
9.6.4	FSD-4 P#38399494 one switching output (PNP/NPN) + 4...20 mA/0...10 V G1/2 A ISO1179-2	ea	
9.6.5	LMC100 LMFCE-B12E-QSKG-0/US Number of digital outputs: 2 G 1/2 external thread 18...30 DC	ea	
9.7	Limit switch	Unit	Rate/Price ZAR (excl.Vat) R c
9.7.1	Limit switch thermoplastic roller lever, 1m cable terminal XCMD2115L1 or equivalent	ea	
9.7.2	Limit switch Wobble, 40mm pitch, M20 cable entry WL5106 or equivalent	ea	
9.7.3	Limit switch push button, 40mm pitch, M20 cable entry WL5101 or equivalent	ea	
9.7.4	Limit switch 180 tilt, 40mm pitch, M20 cable entry WL5108-2 or equivalent	ea	
9.7.5	Limit switch 180 tilt, 28mm pitch, rubber grommet AH8108 or equivalent	ea	
9.7.6	Limit switch roller lever, 28mm pitch, rubber grommet AH8104 or equivalent	ea	
9.8	Pressure switch	Unit	Rate/Price ZAR (excl.Vat) R c
9.8.1	Pressure switch PTP33B-AA4M1PGBWQJ, Switching range: range: 10Bar, Output PNP, IP67, M12 connector or equivalent	ea	
9.8.2	Pressure switch DCMV10, Switching range: 1...10 bar, Floating changeover contact, Plug connection or equivalent	ea	
9.8.3	Pressure switch DCMV16, Switching range: 3...16 bar, Floating changeover contact, Plug connection or equivalent	ea	
9.8.4	Pressure switch 120104-06-017, M12 4-pin, length: 2m or equivalent	ea	
9.8.5	Pressure switch, 0.2-16 BAR rated pressure, 220 Volt, 50-60 Hz. Equivalent to a Burkett pressure switch, ID # 0641072, Model 280-A-13.0.0-B-MS or equivalent	ea	
9.8.6	Water pressure switch, 0 - 10 BAR rated pressure, 10(5)A/250 VAC. Equivalent to a DCM10	ea	

9.9	Pressure transmitter	Unit	Rate/Price
			ZAR (excl.Vat) R c
9.9.1	Pressure Transmitter S-20-6-BG-440-HSC-3K-A-DLZUM2-ZWZ, 0... 40 bar, Output 4–20 mA or equivalent	ea	
9.9.2	Pressure Transmitter WL52.XXX4ATV1DD1X, Range: 0... + 1,0 Bar, Output 4–20 mA Hart, IP68, Cable length 15m or equivalent	ea	
9.9.3	Pressure Transmitter B82.AXDASAGESHXXKIMAX, Range: 0... + 2.5 Bar, Output 4–20 mA Hart, IP67 or equivalent	ea	
9.9.4	Pressure Transmitter B83.AXDASGCSHXXKIMAX, Range: 0... + 0.4 Bar, Output 4–20 mA Hart, IP67 or equivalent	ea	
9.9.5	Pressure Transmitter PMC51-AA21RS1HGCCNJJ , Range: 0... + 1,0 Bar, Output 4–20 mA Hart, IP68 or equivalent	ea	
9.9.6	A-10 P#12783359 output 4 ... 20 mA, DC 0 ... 10 V, DC 0 ... 5 V G ¼ A DIN EN ISO 1179-2, ¼ NPT	ea	
9.9.7	A-10 P#12783359 output 4 ... 20 mA, DC 0 ... 10 V, DC 0 ... 5 V G ¼ A DIN EN ISO 1179-2, ¼ NPT		
9.9.8	S-11 P# 9021272 4 ... 20 mA, 2-wire 10 (14) ... 30 DC G 1 B flush diaphragm with O-ring	ea	
9.9.9	Vegabar 82 B82.AXDASAGESHXXKIMAX eID: ZC124262227	ea	
9.10	Temperature	Unit	Rate/Price
			ZAR (excl.Vat) R c
9.10.1	Temperature sensor 5050717, NM015 Type: PT100 or equivalent	ea	
9.10.2	Temperature controller, 240V, 50Hz, relay output, universal sensor input. (DELTA DTA4848-RO) or equivalent	ea	
9.10.3	Temperature probe, PT100, 5 x 50mm, 3 meter cable. (PT 100 SJ301/P505P/30) or equivalent	ea	
9.10.4	Thermostat, heating/cooling, IP20 contacts, din rail mountable, 15A switch capacity. (Fandis TRT-10A230V-NO/NC) or equivalent	ea	
9.11	Pneumatics	Unit	Rate/Price
			ZAR (excl.Vat) R c
9.11.1	Pneumatic component 7021020100, Mounting Style: NAMUR, Function: Pneumatic component 5/2, Solenoid Voltage: 230 VAC or equivalent	ea	
9.11.2	Pneumatic component W0215000131, Size: 22mm , IP rating: IP65, 220VAC or equivalent	ea	
9.11.3	Pneumatic component W0970510017, 220V Din Plug or equivalent	ea	
9.11.4	Pneumatic component QS-8 153033, Tubing OD: 8mm, length: 37.8mm or equivalent	ea	
9.11.5	Pneumatic component QSS-8-F 130642, Tubing OD: 8mm, length: 38.4mm or equivalent	ea	
9.11.6	Pneumatic component QSC-8H 153269, D1: 8mm, length: 37mm or equivalent	ea	
9.11.7	Pneumatic component QSL-G¼-8 186120, Tubing OD: 8mm or equivalent	ea	
9.11.8	Pneumatic component QS-¼-8 153005, Tubing OD: 8mm	ea	
9.11.9	Pneumatic component QS-10 153034, Tubing OD:10mm	ea	
9.11.10	Pneumatic component Air Hose Blue Polyurethane 8mm x 50m Festo PUN-8X1,25-BL or similar	ea	
9.11.11	Pneumatic Bulkhead Tube-to-Tube Adapter Straight Push In 8 mm to Push In 8 mm	ea	
9.11.12	5/2 Pneumatic Control Valve - Solenoid/Pilot G 1/8 ASCO 52000001 or similar	ea	
9.11.13	G 1/8 Sub Base Manifold, ASCO 35500337 or similar	ea	
9.11.14	Manifold Blanking plate ASCO 88135527 or similar approved	ea	
9.11.15	Filter Regulator Lubricator, Automatic Drain, SMC AC30-F03D-B or similar	ea	
9.11.16	Nickel Plated Brass G 1/4 Male Blanking Plug	ea	

9.11	Pneumatics	Unit	Rate/Price ZAR (excl.Vat) R c
9.11.17	Pneumatic Straight Threaded-to-Tube Adapter, G 1/4 Male, Push In 10 mm	ea	
9.11.18	Pneumatic Bulkhead Tube-to-Tube Adapter Straight Push In 10 mm to Push In 10 mm	ea	
9.11.19	Pneumatic Tee Tube-to-Tube Adapter, Push In 10 mm x Push In 10 mm x Push In 10 mm	ea	
9.11.20	AT251 double acting pneumatic actuator	ea	
9.11.21	5/2Way Neuma standalone solenoid valve, 24V DC G1/4	ea	
9.11.22	A-NVA-NMR1 5/2 or 3/2 bolt on 24 VDC, 24 Vac,230 Vac G1/4	ea	
9.11.23	Hafner MH 311701 3/2 n/c G1/4 inch 24V dc	ea	
9.11.24	EAD drain timer 2/2 way, direct acting 1/4", 3/8", 1/2" (BSP or NPT) 24 - 230 VAC/DC 50/60Hz.(Jorc) complete	ea	
9.11.25	2 Way Solenoid Valve: ASCO SCG238A044, pipe size: 3/8G, Supply voltage 24Vdc, 0 - 10 bar	ea	
9.11.26	2 Way Solenoid Valve: ASCO SCG238A047, pipe size: 1/2G, Supply voltage 24Vdc, 0 - 10 bar	ea	
9.11.27	2 Way Solenoid Valve: ASCO SCG238A048, pipe size: 3/4G, Supply voltage 24Vdc, 0 - 10 bar	ea	
9.11.28	2 Way Solenoid Valve: ASCO SCG238A050, pipe size: 1G, Supply voltage 24Vdc, 0 - 10 bar	ea	
9.11.29	3 Way Solenoid Valve (Normally closed): ASCO SC B320A182, pipe size: 1/4 NPT, 24Vdc, 0 - 55 bar	ea	
9.11.30	Replacement coil C132487 for SCG238A044 - 24Vdc	ea	
9.11.31	Replacement coil C132489 for SCG238A047/048 - 24Vdc	ea	
9.11.32	Replacement coil C132491 for SCG238A050 24Vdc	ea	
9.11.33	0331 D 2,0 nbr ms FLNSCH PN0-16bar 24v 50hz 8w 00041235	ea	
9.12	Signal conditioning	Unit	Rate/Price ZAR (excl.Vat) R c
9.12.1	Signalling component 3108, Input: 1 x 0 ... 23mA, Output: 2 x 0 ... 23mA isolated or equivalent	ea	
9.13	Power Supply	Unit	Rate/Price ZAR (excl.Vat) R c
9.13.1	Power Supply DRL-24V75W1AZ, Input: 85 - 264 VAC, Output: 24 VDC (adj), Rated load: 3.2A or equivalent	ea	
9.13.2	SITOP PSU100S 6EP1333-2BA20 (24 V/5 A)	ea	
9.13.3	SITOP PSU100S 6EP1334-2BA20 (24 V/10 A)	ea	
9.13.4	Power Supply DIN rail mount 120 Watt, 85 - 264 VAC 24 VDC (adj) aluminium, high performance industrial	ea	
9.13.5	Power Supply Din rail mount 240 Watt, 85 - 264 VAC 24 VDC (adj) aluminium, high performance industrial	ea	
9.13.6	Power Supply Din rail mount 480 Watt, 85 - 264 VAC 24 VDC (adj) aluminium, high performance industrial	ea	
9.13.7	Power Supply Din rail mount 100 Watt 85 - 264 VAC 12 VDC (adj) aluminium, high performance industrial	ea	
9.13.8	Power Supply Din rail mount 100 Watt Three phase 320 - 575 VAC 24 VDC (adj aluminium, high performance industrial	ea	
9.13.9	Power Supply Din rail mount 240 Watt Three phase 320 - 575 VAC 24 VDC (adj aluminium, high performance industrial	ea	
9.13.10	Power Supply Din rail mount 480 Watt Three phase 320 - 575 VAC 24 VDC (adj aluminium, high performance industrial	ea	
9.13.11	Power Supply Din rail mount 960 Watt Three phase 320 - 575 VAC 24 VDC (adj aluminium, high performance industrial	ea	

9.13.12	Power Supply wire would transformer 2 kVa 400 Volt input, 230 Volt Output	ea	
9.13.13	Power Supply wire would transformer 6 kVa 400 Volt input, 230 Volt Output	ea	
9.13.14	Power Supply wire would transformer 9 kVa 400 Volt input, 230 Volt Output	ea	
9.13.15	Power Supply wire would transformer 15 kVa 400 Volt input, 230 Volt Output	ea	
9.14	Surge Protection	Unit	Rate/Price ZAR (excl.Vat) R c
9.14.1	Surge Protector LP2-65, 2 pole 230V, 40kA max or equivalent	ea	
9.14.2	Surge Protector I _{max} 40 kA L-N In 20 kA, Max Volts L-N 275 V, Voltage protection Up ≤ 1.5kV ph 1	ea	
9.14.3	Surge Protector I _{max} 40 kA L-N In 20 kA, Max Volts L-N 275 V, Voltage protection Up ≤ 1.5kV, L-N (limp) 1ph+N	ea	
9.14.4	Surge Protector I _{max} 40 kA L-N In 20 kA, Max Volts L-N 275 V, Voltage protection Up ≤ 1.5kV, L-N (limp), 3ph+N	ea	
9.15	Radar Sensor	Unit	Rate/Price ZAR (excl.Vat) R c
9.15.1	Radar sensor: VEGAPULS C11 or equivalent, Range: 8m, IP68, Output: 4 - 20mA, Process fitting: G1 1/2, Mounting fitting: G1, Bluetooth 5.0, 12...35Vdc	ea	
9.16	Vibration Sensor	Unit	Rate/Price ZAR (excl.Vat) R c
9.16.1	Vibration transducer type, P2 NN, 24V DC power supply. Equivalent to a IQ4	ea	
9.17	Allow for the provisional sum for the selection, supply, delivery to site and installation for Process Control and Instrumentation parts, maintenance parts and components or optional extras not listed in the schedule. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment) clause 4.16	Provisional Sum	R300 000.00 Incl VAT
	Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

10.	Wire and Cable	Unit	Rate/Price ZAR (excl.Vat) R c
10.1	Silicone insulated single core copper flexible multi stranded panel wire (Black, Blue, Brown, Green, Grey, Orange Red, White)		
10.1.1	0.5 mm ² single core silicon insulated single core flex Cu	m	
10.1.2	0.75 mm ² single core silicon insulated single core flex Cu	m	
10.1.3	1 mm ² single core silicon insulated single core flex Cu	m	
10.1.4	1.5 mm ² single core silicon insulated single core flex Cu	m	
10.1.5	2.5 mm ² single core silicon insulated single core flex Cu	m	
10.1.6	4 mm ² single core silicon insulated single core flex Cu	m	
10.1.7	6 mm ² single core silicon insulated single core flex Cu	m	
10.1.8	10 mm ² single core silicon insulated single core flex Cu	m	
10.1.9	16 mm ² single core silicon insulated single core flex Cu	m	
10.1.10	25 mm ² single core silicon insulated single core flex Cu	m	
10.1.11	35 mm ² single core silicon insulated single core flex Cu	m	
10.1.12	50 mm ² single core silicon insulated single core flex Cu	m	
10.1.13	70 mm ² single core silicon insulated single core flex Cu	m	
10.2	House Wire multi stranded copper (Black, Blue, Brown, Green, Grey, Orange Red, White) PVC insulated	Unit	Rate/Price ZAR (excl.Vat) R c
10.2.1	1 mm ² house wire multi stranded Cu	m	
10.2.2	1.5 mm ² house wire multi stranded Cu	m	
10.2.3	2.5 mm ² house wire multi stranded Cu	m	
10.2.4	4 mm ² house wire multi stranded Cu	m	
10.2.5	6 mm ² house wire multi stranded Cu	m	
10.2.6	10 mm ² house wire multi stranded Cu	m	
10.2.7	16 mm ² house wire multi stranded Cu	m	
10.2.8	25 mm ² house wire multi stranded Cu	m	
10.2.9	35 mm ² house wire multi stranded Cu	m	
10.2.10	50 mm ² house wire multi stranded Cu	m	
10.2.11	70 mm ² house wire multi stranded Cu	m	
10.2.12	95 mm ² house wire multi stranded Cu	m	
10.3	Surfix (Black/White)	Unit	Rate/Price ZAR (excl.Vat) R c
10.3.1	2 Core plus earth Surfix (Black/White)		
10.3.1.1	1.5 mm ² 2 x core twin + earth	m	
10.3.1.2	2.5 mm ² 2 x core twin + earth	m	
10.3.1.3	4 mm ² 2 x core twin + earth	m	
10.3.1.4	6 mm ² 2 x core twin + earth	m	

			Rate/Price ZAR (excl.Vat) R c
10.3.2	3 Core plus earth Surfex (Black/White)	Unit	
10.3.2.1	1.5mm ² 3 x core twin + earth	m	
10.3.2.2	2.5mm ² 3 x core twin + earth	m	
10.3.2.3	4mm ² 3 x core twin + earth	m	
10.3.2.4	6mm ² 3 x core twin + earth	m	
10.3.3	4 Core plus earth Surfex (Black/White)	Unit	Rate/Price ZAR (excl.Vat) R c
10.3.3.1	1.5mm ² 4 x core twin + earth	m	
10.3.3.2	2.5mm ² 4 x core twin + earth	m	
10.3.3.3	4mm ² 4 x core twin + earth	m	
10.3.3.4	6mm ² 4 x core twin + earth	m	
10.4.1	Flat Twin and Earth	Unit	Rate/Price ZAR (excl.Vat) R c
	2 Core plus earth Flat Twin and Earth		
10.4.1.1	1.5mm ² 2 x core twin + earth	m	
10.4.1.2	2.5mm ² 2 x core twin + earth	m	
10.4.1.3	4mm ² 2 x core twin + earth	m	
10.4.1.4	6mm ² 2 x core twin + earth	m	
10.4.1.5	10mm ² 2 x core twin + earth	m	
10.5	Cabtyre Cable (Black/Grey/White)	Unit	Rate/Price ZAR (excl.Vat) R c
10.5.1	0.5mm ² 5 x core cabtyre	m	
10.5.2	0.75mm ² 3 x core cabtyre	m	
10.5.3	0.75mm ² 7 x core cabtyre	m	
10.5.4	1mm ² 7 x core cabtyre	m	
10.5.5	1.5mm ² 7 x core cabtyre	m	
10.5.6	2.5mm ² 7 x core cabtyre	m	
10.5.7	4mm ² 7 x core cabtyre	m	

10.6	PVC Single core flexible multi stranded copper wire/cable (Black, Blue, Brown, Green, Grey, Orange Red, White)	Unit	Rate/Price ZAR (excl.Vat) R c
10.6.1	0.5mm ² single core PVC single core multi stranded Cu	m	
10.6.2	0.75mm ² single core PVC single core multi stranded Cu	m	
10.6.3	1mm ² single core- PVC single core multi stranded Cu	m	
10.6.4	1.5mm ² single core PVC single core multi stranded Cu	m	
10.6.5	2.5mm ² single core PVC single core multi stranded Cu	m	
10.6.6	4mm ² single core PVC single core multi stranded Cu	m	
10.6.7	6mm ² single core PVC single core multi stranded Cu	m	
10.6.8	10mm ² single core PVC single core multi stranded Cu	m	
10.6.9	25mm ² single core PVC single core multi stranded Cu	m	
10.6.10	35mm ² single core PVC single core multi stranded Cu	m	
10.7	Power Panel Flex Copper Cable	Unit	Rate/Price ZAR (excl.Vat) R c
10.7.1	16mm ² single core power panel flex Cu	m	
10.7.2	25mm ² single core power panel flex Cu	m	
10.7.3	35mm ² single core power panel flex Cu	m	
10.7.4	50mm ² single core power panel flex Cu	m	
10.7.5	70mm ² single core power panel flex Cu	m	
10.7.6	95mm ² single core power panel flex Cu	m	
10.7.7	120mm ² single core power panel flex Cu	m	
10.7.8	150mm ² single core power panel flex Cu	m	
10.7.9	185mm ² single core power panel flex Cu	m	
10.8	SILICONE CABTYRE CABLE	Unit	Rate/Price ZAR (excl.Vat) R c
10.8.1	3 Core SILICONE CABTYRE CABLE		
10.8.1.1	0.75mm ² 3 x Core Silcon cabtyre	m	
10.8.1.2	1mm ² 3 x Core Silcon cabtyre	m	
10.8.1.3	1.5mm ² 3 x Core Silcon cabtyre	m	
10.8.1.4	2.5mm ² 3 x Core Silcon cabtyre	m	
10.8.1.5	4mm ² 3 x Core Silcon cabtyre	m	
10.8.2	4 Core SILICONE CABTYRE CABLE		
10.8.2.1	0.75mm ² 4 x Core Silcon cabtyre	m	
10.8.2.2	1mm ² 4 x Core Silcon cabtyre	m	
10.8.2.3	1.5mm ² 4 x Core Silcon cabtyre	m	
10.8.2.4	2.5mm ² 4 x Core Silcon cabtyre	m	
10.8.2.5	4mm ² 4 x Core Silcon cabtyre	m	

			Rate/Price ZAR (excl.Vat)
10.9	SUBMERSIBLE PUMP CABLE	Unit	R c
10.9.1	3 Core SUBMERSIBLE PUMP CABLE		
10.9.1.1	1.5mm ² 3 x core SUBMERSIBLE PUMP CABLE	m	
10.9.1.2	2.5mm ² 3 x core SUBMERSIBLE PUMP CABLE	m	
10.9.1.3	4mm ² 3 x core SUBMERSIBLE PUMP CABLE	m	
10.9.1.4	6mm ² 3 x core SUBMERSIBLE PUMP CABLE	m	
10.9.1.5	10mm ² 3 x core SUBMERSIBLE PUMP CABLE	m	
10.9.1.6	16mm ² 3 x core SUBMERSIBLE PUMP CABLE	m	
10.9.2	4 Core SUBMERSIBLE PUMP CABLE	Unit	Rate/Price ZAR (excl.Vat) R c
10.9.2.1	1.5mm ² 4 x core SUBMERSIBLE PUMP CABLE	m	
10.9.2.2	2.5mm ² 4 x core SUBMERSIBLE PUMP CABLE	m	
10.9.2.3	4mm ² 4 x core SUBMERSIBLE PUMP CABLE	m	
10.9.2.4	6mm ² 4 x core SUBMERSIBLE PUMP CABLE	m	
10.9.2.5	10mm ² 4 x core SUBMERSIBLE PUMP CABLE	m	
10.9.2.6	16mm ² 4 x core SUBMERSIBLE PUMP CABLE	m	
10.10	NITRILE TRAILING CABLE 4 Core	Unit	Rate/Price ZAR (excl.Vat) R c
10.10.1	1.5mm ² 4 x core NITRILE TRAILING CABLE 4 Core	m	
10.10.2	2.5mm ² 4 x core NITRILE TRAILING CABLE 4 Core	m	
10.10.3	4mm ² 4 x core NITRILE TRAILING CABLE 4 Core	m	
10.10.4	6mm ² 4 x core NITRILE TRAILING CABLE 4 Core	m	
10.10.5	10mm ² 4 x core NITRILE TRAILING CABLE 4 Core	m	
10.10.6	16mm ² 4 x core NITRILE TRAILING CABLE 4 Core	m	
10.10.7	25mm ² 4 x core NITRILE TRAILING CABLE 4 Core	m	
10.11	HO7RN-F FLEXIBLE GENERAL PURPOSE TRAILING CABLE		
10.11.1	Single Core HO7RN-F	Unit	Rate/Price ZAR (excl.Vat) R c
10.11.1.1	1.5mm ² Single Core HO7RN-F	m	
10.11.1.2	2.5mm ² Single Core HO7RN-F	m	
10.11.1.3	4mm ² Single Core HO7RN-F	m	
10.11.1.4	6mm ² Single Core HO7RN-F	m	
10.11.1.5	10mm ² Single Core HO7RN-F	m	
10.11.1.6	16mm ² Single Core HO7RN-F	m	
10.11.1.7	25mm ² Single Core HO7RN-F	m	
10.11.1.8	35mm ² Single Core HO7RN-F	m	
10.11.1.9	50mm ² Single Core HO7RN-F	m	
10.11.1.10	70mm ² Single Core HO7RN-F	m	
10.11.1.11	95mm ² Single Core HO7RN-F	m	
10.11.1.12	120mm ² Single Core HO7RN-F	m	
10.11.2.13	150mm ² Single Core HO7RN-F	m	
10.11.1.14	185mm ² Single Core HO7RN-F	m	

			Rate/Price ZAR (excl.Vat)
10.11.2	Multicore HO7RN-F	Unit	R c
10.11.2.1	1.5mm ² 7 x core Multicore HO7RN-F	m	
10.11.2.2	2.5mm ² 7 x core Multicore HO7RN-F	m	
10.11.2.3	4mm ² 7 x core Multicore HO7RN-F	m	
10.11.2.4	16mm ² 5 x core Multicore HO7RN-F	m	
10.11.2.5	25mm ² 5 x core Multicore HO7RN-F	m	
10.11.2.6	35mm ² 4 x core Multicore HO7RN-F	m	
10.11.2.7	50mm ² 4 x core Multicore HO7RN-F	m	
10.11.2.8	70mm ² 4 x core Multicore HO7RN-F	m	
10.12	BARE COPPER	Unit	Rate/Price ZAR (excl.Vat)
10.12.1	1.5mm ² single core bare copper wire	m	R c
10.12.2	2.5mm ² single core bare copper wire	m	
10.12.3	4mm ² single core bare copper wire	m	
10.12.4	6mm ² single core bare copper wire	m	
10.12.5	10mm ² single core bare copper wire	m	
10.12.6	16mm ² single core bare copper wire	m	
10.12.7	25mm ² single core bare copper wire	m	
10.12.8	35mm ² single core bare copper wire	m	
10.12.9	50mm ² single core bare copper wire	m	
10.12.10	70mm ² single core bare copper wire	m	
10.12.11	95mm ² single core bare copper wire	m	
10.12.12	120mm ² single core bare copper wire	m	
10.12.13	150mm ² single core bare copper wire	m	
10.12.14	185mm ² single core bare copper wire	m	
10.13	SINGLE CORE XLPE PVC CABLE	Unit	Rate/Price ZAR (excl.Vat)
10.13.1	25mm ² single core XLPE PVC CABLE	m	R c
10.13.2	35mm ² single core XLPE PVC CABLE	m	
10.13.3	50mm ² single core XLPE PVC CABLE	m	
10.13.4	70mm ² single core XLPE PVC CABLE	m	
10.13.5	95mm ² single core XLPE PVC CABLE	m	
10.13.6	120mm ² single core XLPE PVC CABLE	m	
10.13.7	150mm ² single core XLPE PVC CABLE	m	
10.13.8	185mm ² single core XLPE PVC CABLE	m	
10.13.9	240mm ² single core XLPE PVC CABLE	m	
10.13.10	300 mm ² single core XLPE PVC CABLE	m	
10.13.11	500 mm ² single core XLPE PVC CABLE	m	
10.13.12	630 mm ² single core XLPE PVC CABLE	m	

10.14	Low-Voltage Armoured Cable (SWA 3 Core) 600/1000V	Unit	Rate/Price ZAR (excl.Vat) R c
10.14.1	1.5mm ² 3 x core SWA	m	
10.14.2	2.5mm ² 3 x core SWA	m	
10.14.3	4mm ² 3 x core SWA	m	
10.14.4	6mm ² 3 x core SWA	m	
10.14.5	10mm ² 3 x core SWA	m	
10.14.6	16mm ² 3 x core SWA	m	
10.14.7	25mm ² 3 x core SWA	m	
10.14.8	35mm ² 3 x core SWA	m	
10.14.9	50mm ² 3 x core SWA	m	
10.14.10	70mm ² 3 x core SWA	m	
10.14.11	95mm ² 3 x core SWA	m	
10.14.12	120mm ² 3 x core SWA	m	
10.14.13	150mm ² 3 x core SWA	m	
10.14.14	185mm ² 3 x core SWA	m	
10.14.15	240mm ² 3 x core SWA	m	
10.14.16	300mm ² 3 x core SWA	m	
10.15	Low-Voltage Armoured Cable (SWA 4 Core) 600/1000V	Unit	Rate/Price ZAR (excl.Vat) R c
10.15.1	1.5mm ² 4 x core SWA	m	
10.15.2	2.5mm ² 4 x core SWA	m	
10.15.3	4mm ² 4 x core SWA	m	
10.15.4	6mm ² 4 x core SWA	m	
10.15.5	10mm ² 4 x core SWA	m	
10.15.6	16mm ² 4 x core SWA	m	
10.15.7	25mm ² 4 x core SWA	m	
10.15.8	35mm ² 4 x core SWA	m	
10.15.9	50mm ² 4 x core SWA	m	
10.15.10	70mm ² 4 x core SWA	m	
10.15.11	95mm ² 4 x core SWA	m	
10.15.12	120mm ² 4 x core SWA	m	
10.15.13	150mm ² 4 x core SWA	m	
10.15.14	185mm ² 4 x core SWA	m	
10.15.15	240mm ² 3 x core SWA	m	
10.15.16	300mm ² 3 x core SWA	m	

10.16	Medium Voltage Cable 3.3kV– Copper PILC (Steel Tape Armoured 3 Core)	Unit	Rate/Price ZAR (excl.Vat) R c
10.16.1	25mm ² 3 x core Cu MV Cu PILC 3.3kV	m	
10.16.2	35mm ² 3 x core Cu PILC 3.3kV	m	
10.16.3	50mm ² 3 x core Cu PILC 3.3kV	m	
10.16.4	70mm ² 3 x core Cu PILC 3.3kV	m	
10.16.5	95mm ² 3 x core Cu Cu PILC 3.3kV	m	
10.16.6	120mm ² 3 x core Cu PILC 3.3kV	m	
10.16.7	150mm ² 3 x core Cu PILC 3.3kV	m	
10.16.8	185mm ² 3 x core Cu PILC 3.3kV	m	
10.16.9	240mm ² 3 x core Cu PILC 3.3kV	m	
10.16.10	300mm ² 3 x core Cu PILC 3.3kV	m	

10.17	Medium Voltage Cable – Aluminium PILC Steel Tape Armoured 3 Core	Unit	Rate/Price ZAR (excl.Vat) R c
10.17.1	25mm² 3 x core Aluminium PILC Steel Tape Armoured	m	
10.17.2	35mm² 3 x core Aluminium PILC Steel Tape Armoured	m	
10.17.3	50mm² 3 x core Aluminium PILC Steel Tape Armoured	m	
10.17.4	70mm² 3 x core Aluminium PILC Steel Tape Armoured	m	
10.17.5	95mm² 3 x core Aluminium PILC Steel Tape Armoured	m	
10.17.6	120mm² 3 x core Aluminium PILC Steel Tape Armoured	m	
10.17.7	150mm² 3 x core Aluminium PILC Steel Tape Armoured	m	
10.17.8	185mm² 3 x core Aluminium PILC Steel Tape Armoured	m	
10.17.9	240mm² 3 x core Aluminium PILC Steel Tape Armoured	m	
10.17.10	300mm² 3 x core Aluminium PILC Steel Tape Armoured	m	
10.18	Medium Voltage Cable – Copper XLPE PVC SWA 3 Core	Unit	Rate/Price ZAR (excl.Vat) R c
10.18.1	25mm² 3 x core Cu XLPE PVC SWA	m	
10.18.2	35mm² 3 x core Cu XLPE PVC SWA	m	
10.18.3	50mm² 3 x core Cu XLPE PVC SWA	m	
10.18.4	70mm² 3 x core Cu XLPE PVC SWA	m	
10.18.5	95mm² 3 x core Cu XLPE PVC SWA	m	
10.18.6	120mm² 3 x core Cu XLPE PVC SWA	m	
10.18.7	150mm² 3 x core Cu XLPE PVC SWA	m	
10.18.8	185mm² 3 x core Cu XLPE PVC SWA	m	
10.18.9	240mm² 3 x core Cu XLPE PVC SWA	m	
10.18.10	300mm² 3 x core Cu XLPE PVC SWA	m	
10.19	Medium Voltage Cable – Aluminium XLPE PVC SWA 3 Core	Unit	Rate/Price ZAR (excl.Vat) R c
10.19.1	50mm² 3 x core Aluminium XLPE PVC SWA	m	
10.19.2	70mm² 3 x core Aluminium XLPE PVC SWA	m	
10.19.3	95mm² 3 x core Aluminium XLPE PVC SWA	m	
10.19.4	120mm² 3 x core Aluminium XLPE PVC SWA	m	
10.19.5	150mm² 3 x core Aluminium XLPE PVC SWA	m	
10.19.6	185mm² 3 x core Aluminium XLPE PVC SWA	m	
10.19.7	240mm² 3 x core C Aluminium XLPE PVC SWA	m	
10.19.8	300mm² 3 x core Aluminium XLPE PVC SWA	m	
10.19.9	Allow for the provisional sum for the selection, supply, delivery to site and installation for any cable and wire listed in Schedule 10. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment) clause 4.16	Provisional Sum	R300 000.00 Incl VAT
	Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

11.	Cable support and conduit systems (material and parts only all inclusive)	Unit	Rate/Price ZAR (excl.Vat) R c
11.1	Power skirting (units each and per full length)		
11.1.1	Power skirting single duct plus cover execu duct PVC (white and grey)	ea	
11.1.2	Power skirting double duct plus cover duct execu duct PVC (white and grey)	ea	
11.1.3	Power skirting single internal 90 elbow (white and grey)	ea	
11.1.4	Power skirting double internal 90 elbow (white and grey)	ea	
11.1.5	Power skirting single external 90 elbow (white and grey)	ea	
11.1.6	Power skirting double external 90 elbow (white and grey)	ea	
11.1.7	Power skirting single flat T (white and grey)	ea	
11.1.8	Power skirting double flat T (white and grey)	ea	
11.1.9	Power skirting single flat elbow (white and grey)	ea	
11.1.10	Power skirting double flat elbow (white and grey)	ea	
11.1.11	End cap single	ea	
11.1.12	End cape double	ea	
11.1.13	Power skirting single PSO plus platinum cover kit	ea	
11.2	Cable support channels (units each and per full length)		
11.2.1	Support channel P4000	ea	
11.2.2	Support channel P2000	ea	
11.2.3	Cantilever arm warp around P1000 350 mm	ea	
11.2.4	Cantilever arm warp around P1000 450 mm	ea	
11.2.5	Cantilever arm warp around P1000 550 mm	ea	
11.2.6	Cantilever arm flat plate P1000 350 mm	ea	
11.2.7	Cantilever arm flat plate P1000 450 mm	ea	
11.2.8	Cantilever arm flat plate P1000 550 mm	ea	
11.3	Perforated metal cable tray – Medium Duty (units each and per full length)		
11.3.1	Cable tray medium duty, perforated slotted mild steel hot dipped galvanized – 152mm	ea	
11.3.2	Cable tray medium duty, perforated slotted mild steel hot dipped galvanized – 228mm	ea	
11.3.3	Cable tray medium duty, perforated slotted mild steel hot dipped galvanized – 305mm	ea	
11.3.4	Cable tray medium duty, perforated slotted mild steel hot dipped galvanized – 457mm	ea	
11.3.5	Cable tray medium duty, internal riser 90 – 152mm	ea	
11.3.6	Cable tray medium duty, internal riser 90 – 228mm	ea	
11.3.7	Cable tray medium duty, internal riser 90 - 305mm	ea	
11.3.8	Cable tray medium duty, internal riser 90 - 457mm	ea	
11.3.9	Cable tray medium duty, dropper –152mm	ea	
11.3.10	Cable tray medium duty, dropper – 228mm	ea	
11.3.11	Cable tray medium duty, dropper - 305mm	ea	
11.3.12	Cable tray medium duty, dropper - 457mm	ea	
11.3.13	Cable tray medium duty, horizontal bend 90 –152mm	ea	
11.3.14	Cable tray medium duty, horizontal bend 90 – 228mm	ea	
11.3.15	Cable tray medium duty, horizontal bend 90 - 305mm	ea	
11.3.16	Cable tray medium duty, horizontal bend 90 - 457mm	ea	

11.4	Perforated metal cable tray – Heavy Duty (units each and per full length)		
11.4.1	Cable tray heavy duty, perforated slotted mild steel hot dipped galvanized – Cable tray perforated slotted mild steel hot dipped galvanized – 305mm	ea	
11.4.2	Cable tray heavy duty, perforated slotted mild steel hot dipped galvanized – Cable tray perforated slotted mild steel hot dipped galvanized – 457mm	ea	
11.4.3	Cable tray heavy duty, perforated slotted mild steel hot dipped galvanized – Cable tray perforated slotted mild steel hot dipped galvanized – 610mm	ea	
11.4.4	Cable tray heavy duty, internal riser 90 – 305mm	ea	
11.4.5	Cable tray heavy duty, internal riser 90 – 457mm	ea	
11.4.6	Cable tray heavy duty, internal riser 90 – 610mm	ea	
11.4.7	Cable tray heavy duty, dropper – 305mm	ea	
11.4.8	Cable tray heavy duty, dropper - 457mm	ea	
11.4.9	Cable tray heavy duty, dropper - 610mm	ea	
11.4.10	Cable tray heavy duty, horizontal bend 90 – 305mm	ea	
11.4.11	Cable tray heavy duty, horizontal bend 90 – 457mm	ea	
11.4.12	Cable tray heavy duty, horizontal bend 90 – 610mm	ea	
11.5	Cable ladder– Medium Duty (units each and per full length)		
11.5.1	Cable ladder medium duty, perforated slotted mild steel hot dipped galvanized – 200mm	ea	
11.5.2	Cable ladder medium duty, perforated slotted mild steel hot dipped galvanized – 300mm	ea	
11.5.3	Cable ladder medium duty, perforated slotted mild steel hot dipped galvanized – 400mm	ea	
11.5.4	Cable ladder medium duty, perforated slotted mild steel hot dipped galvanized – 600mm	ea	
11.5.5	Cable ladder medium duty, internal riser 90 – 200mm	ea	
11.5.6	Cable ladder medium duty, internal riser 90 – 300mm	ea	
11.5.7	Cable ladder medium duty, internal riser 90 - 400mm	ea	
11.5.8	Cable ladder medium duty, internal riser 90 - 500mm	ea	
11.5.9	Cable ladder medium duty, dropper – 200mm	ea	
11.5.10	Cable ladder medium duty, dropper – 300mm	ea	
11.5.11	Cable ladder medium duty, dropper - 400mm	ea	
11.5.12	Cable ladder medium duty, dropper - 500mm	ea	
11.5.13	Cable ladder medium duty, horizontal bend 90 – 200mm	ea	
11.5.14	Cable ladder medium duty, horizontal bend 90 – 300mm	ea	
11.5.15	Cable ladder medium duty, horizontal bend 90 - 400mm	ea	
11.5.16	Cable ladder medium duty, horizontal bend 90 - 500mm	ea	
11.6	Cable ladder– Heavy Duty (units each and per full length)		
11.6.1	Cable ladder heavy duty, perforated slotted mild steel hot dipped galvanized – 200mm	ea	
11.6.2	Cable ladder heavy duty, perforated slotted mild steel hot dipped galvanized – 300mm	ea	
11.6.3	Cable ladder heavy duty, perforated slotted mild steel hot dipped galvanized – 400mm	ea	
11.6.4	Cable ladder heavy duty, perforated slotted mild steel hot dipped galvanized – 600mm	ea	
11.6.5	Cable ladder heavy duty, internal riser 90 – 200mm	ea	
11.6.6	Cable ladder heavy duty, internal riser 90 – 300mm	ea	
11.6.7	Cable ladder heavy duty, internal riser 90 - 400mm	ea	
11.6.8	Cable ladder heavy duty, internal riser 90 - 500mm	ea	
11.6.9	Cable ladder heavy duty, dropper – 200mm	ea	

11.6	Cable ladder– Heavy Duty (units each and per full length)		
11.6.10	Cable ladder heavy duty, dropper – 300mm	ea	
11.6.11	Cable ladder heavy duty, dropper - 400mm	ea	
11.6.12	Cable ladder heavy duty, dropper - 500mm	ea	
11.6.13	Cable ladder heavy duty, horizontal bend 90 –200mm	ea	
11.6.14	Cable ladder heavy duty, horizontal bend 90 – 300mm	ea	
11.6.15	Cable ladder heavy duty, horizontal bend 90 - 400mm	ea	
11.6.16	Cable ladder heavy duty, horizontal bend 90 - 500mm	ea	
11.7	Welded wire mesh cable tray – Medium duty (units each and per full length)		
11.7.1	Wire mesh cable tray medium duty, perforated slotted mild steel hot dipped galvanized – 150mm	ea	
11.7.2	Wire mesh cable tray medium duty, perforated slotted mild steel hot dipped galvanized – 200mm	ea	
11.7.3	Wire mesh cable tray medium duty, perforated slotted mild steel hot dipped galvanized – 300mm	ea	
11.7.4	Wire mesh cable tray medium duty, perforated slotted mild steel hot dipped galvanized – 400mm	ea	
11.7.5	Wire mesh cable tray medium duty, internal riser 90 –150mm	ea	
11.7.6	Wire mesh cable tray medium duty, internal riser 90 – 200mm	ea	
11.7.7	Wire mesh cable tray medium duty, internal riser 90 - 300mm	ea	
11.7.8	Wire mesh cable tray medium duty, internal riser 90 - 400mm	ea	
11.7.9	Wire mesh cable tray medium duty, dropper –150mm	ea	
11.7.10	Wire mesh cable tray medium duty, dropper – 200mm	ea	
11.7.11	Wire mesh cable tray medium duty, dropper - 300mm	ea	
11.7.12	Wire mesh cable tray medium duty, dropper - 400mm	ea	
11.7.13	Wire mesh cable tray medium duty, horizontal bend 90 –150mm	ea	
11.7.14	Wire mesh cable tray medium duty, horizontal bend 90 – 200mm	ea	
11.7.15	Wire mesh cable tray medium duty, horizontal bend 90 - 300mm	ea	
11.7.16	Wire mesh cable tray medium duty, horizontal bend 90 - 400mm	ea	
11.8	Welded wire mesh cable tray – Heavy duty (units each and per full length)		
11.8.1	Wire mesh cable tray heavy duty, perforated slotted mild steel hot dipped galvanized – 150mm	ea	
11.8.2	Wire mesh cable tray heavy duty, perforated slotted mild steel hot dipped galvanized – 200mm	ea	
11.8.3	Wire mesh cable tray heavy duty, perforated slotted mild steel hot dipped galvanized – 300mm	ea	
11.8.4	Wire mesh cable tray heavy duty, perforated slotted mild steel hot dipped galvanized – 400mm	ea	
11.8.5	Wire mesh cable tray heavy duty, internal riser 90 –150mm	ea	
11.8.6	Wire mesh cable tray heavy duty, internal riser 90 – 200mm	ea	
11.8.7	Wire mesh cable tray heavy duty, internal riser 90 - 300mm	ea	
11.8.8	Wire mesh cable tray heavy duty, internal riser 90 - 400mm	ea	
11.8.9	Wire mesh cable tray heavy duty, dropper –150mm	ea	
11.8.10	Wire mesh cable tray heavy duty, dropper – 200mm	ea	
11.8.11	Wire mesh cable tray heavy duty, dropper - 300mm	ea	
11.8.12	Wire mesh cable tray heavy duty, dropper - 400mm	ea	
11.8.13	Wire mesh cable tray heavy duty, horizontal bend 90 –150mm	ea	
11.8.14	Wire mesh cable tray heavy duty, horizontal bend 90 – 200mm	ea	
11.8.15	Wire mesh cable tray heavy duty, horizontal bend 90 - 300mm	ea	
11.8.16	Wire mesh cable tray heavy duty, horizontal bend 90 - 400mm	ea	

12.	Cable termination, jointing and wiring systems	Unit	Rate/Price ZAR (excl.Vat) R c
12.1	Make-off <u>glanding</u> for Steel Wire Armoured cable including IP68 eX rated <u>glanding</u> , material and parts only all inclusive		
12.1.1	1.5mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.2	2.5mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.3	4mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.4	6mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.5	10mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.6	16mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.7	25mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.8	35mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.9	50mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.10	70mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.11	95mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.12	120mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.13	150mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.14	185mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.15	240mm ² x 3 core or 4 core SWA PVC cable	sum	
12.1.16	300mm ² x 3 core or 4 core SWA PVC cable	sum	
12.2	Make-off <u>glanding</u> for Surfix, House wire, cabtyre including <u>glanding</u> , material and parts only all inclusive	Unit	Rate/Price ZAR (excl.Vat) R c
12.2.1	1.5mm ² x 2 core to 6 core	sum	
12.2.2	2.5mm ² x 2 core to 6 core	sum	
12.2.3	4mm ² x 2 core to 6 core	sum	
12.2.4	6mm ² x 2 core to 6 core	sum	
12.2.5	Allow for the provisional sum for the selection, supply, delivery to site and installation for any cable termination system cable fixing and fasteners, cable support system brackets and general goods required not listed in the schedule 12. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment) clause 4.16	Provisional Sum	R300 000.00 Incl VAT
	Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

13	Payment reference to specification	Specialised Services	Unit	Rate/Price ZAR (excl.Vat) R c
13.1	(13) Specifications section 3.2.1	Low Voltage air circuit breaker 1-Yearly Service and Inspection This work may only be performed by authorised or recognised by the OEM as being trained, competent and qualified staff with the tools and testing equipment for a particular brand, make and type of circuit breaker. Schneider (Merlin Gerin), ABB, CBI or equivalent	Sum	
13.2	(13) Specifications section 3.2.1	Low Voltage air circuit breaker 2-Yearly Service and Inspection This work may only be performed by authorised or recognised by the OEM as being trained, competent and qualified staff with the tools and testing equipment for a particular brand, make and type of circuit breaker. Schneider (Merlin Gerin), ABB, CBI or equivalent	Sum	
13.3	(13) Specifications section 3.2.1	Low Voltage air circuit breaker 5-Yearly Service and Inspection This work may only be performed by authorised or recognised by the OEM as being trained, competent and qualified staff with the tools and testing equipment for a particular brand, make and type of circuit breaker. Schneider (Merlin Gerin), ABB, CBI or equivalent	Sum	
13.4	(13) Specifications section 3.2.2	DPFC Type A Service: 6 monthly system service, inspection and diagnostic check	Sum	
13.5	(13) Specifications section 3.2.2	DPFC Type B Service: 1 yearly system service, inspection, diagnostic check, Inspection and metering calibration	Sum	
13.6	(13) Specifications section 3.2.3	Electrical actuator service and maintenance plans: (AUMA, Greatork, ROTORK) or equivalent Type A Service: 6 Monthly Service and Inspection	Sum	
13.7	(13) Specifications section 3.2.3	Type B Service: (AUMA, Greatork, ROTORK) or equivalent Basic electric actuator Service and Inspection	Sum	
13.8	(13) Specifications section 3.2.4	Variable Speed (VFD) service and maintenance plan: Type A Service: (Basic repair and maintenance plan) Low Voltage 400 V AC 50Hz Variable Speed drives (Yaskawa, WEG, Delta, Allen Bradley, ABB, and Schneider Electric) or equivalent	Sum	
13.9	(13) Specifications section 3.2.4	Variable Speed (VFD) service and maintenance plan: Type B Service: (Advanced repair and maintenance plan) Low Voltage 400 V AC 50Hz Variable Speed drives (Yaskawa, WEG, Delta, Allen Bradley, ABB, Schneider Electric) or equivalent	Sum	

	Payment reference to specification	Specialised Services	Unit	Rate/Price ZAR (excl.Vat) R c
13.10	(13) Specifications section 3.2.8	Variable Speed (VFD) service and maintenance plan: Type C Service: (Basic repair and maintenance plan) Medium Voltage 3300 V AC 50Hz Variable Speed drives (Yaskawa, WEG, Allen Bradley, ABB, and Schneider Electric) or equivalent	Sum	
13.11	(13) Specifications section 3.2.8	Variable Speed (VFD) service and maintenance plan: Type D Service: (Advanced repair and maintenance plan) Medium Voltage 3300 V AC 50Hz Variable Speed drives (Yaskawa, WEG, Allen Bradley, ABB, and Schneider Electric) or equivalent	Sum	
13.12	(13) Specifications section 3.2.5A	Electronic Soft Starter service and maintenance plan: Type A Service: (Basic repair and maintenance plan) Low Voltage 400 V AC 50Hz Variable Voltage drives (Yaskawa, WEG, Delta, Allen Bradley, ABB, and Schneider Electric) or equivalent	Sum	
13.13	(13) Specifications section 3.2.5A	Electronic Soft Starter) service and maintenance plan: Type B Service: (Advanced repair and maintenance plan) Low Voltage 400 V AC 50Hz Variable Voltage drives (Yaskawa, WEG, Delta, Allen Bradley, ABB, Schneider Electric) or equivalent	Sum	
13.14	(13) Specifications section 3.2.7	Variable Speed (VFD) service and maintenance plan: Allen-Bradley PowerFlex 7000 Medium Voltage Variable Speed Drive (VFD) Voelvlei Water Treatment plant Low Lift Pump Station Type A Service: (Service and maintenance plan)	Sum	
13.15	(13) Specifications section 3.2.7	Variable Speed (VFD) service and maintenance plan: Allen-Bradley PowerFlex 7000 Medium Voltage Variable Speed Drive (VFD) Voelvlei Water Treatment plant Low Lift Pump Station Type B Service: (Service and maintenance plan)	Sum	
13.16	(13) Specifications section 3.2.7	Variable Speed (VFD) service and maintenance plan: Allen-Bradley PowerFlex 7000 Medium Voltage Variable Speed Drive (VFD) Voelvlei Water Treatment plant Low Lift Pump Station Type C Service: (Service and maintenance plan)	Sum	

	Payment reference to specification	Specialised Services	Unit	Rate/Price ZAR (excl.Vat) R c
13.17	(13) Specifications section 3.2.7	Variable Speed (VFD) service and maintenance plan: Allen-Bradley PowerFlex 7000 Medium Voltage Variable Speed Drive (VFD) Voelvlei Water Treatment plant Low Lift Pump Station Type D Service: (Service and maintenance plan)	Sum	
13.18	(13) Specifications section 3.2.7	Variable Speed (VFD) service and maintenance plan: Allen-Bradley PowerFlex 7000 Medium Voltage Variable Speed Drive (VFD) Voelvlei Water Treatment plant Low Lift Pump Station Type E Service: (Service and maintenance plan)	Sum	
13.19	(13) Specifications section 3.2.7	Variable Speed (VFD) service and maintenance plan: Allen-Bradley PowerFlex 7000 Medium Voltage Variable Speed Drive (VFD) Voelvlei Water Treatment plant Low Lift Pump Station Type F Service: (Service and maintenance plan)	Sum	
13.20	(13) Specifications section 3.2.7	Variable Speed (VFD) service and maintenance plan: Allen-Bradley PowerFlex 7000 Medium Voltage Variable Speed Drive (VFD) Voelvlei Water Treatment plant Low Lift Pump Station Type G Service: (Service and maintenance plan)	Sum	
13.21	(13) Specifications section 3.2.7	Variable Speed (VFD) service and maintenance plan: Allen-Bradley PowerFlex 7000 Medium Voltage Variable Speed Drive (VFD) Voelvlei Water Treatment plant Low Lift Pump Station Type H Service: (Service and maintenance plan)	Sum	
13.22	(13) Specifications section 3.2.7	Variable Speed (VFD) service and maintenance plan: Allen-Bradley PowerFlex 7000 Medium Voltage Variable Speed Drive (VFD) Voelvlei Water Treatment plant Low Lift Pump Station Type I Service: (Service and maintenance plan)	Sum	
13.23	(13) Specifications section 3.2.9	Type A Service for Uninterruptable Power Supply (UPS) service, inspection and diagnostic check: 6-Monthly Inspection/Battery Checks	Sum	
13.24	(13) Specifications section 3.2.9	Type B Service for Uninterruptable Power Supply (UPS) service, inspection and diagnostic check: 5 Yearly Battery Pack/Unit Replacement	Sum	
13.25	(13) Specifications section 3.2.5B	6 Monthly Dry air dehumidifier service and maintenance	Sum	
13.26	(13) Specifications section 3.2.4	Conduct power quality and electricity load demand study by means of specialised data logger and reporting on a 3 phase electrical system	R/hr	
13.26	13) Specifications section 3.2.9.5 (2.5)	Annual service and check and certify Aqueous Vermiculite Dispersion (AVD) fire extinguisher	Sum	
13.27	13) Specifications section 3.2.9.5 (2.5)	Annual service and refill and certify Aqueous Vermiculite Dispersion (AVD) fire extinguisher	Sum	

13.28	(13) Specifications sections 3.2.1 – 3.2.9	Allow for the provisional sum for the selection, supply, delivery to site and installation for any specialised maintenance service and parts not listed in pricing schedule 13. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment) clause 4.16	Provisional Sum	R300 000.00 Incl VAT
		Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

14	Payment reference to specification	Electrical Actuators	Unit	Rate/Price ZAR (excl.Vat) R c
14.1	(13) Specifications sections 3.2.1 – 3.2.9	Allow for the provisional sum for the selection, supply, delivery to site and installation for multi-turn electrical actuator, parts or components and specialised maintenance services not listed in pricing schedule. Replacements to conform to the same specification as the units on site in-situe. (This items will be awarded and will only be used for unseen works as scribed in the SPECIFICATIONS (4) Measurement and Payment clause 4.16	Provisional Sum	R300 000.00 Incl VAT
		Allow for profit on the provisional sum (Complete the offered % up to maximum of 10%)	%	

15	Labour Charges		
	Supply the following labour rates based on normal hourly labour rates for labour only. Rates include all incidental costs such as equipment, hand tools, power tools, PPE, safety equipment, medicals and all trade related training to comply with OSH Act 85 Of 1993 etc.		Rate/Price ZAR (excl.Vat)
15.1	Base labour rate x 1.0 Weekdays	Unit	R c
15.1.1	Foreman/Technician/Site agent	hr	
15.1.2	Electrician	hr	
15.1.3	Electrician Installation Electrician with SANS 10142-1 Wiring Regulations	hr	
15.1.4	Master Installation Electrician	hr	
15.1.5	Electrical cable jointer (3300 Volt AC)	hr	
15.1.6	Panel wireman	hr	
15.1.7	PLC, HMI & SCADA Programmer	hr	
15.1.8	Instrumentation Technician/Artisan	hr	
15.1.9	Electrician's Assistant	hr	
15.1.10	Draughtsman	hr	
15.1.11	Contractor's work scoping/quoting representative	hr	
15.1.12	Contractor's Health and Safety Officer (GMR8.5)	hr	
15.1.13	Certified Mechanical Handling (Rigger)	hr	
15.1.14	Service Technician/Artisan/Assistant Switchgear and circuit breaker services (Schneider/Merlin Gerin, or equivalent)	hr	
15.1.15	Service Technician/Artisan/Assistant – <u>Low Voltage 230/440 VAC</u> Electronic Soft starter and Variable Speed drive services (WEG, Yaskawa, Delta, ABB, Allan Bradley, or equivalent)	hr	
15.1.16	Service Engineer – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	hr	
15.1.17	Service Technician/Artisan/Assistant – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	hr	
15.1.18	Technician/Artisan/Assistant – Electrical valve actuator (AUMA, Greatork, ROTORK, or equivalent)	hr	
15.1.19	Dynamic Power Factor Correction specialist Service Technician (Impact Power Innovations & Bellco)	hr	
15.1.20	Specialist Service Technician - generator engine controllers and changeover (Deep Sea and Lovato or equivalent)	hr	
15.1.21	Service Technician/Artisan/Assistant – Uninterruptable Power Supply (Riello, Schneider Electric, APC or equivalent)	hr	
15.1.22	Service Technician - Air conditioner and dry air de-humidifier (Dehu Tech or equivalent)	hr	

15.2	Additional labour rates over and above the normal working hour rates for labour engaged in labour only works or other works that are required to be executed outside of all the normal working hours. Rates include all incidental costs such as equipment, hand tools, power tools, PPE, safety equipment, medicals and all training etc. Base labour rate x 1.5 weekend and after hours	Unit	Rate/Price ZAR (excl.Vat) R c
15.2.1	Foreman/Technician/Site agent	hr	
15.2.2	Electrician	hr	
15.2.3	Installation Electrician with SANS 10142-1 Wiring Regulations	hr	
15.2.4	Master Installation Electrician	hr	
15.2.5	Electrical cable jointer (3300 Volt AC)	hr	
15.2.6	Panel wireman	hr	
15.2.7	PLC, HMI & SCADA Programmer	hr	
15.2.8	Instrumentation Technician/Artisan	hr	
15.2.9	Electrician's Assistant	hr	
15.2.10	Draughtsman	hr	
15.2.11	Contractor's work scoping/quoting representative	hr	
15.2.12	Contractor's Health and Safety Officer (GMR8.5)	hr	
15.2.13	Certified Mechanical Handling (Rigger)	hr	
15.2.14	Service Technician/Artisan/Assistant Switchgear and circuit breaker services (Schneider/Merlin Gerin, or equivalent)	hr	
15.2.15	Service Technician/Artisan/Assistant – <u>Low Voltage 230/440 VAC</u> Electronic Soft starter and Variable Speed drive services (WEG, Yaskawa, Delta, ABB, Allan Bradley, or equivalent)	hr	
15.2.16	Service Engineer – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	hr	
15.2.17	Service Technician/Artisan/Assistant – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	hr	
15.2.18	Technician/Artisan/Assistant – Electrical valve actuator (AUMA, Greatork, ROTORK, or equivalent)	hr	
15.2.19	Dynamic Power Factor Correction specialist Service Technician (Impact Power Innovations & Bellco)	hr	
15.2.20	Specialist Service Technician - generator engine controllers and changeover (Deep Sea and Lovato or equivalent)	hr	
15.2.21	Service Technician/Artisan/Assistant – Uninterruptable Power Supply (Riello, Schneider Electric, APC or equivalent)	hr	
15.2.22	Service Technician - Air conditioner and dry air de-humidifier (Dehu Tech or equivalent)	hr	

15.3	Additional labour rates over and above the normal working hour rates for labour engaged in labour only works or other works that are required to be executed outside of all the normal working hours. Rates include all incidental costs such as equipment, hand tools, power tools, PPE, safety equipment, medicals and all training etc. Base labour rate x 2.0 Sunday and Public Holiday	Unit	Rate/Price ZAR
			(excl.Vat) R c
15.3.1	Foreman/Technician/Site agent	hr	
15.3.2	Electrician	hr	
15.3.3	Electrician Installation Electrician with SANS 10142-1 Wiring Regulations	hr	
15.3.4	Master Installation Electrician	hr	
15.3.5	Electrical cable jointer (3300 Volt AC)	hr	
15.3.6	Panel wireman	hr	
15.3.7	PLC, HMI & SCADA Programmer	hr	
15.3.8	Instrumentation Technician/Artisan	hr	
15.3.9	Electrician's Assistant	hr	
15.3.10	Draughtsman	hr	
15.3.11	Contractor's work scoping/quoting representative	hr	
15.3.12	Contractor's Health and Safety Officer (GMR8.5)	hr	
15.3.13	Certified Mechanical Handling (Rigger)	hr	
15.3.14	Service Technician/Artisan/Assistant Switchgear and circuit breaker services (Schneider/Merlin Gerin, or equivalent)	hr	
15.3.15	Service Technician/Artisan/Assistant – <u>Low Voltage 230/440 VAC</u> Electronic Soft starter and Variable Speed drive services (WEG, Yaskawa, Delta, ABB, Allan Bradley, or equivalent)	hr	
15.3.16	Service Engineer – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	hr	
15.3.17	Service Technician/Artisan/Assistant – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	hr	
15.3.18	Technician/Artisan/Assistant – Electrical valve actuator (AUMA, Greatork, ROTORK, or equivalent)		
15.3.19	Dynamic Power Factor Correction specialist Service Technician (Impact Power Innovations & Bellco)	hr	
15.3.20	Specialist Service Technician - generator engine controllers and changeover (Deep Sea and Lovato or equivalent)	hr	
15.3.21	Service Technician/Artisan/Assistant – Uninterruptable Power Supply (Riello, Schneider Electric, APC or equivalent)	hr	
15.3.22	Service Technician - Air conditioner and dry air de-humidifier (Dehu Tech or equivalent)	hr	

16	Transport Charges	Unit	Rate/Price ZAR (excl.Vat) R c
	Supply the following transport rates based on normal hourly rates for transportation, rates include all costs for the vehicle ownership, rental or hiring cost, labour cost for driver or any other incidental costs, equipment, and safety equipment etc. All hours		
16.1	Light delivery vehicle or panel van (0.5 - 1.0 Ton)	km	
16.2	Vehicle with unladen mass of 2000kg up to 3500kg with 5 Ton hydraulic lifting crane x 1 owned or proof of rental agreement with heavy truck rental company or proof of previous rental agreements for similar size trucks	km	
16.3	Truck mounted or mobile 15 meter aerial platform (Cherry picker) x1 owned or proof of rental agreement with rental company or proof of previous rental agreements	km	

(6) SUPPORTING SCHEDULES

Schedule 1: Certificate of Authority for Partnerships/ Joint Ventures/ Consortiums

This schedule is to be completed if the tender is submitted by a partnership/joint venture/ consortium.

1. We, the undersigned, are submitting this tender offer as a partnership/ joint venture/ consortium and hereby authorize Mr/Ms _____, of the authorised entity _____, acting in the capacity of Lead Partner, to sign all documents in connection with the tender offer and any contract resulting from it on the partnership/joint venture/ consortium's behalf.
2. By signing this schedule the partners to the partnership/joint venture/ consortium:
 - 2.1 warrant that the tender submitted is in accordance with the main business and objectives of the partnership/joint venture/ consortium;
 - 2.2 agree that the CCT shall make all payments in terms of this Contract into the following bank account of the Lead Partner:

Account Holder: _____

Financial Institution: _____

Branch Code: _____

Account No.: _____
 - 2.3 agree that in the event that there is a change in the partnership/ joint venture/ consortium and/or should a dispute arise between the partnership/joint venture/ consortium partners, that the CCT shall continue to make any/all payments due and payable in terms of the Contract into the aforesaid bank account until such time as the CCT is presented with a Court Order or an original agreement (signed by each and every partner of the partnership/joint venture/ consortium) notifying the CCT of the details of the new bank account into which it is required to make payment.
 - 2.4 agree that they shall be jointly and severally liable to the CCT for the due and proper fulfilment by the successful tenderer/supplier of its obligations in terms of the Contract as well as any damages suffered by the CCT as a result of breach by the successful tenderer/supplier. The partnership/joint venture/ consortium partners hereby renounce the benefits of exclusion and division.

SIGNED BY THE PARTNERS OF THE PARTNERSHIP/ JOINT VENTURE/ CONSORTIUM		
NAME OF FIRM	ADDRESS	DULY AUTHORISED SIGNATORY
Lead partner		Signature..... Name..... Designation.....
		Signature..... Name..... Designation.....

		Signature..... Name..... Designation.....
		Signature..... Name..... Designation.....

Note: A copy of the Joint Venture Agreement shall be appended to List of other documents attached by tenderer schedule.

Schedule 2: Declaration for Procurement above R10 million

If the value of the transaction is expected to exceed R10 million (VAT included) the tenderer shall complete the following questionnaire, attach the necessary documents and sign this schedule:

1. Are you by law required to prepare annual financial statements for auditing ? (Please mark with X)

YES		NO	
-----	--	----	--

1.1 If YES, submit audited annual financial statements:

- (i) for the past three years, or
- (ii) since the date of establishment of the tenderer (if established during the past three years)

By attaching such audited financial statements to **List of other documents attached by tenderer** schedule.

2. Do you have any outstanding undisputed commitments for municipal services towards the CCT or other municipality in respect of which payment is overdue for more than 30 (thirty) days? (Please mark with X)

YES		NO	
-----	--	----	--

2.1 If NO, this serves to certify that the tenderer has no undisputed commitments for municipal services towards any municipality for more than three (3) (three) months in respect of which payment is overdue for more than 30 (thirty) days.

2.2 If YES, provide particulars:

—

—

—

—

3. Has any contract been awarded to you by an organ of state during the past five (5) years? (Please mark with X)

YES		NO	
-----	--	----	--

3.1 If YES, insert particulars in the table below including particulars of any material non-compliance or dispute concerning the execution of such contract. Alternatively attach the particulars to **List of other documents attached by tenderer** schedule in the same format as the table below:

Organ of State	Contract Description	Contract Period	Non-compliance/dispute (if any)

4. Will any portion of the goods or services be sourced from outside the Republic, and if so, what portion and whether any portion of payment from the CCT is expected to be transferred out of the Republic? (Please mark with X)

YES		NO	
-----	--	----	--

4.1 If YES, furnish particulars below

The tenderer hereby certifies that the information set out in this schedule and/or attached hereto is true and correct, and acknowledges that failure to properly and truthfully complete this schedule may result in steps being taken against the tenderer, the tender being disqualified, and/or (in the event that the tenderer is successful) the cancellation of the contract, restriction of the tenderer or the exercise by the employer of any other remedies available to it.

Signature
Print name:
On behalf of the tenderer (duly authorised)

Date

**Schedule 3: PREFERENCE POINTS CLAIM FORM IN TERMS OF
THE PREFERENTIAL PROCUREMENT REGULATIONS 2022**
Definitions

The following definitions shall apply to this schedule:

- (a) “tender” means a written offer in the form determined by an organ of state in response to an invitation to provide goods or services through price quotations, competitive tendering process or any other method envisaged in legislation;
- (b) “price” means an amount of money tendered for goods or services, and includes all applicable taxes less all unconditional discounts;
- (c) “rand value” means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;
- (d) “tender for income-generating contracts” means a written offer in the form determined by an organ of state in response to an invitation for the origination of income-generating contracts through any method envisaged in legislation that will result in a legal agreement between the organ of state and a third party that produces revenue for the organ of state, and includes, but is not limited to, leasing and disposal of assets and concession contracts, excluding direct sales and disposal of assets through public auctions; and
- (e) “the Act” means the Preferential Procurement Policy Framework Act, 2000 (Act No. 5 of 2000).

FORMULAE FOR PROCUREMENT OF GOODS AND SERVICES
3.1. POINTS AWARDED FOR PRICE
3.1.1 THE 90/10 PREFERENCE POINT SYSTEMS

A maximum of 90 points is allocated for price on the following basis:

90/10

$$Ps = 90 \left(1 - \frac{Pt - P_{min}}{P_{min}} \right)$$

Where

- Ps = Points scored for price of tender under consideration
- Pt = Price of tender under consideration
- Pmin = Price of lowest acceptable tender

Where

- Ps = Points scored for price of tender under consideration
- Pt = Price of tender under consideration
- Pmax = Price of highest acceptable tender

4. POINTS AWARDED FOR SPECIFIC GOALS

- 4.1. In terms of Regulation 4(2); 5(2); 6(2) and 7(2) of the Preferential Procurement Regulations, preference points must be awarded for specific goals stated in the tender. For the purposes of this tender the tenderer will be allocated points based on the goals stated in table 1 below as may be supported by proof/ documentation stated in the conditions of this tender:
- 4.2. In cases where organs of state intend to use Regulation 3(2) of the Regulations, which states that, if it is unclear whether the 80/20 or 90/10 preference point system applies, an organ of state must, in the tender documents, stipulate in the case of—
- (a) an invitation for tender for income-generating contracts, that either the 80/20 or 90/10 preference point system will apply and that the highest acceptable tender will be used to determine the applicable preference point system; or
- (b) any other invitation for tender, that either the 80/20 or 90/10 preference point system will apply and that the lowest acceptable tender will be used to determine the applicable preference point system,
- then the organ of state must indicate the points allocated for specific goals for both the 90/10 and 80/20 preference point system.

Table 1: Specific goals for the tender and points claimed are indicated per the table below.

(Note to organs of state: Where either the 90/10 or 80/20 preference point system is applicable, corresponding points must also be indicated as such.

Note to tenderers: The tenderer must indicate how they claim points for each preference point system.)

The specific goals allocated points in terms of this tender	Number of points allocated (90/10 system) (To be completed by the organ of state)	Number of points allocated (80/20 system) (To be completed by the organ of state)	Number of points claimed (90/10 system) (To be completed by the tenderer)	Number of points claimed (80/20 system) (To be completed by the tenderer)
Gender Ownership	5			
Race Ownership	5			

DECLARATION WITH REGARD TO COMPANY/FIRM

4.3. Name of company/firm.....

4.4. Company registration number:

4.5. TYPE OF COMPANY/ FIRM

- ☐ Partnership/Joint Venture / Consortium
- ☐ One-person business/sole propriety
- ☐ Close corporation
- ☐ Public Company
- ☐ Personal Liability Company
- ☐ (Pty) Limited

- ☐ Non-Profit Company
☐ State Owned Company
[Tick applicable box]

- 4.6. I, the undersigned, who is duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the specific goals as advised in the tender, qualifies the company/firm for the preference(s) shown and I acknowledge that:
- i) The information furnished is true and correct;
 - ii) The preference points claimed are in accordance with the General Conditions as indicated in paragraph 1 of this form;
 - iii) In the event of a contract being awarded as a result of points claimed as shown in paragraphs 1.4 and 4.2, the contractor may be required to furnish documentary proof to the satisfaction of the organ of state that the claims are correct;
 - iv) If the specific goals have been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the organ of state may, in addition to any other remedy it may have –
 - (a) disqualify the person from the tendering process;
 - (b) recover costs, losses or damages it has incurred or suffered as a result of that person's conduct;
 - (c) cancel the contract and claim any damages which it has suffered as a result of having to make less favourable arrangements due to such cancellation;
 - (d) recommend that the tenderer or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted from obtaining business from any organ of state for a period not exceeding 10 years, after the audi alteram partem (hear the other side) rule has been applied; and
 - (e) forward the matter for criminal prosecution, if deemed necessary.

.....
SIGNATURE(S) OF TENDERER(S)

SURNAME AND NAME:

DATE:

ADDRESS:

.....

.....

.....

For official use.		
SIGNATURE OF CITY OFFICIALS AT TENDER OPENING		
1.	2.	3.

Schedule 4: Declaration of Interest – State Employees (MBD 4 amended)
--

1. No bid will be accepted from:
 - 1.1 persons in the service of the state¹, or
 - 1.2 if the person is not a natural person, of which any director, manager or principal shareholder or stakeholder is in the service of the state, or
 - 1.3 from persons, or entities of which any director, manager or principal shareholder or stakeholder, has been in the service of the City of Cape Town during the twelve months after the City employee has left the employ of the City, or
 - 1.4 from an entity who has employed a former City employee who was at a level of T14 of higher at the time of leaving the City's employ and involved in any of the City's bid committees for the bid submitted, if:
 - 1.4.1 the City employee left the City's employment voluntarily, during a period of 12 months after the City employee has left the employ of the City;
 - 1.4.2 the City employee left the City's employment whilst facing disciplinary action by the City, during a period of 24 months after the City employee has left the employ of the City, or any other period prescribed by applicable legislative provisions, after having left the City's employ.
2. Any person, having a kinship with persons in the service of the state, including a blood relationship, may make an offer or offers in terms of this invitation to bid. In view of possible allegations of favouritism, should the resulting bid, or part thereof, be awarded to persons connected with or related to persons in service of the state, it is required that the tenderer or their authorised representative declare their position in relation to the evaluating/adjudicating authority.
3. In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.
 - 3.1 Full Name of tenderer or his or her representative:.....
 - 3.2 Identity Number:.....
 - 3.3 Position occupied in the Company (director, trustee, shareholder²)......
 - 3.4 Company or Close Corporation Registration Number:.....
 - 3.5 Tax Reference Number:.....

3.6 VAT
Number:.....

Registration

3.7 The names of all directors / trustees / shareholders members, their individual identity numbers and state employee numbers must be indicated in paragraph 4 below.

3.8 Are you presently in the service of the state? **YES / NO**

3.8.1 If yes, furnish particulars

3.9 Have you been in the service of the state for the past twelve months? **YES / NO**

3.9.1 If yes, furnish particulars

3.10

Do you have any relationship (family, friend, other) with persons in the service of the state and who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.10.1 If yes, furnish particulars

3.11 Are you, aware of any relationship (family, friend, other) between any other tenderer and any persons in the service of the state who may be involved with the evaluation and or adjudication of this bid? **YES / NO**

3.11.1 If yes, furnish particulars.....

3.12 Are any of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**

3.12.1 If yes, furnish particulars

3.13 Are any spouse, child or parent of the company's directors, trustees, managers, principle shareholders or stakeholders in service of the state? **YES / NO**

3.13.1 If yes, furnish particulars

.....

3.14 Do you or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company have any interest in any other related companies or business whether or not they are bidding for this contract? **YES / NO**

3.14.1 If yes, furnish particulars

.....

3.15 Have you, or any of the directors, trustees, managers, principle shareholders, or stakeholders of this company been in the service of the City of Cape Town in the past twelve months? **YES / NO**

3.15.1 If yes, furnish particulars

.....

3.16 Do you have any employees who was in the service of the City of Cape Town at a level of T14 or higher at the time they left the employ of the City, and who was involved in any of the City's bid committees for this bid? **YES / NO**

3.16.1 If yes, furnish particulars

.....

4. Full details of directors / trustees / members / shareholders

Full Name	Identity Number	State Employee Number

If the above table does not sufficient to provide the details of all directors / trustees / shareholders, please append full details to the tender submission.

The tenderer hereby certifies that the information set out in this schedule and/or attached hereto is true and correct, and acknowledges that failure to properly and truthfully complete this schedule may result in steps being taken against the tenderer, the tender being disqualified, and/or (in the event that the tenderer is successful) the cancellation of the contract, restriction of the tenderer or the exercise by the employer of any other remedies available to it.

Signature

Print name:

Date

On behalf of the tenderer (duly authorised)

'MSCM Regulations: "in the service of the state" means to be –

(a) a member of –

- (i) any municipal council;***
- (ii) any provincial legislature; or***
- (iii) the national Assembly or the national Council of provinces;***

(b) a member of the board of directors of any municipal entity;

(c) an official of any municipality or municipal entity;

(d) an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No.1 of 1999);

(e) an executive member of the accounting authority of any national or provincial public entity; or

(f) an employee of Parliament or a provincial legislature.

² *Shareholder” means a person who owns shares in the company and is actively involved in the management of the company or business and exercises control over the company.*

Schedule 5: Conflict of Interest Declaration

1. The tenderer shall declare whether it has any conflict of interest in the transaction for which the tender is submitted. (Please mark with X)

YES		NO	
-----	--	----	--

- 1.1 If yes, the tenderer is required to set out the particulars in the table below:

2. The tenderer shall declare whether it has directly or through a representative or intermediary promised, offered or granted:

- 2.1 any inducement or reward to the CCT for or in connection with the award of this contract;
or

- 2.2 any reward, gift, favour or hospitality to any official or any other role player involved in the implementation of the supply chain management policy. (Please mark with X)

YES		NO	
-----	--	----	--

- If yes, the tenderer is required to set out the particulars in the table below:

Should the tenderer be aware of any corrupt or fraudulent transactions relating to the procurement process of the City of Cape Town, please contact the following:

the City's anti-corruption hotline at 0800 32 31 30 (toll free)

The tenderer hereby certifies that the information set out in this schedule and/or attached hereto is true and correct, and acknowledges that failure to properly and truthfully complete this schedule may result in steps being taken against the tenderer, the tender being disqualified, and/or (in the event that the tenderer is successful) the cancellation of the contract, restriction of the tenderer or the exercise by the employer of any other remedies available to it.

Signature
Print name:
On behalf of the tenderer (duly authorised)

Date

Schedule 6: Declaration of Tenderer's Past Supply Chain Management Practices (MBD 8)

Where the entity tendering is a partnership/joint venture/consortium, each party to the partnership/joint venture/consortium must sign a declaration in terms of the Municipal Finance Management Act, Act 56 of 2003, and attach it to this schedule.

- 1 The tender offer of any tenderer may be rejected if that tenderer or any of its directors/members have:
 - a) abused the municipality's / municipal entity's supply chain management system or committed any fraudulent conduct in relation to such system;
 - b) been convicted for fraud or corruption during the past five years;
 - c) willfully neglected, reneged on or failed to comply with any government, municipal or other public sector contract during the past five years; or
 - d) been listed in the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004) or Database of Restricted Suppliers.

- 2 In order to give effect to the above, the following questionnaire must be completed and submitted with the bid.

Item	Question	Yes	No
2.1	Is the tenderer or any of its directors/members listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector? (Companies or persons who are listed on this Database were informed in writing of this restriction by the Accounting Officer/Authority of the institution that imposed the restriction after the <i>audi alteram partem</i> rule was applied). The Database of Restricted Suppliers now resides on the National Treasury's website (www.treasury.gov.za) and can be accessed by clicking on its link at the bottom of the home page.	Yes ☐	No ☐
2.1.1	If so, furnish particulars:		
2.2	Is the tenderer or any of its directors/members listed on the Register for Tender Defaulters in terms of section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004) or Database of Restricted Suppliers? The Register for Tender Defaulters can be accessed on the National Treasury's website (www.treasury.gov.za) by clicking on its link at the bottom of the home page.	Yes ☐	No ☐
2.2.1	If so, furnish particulars:		

2.3	Was the tenderer or any of its directors/members convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?	Yes ☐	No ☐
2.3.1	If so, furnish particulars:		
Item	Question	Yes	No
2.4	Does the tenderer or any of its directors owe any municipal rates and taxes or municipal charges to the municipality / municipal entity, or to any other municipality / municipal entity, that is in arrears for more than three months?	Yes ☐	No ☐
2.4.1	If so, furnish particulars:		
2.5	Was any contract between the tenderer and the municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?	Yes ☐	No ☐
2.7.1	If so, furnish particulars:		

The tenderer hereby certifies that the information set out in this schedule and/or attached hereto is true and correct, and acknowledges that failure to properly and truthfully complete this schedule may result in steps being taken against the tenderer, the tender being disqualified, and/or (in the event that the tenderer is successful) the cancellation of the contract, , restriction of the tenderer or the exercise by the employer of any other remedies available to it.

 Signature
 Print name:
 On behalf of the tenderer (duly authorised)

 Date

Schedule 7: Authorisation for the Deduction of Outstanding Amounts Owed to the City of Cape Town

To: THE CITY MANAGER, CITY OF CAPE TOWN

From: _____
(Name of tenderer)

RE: AUTHORISATION FOR THE DEDUCTION OF OUTSTANDING AMOUNTS OWED TO THE CITY OF CAPE TOWN

The tenderer:

- a) hereby acknowledges that according to SCM Regulation 38(1)(d)(i) the City Manager may reject the tender of the tenderer if any municipal rates and taxes or municipal service charges owed by the tenderer (or any of its directors/members/partners) to the CCT, or to any other municipality or municipal entity, are in arrears for more than 3 (three) months; and
- b) therefore hereby agrees and authorises the CCT to deduct the full amount outstanding by the Tenderer or any of its directors/members/partners from any payment due to the tenderer; and
- c) confirms the information as set out in the tables below for the purpose of giving effect to b) above;
- d) The tenderer hereby certifies that the information set out in this schedule and/or attached hereto is true and correct, and acknowledges that failure to properly and truthfully complete this schedule may result in steps being taken against the tenderer, the tender being disqualified, and/or (in the event that the tenderer is successful) the cancellation of the contract, restriction of the tenderer or the exercise by the employer of any other remedies available to it.

Physical Business address(es) of the tenderer	Municipal Account number(s)

If there is not enough space for all the names, please attach the information to **List of other documents attached by tenderer** schedule in the same format:

Name of Director / Member / Partner	Identity Number	Physical residential address of Director / Member / Partner	Municipal Account number(s)

Signature
Print name:
On behalf of the tenderer (duly authorised)

Date



Schedule 8: Contract Price Adjustment and/or Rate of Exchange Variation

1.1 The prices for the goods delivered and services performed shall be subject to contract price adjustment and the following conditions will be applicable:

1.1.1 PRICING INSTRUCTIONS

1. The Tenderer is required to use one or more of the Contract Price Adjustment mechanisms and/or provisions relating to the line items and indicate their preference which line items are relevant to a particular CPA mechanism. The Tenderer is required to use and apply only one Contract Price Adjustment Mechanism (CPA) for a selected line item. This implies that a tender line item cannot have more than one CPA mechanism.
2. The tenderer is required to fill in all schedules for all line items at and before the time of tender to be eligible for CPA for one or more contract price line item/s.
3. The tenderer may submit schedules and copies of their own indicating which line items are relevant to a particular CPA mechanism.
4. The Contract Price Adjustment mechanisms and/or provisions relating to Rate of Exchange Variation contained in this schedule are compulsory and binding on all tenderers.
5. Failure to complete this schedule or any part thereof may result in the tender offer being declared non-responsive.
6. Tenderers are not permitted to amend, vary, alter or delete this schedule or any part thereof unless otherwise stated in this schedule, failing which the tender offer shall be declared non-responsive.
7. Tenderers are not permitted to offer firm prices. If the tenderer offers firm prices in contravention of this clause the tender offer shall be declared non-responsive.

The prices tendered on the pricing schedule shall be subject to price adjustment as follows:

1.1.2 SUPPLIER / MANUFACTURER CONTRACT PRICE ADJUSTMENT

Tenderers that are NOT Manufacturers of the Tendered Items (If more than one manufacturer are used please supply the additional manufacturer's information.

Tenderers that are **NOT** manufacturers of the tendered items are subject to contract price adjustment based on the SUPPLIER'S / MANUFACTURER'S PRICE LISTS from the supplier or manufacturer of the tendered items, as detailed in Clause 8.4.2 of Schedule 8, and shall complete the following:

The tenderer may submit schedules and copies of their own indicating which line items are relevant to supplier's / manufacturer's price lists CPA mechanism.

Supplier: _____

Date of Price List/Quotation upon which tender is based _____
 Price List/Quotation Reference Number _____

N.B.

- The above information must be provided for each item supplied to the Tenderer.
- Copies of price lists on which tender prices are based shall be enclosed for all items. The items referenced on the Pricing Schedule must be clearly identified on the Price List.
- Tenderers will be entitled to claim only the difference between the cost of the product at the time of tendering and the new cost. Documentation to this effect must be submitted with each claim.

1.1.3 TENDERERS THAT ARE MANUFACTURERS OF THE TENDERED ITEMS (COMPLETE PARAGRAPH A, B OR A COMBINATION OR BOTH):

Tenderers that are manufacturers of the tendered items are subject to contract price adjustment based on SEIFSA INDICES and/or MATERIALS SUPPLIER'S PRICE LISTS, and shall complete only the following options:

a) **SEIFSA Index based Contract Price Variations**

Published indices shall be applied quarterly to determine a fixed rate for the following quarter, as detailed below.

Material and labour price variation shall be calculated based upon the SEIFSA base material and labour prices / indices and the stipulated price proportions as detailed in Annexure A of Schedule 8, which shall be completed in full.

A minimum of 10% of the tender price shall be fixed and free of variation for the duration of the contract.

The SEIFSA contract price adjustment formula shall apply, unless otherwise detailed.

This section is applicable to **Tenderers that ARE the manufacturer** of the tendered Goods.

Only Contractors that are the manufacturers of the Goods may claim SEIFSA Index based contract price adjustments.

For items that are subject to ROE, the SEIFSA index based CPA **shall apply only to the South African Content portion**, column (F) of the above table.

The contract price per item shall be adjusted **quarterly** in advance of placement of orders, and the adjusted contract price shall be applicable for purchase orders placed during the following three full calendar months.

Fluctuations in the prices of raw materials and labour will be acceptable for the Contract Price Adjustment calculations for the tendered Goods.

The base month for Contract Price Adjustment calculations shall be the calendar month prior to the month of the closing date for tenders, and published indices applicable to this month shall be used.

Adjusted contract prices per item shall be calculated based upon the SEIFSA indices published in the calendar month of application for the amended equipment contract prices.

Material and labour price variation shall be calculated based upon the SEIFSA base material and labour indices and the stipulated price proportions as detailed in Annexure A of Schedule 8.

A minimum of 10% of the **South African Content portion** of the tender price per item (column (F) of the above table) shall be fixed and free of variation for the duration of the contract.

The process to be followed by Contractors for claims for contract price adjustment in terms of SEIFSA shall be as follows:

- a) The Contractor shall approach the Employer in writing prior to the third Friday of each of **February, May, August and November** month with an application for the amended unit prices of the Goods to be applicable to the contract during the following month.

- b) The application shall be based upon the SEIFSA indices published during the calendar month of application (published before the end of the third week of the month and detailing the latest available indices) and shall detail the proposed adjusted unit prices for the Goods and include detailed calculations indicating how the adjusted unit prices per item have been established.
- c) Calculations of the contract price adjustment shall use the original tendered unit rates, the base indices, the indices published in the calendar month of application and the SEIFSA formula and shall contain no other factors or adjustments.
- d) The Employer will check and approve the proposed unit prices for the following month prior to the last Friday of the month of application. The Employer will notify the Contractor in writing of approval of the adjusted prices. Any communications regarding approval of the proposed adjusted prices shall be completed before the last Friday of the month of application for the amended unit prices for the Goods.
- e) The Employer will update the SAP Contract records at the end of the month with the approved amended unit prices for the following three months.
- f) All purchase orders for the contracted Goods issued during a quarterly period shall be issued, invoiced and paid at the contract unit prices approved for that quarterly period and no further contract price adjustment claims will be considered, irrespective of the actual month of delivery and whether or not deliveries were subject to any manufacturing or delivery delays.
- g) The required delivery dates for orders for the contracted Goods placed by the Employer will be determined based upon the date of issue of the purchase order and the contract delivery period.
- h) Failure by the Contractor to submit claims for Contract Price Adjustment within the timeframes detailed above will result in the unit rates for the Goods concerned being determined by the Employer in accordance with the published SEIFSA indices. The Employer however reserves the right in such a case not to amend the unit rates for the Goods if it is not to the Employer's advantage.
- i) The successful Contractor shall immediately upon notification of the commencement date of contract submit written application for approval of adjusted unit prices for the Goods that shall be applicable during the first calendar month of the contract. This application will be assessed in accordance with the process laid out above in order to determine approved contract prices for the first calendar month of the contract.
- j) Failure to submit such application within one working week of commencement of contract shall result in the tendered unit prices being applied for orders placed during the first calendar month of the contract.
- k) Application for Contract Price Adjustment thereafter shall follow the process detailed above.

b) Increase using Material Supplier Price Lists

The tender price shall be subject to adjustment based on Supplier's Price Lists for the materials supplied for the manufacture of the tendered items.

Supplier: _____ rate of Price List/Quotation
upon which tender is based _____

Price List/Quotation Reference Number _____

N.B.

- The above information must be provided for each item supplied to the Tenderer.
- Copies of price lists on which tender prices are based shall be enclosed for all items.

- Tenderers will be entitled to claim only the difference between the cost of the product at the time of tendering and the new cost. Documentation to this effect must be submitted with each claim.

1.1.4 RATE OF EXCHANGE VARIATIONS

- (a) The value in foreign currency inserted in column (A) shall be subject to clause (h) below when recalculating the Rand value.
- (b) The rate of exchange inserted in column (B) shall be the closing spot selling rate quoted by Council's main banker, NEDBANK, on the Base Date, rounded to the second decimal place, subject to sub-paragraph (c) below.
- (c) If the rate of exchange inserted by the Tenderer differs from the NEDBANK rate referred to above, then the NEDBANK rate shall apply and the Rand value in columns (C) and (F) shall be recalculated accordingly, without altering the price in the Price Schedule for the relevant items.
- (d) If a tender from a supplier or sub-contractor provides for variations in rates of exchange, the Supplier may **only** claim for variations in rates of exchange if he binds the supplier or sub-contractor to the same provision to take out forward cover as described in sub-paragraph (e) below.
- (e) The Supplier (or sub-contractor) shall within five working days from the date of placing a firm order on an overseas supplier, cover or recover forward by way of a contract with a bank which is an authorised foreign exchange dealer, the foreign exchange component of the cost of any imported Plant and Materials inserted by the Tenderer on the schedule titled "**Price Basis for Imported Resources**".
- (f) When the Supplier (or sub-contractor) so obtains forward cover, the Supplier shall immediately notify the CCT of the rate obtained and furnish the CCT with a copy of the foreign exchange contract note.
- (g) Based on the evidence provided in sub-paragraph (f) above, the value in Rand inserted in column (C) of on the schedule titled "**Price Basis for Imported Resources**" shall be recalculated using the forward cover rate obtained, and any increase or decrease in the Rand value defined in this clause shall be adjusted accordingly, subject to sub-paragraph (h) below.
- (h) The adjustments shall be calculated upon the value in foreign currency in the Supplier's (or sub-contractor's) **forward cover contract**, provided that, should this value exceed the value in foreign currency inserted in column (A) of on the schedule titled "**Price Basis for Imported Resources**", then the value in column (A) shall be used.

TABLE 1.1.4: PRICE BASIS FOR IMPORTED RESOURCES

[illegible]

1. Companies to list the items numbers which is applicable as per the pricing schedule copies to be made if more space is needed.
2. If the Contract price is subject to variations in RATES OF EXCHANGE the Tenderer SHALL complete the appropriate section, failing which no claim for contract price adjustment on the basis of rate of exchange variations will be considered.
3. Only Contractors that are directly importing the tendered Goods or component parts of the tendered Goods may claim rate of exchange variations.
4. If price adjustment for variations in the cost of plant and materials imported from outside of South Africa is provided for in the contract, such adjustment shall be based on the information contained on the schedule titled **"Price Basis for Imported Resources"** and as below. For the purposes of this clause the Rand value of imported Plant and Materials inserted on the schedule titled **"Price Basis for Imported Resources"** (column (F) shall be the value in foreign currency (column (A) converted to South African Rand (column (C) by using the closing spot selling rate quoted by **CCT's** main banker, NEDBANK, on the Base Date (seven calendar days before tender closing date) rounded to the second decimal place (column(B), to which shall be added any Customs Surcharge and Customs Duty applicable at that date (columns (D) and (E).
5. The Supplier shall within seven working days from the date of receipt of the purchase order arrange for cover or recovering forward by way of a contract with a bank which is an authorised foreign exchange dealer, the foreign exchange component of the cost of any imported Plant and Materials inserted by the Tenderer on the scheduled titled **"Price Basis for Imported Resources"**, and submit such Forward Cover quotation to the City for approval. Following such approval the forward cover shall be contracted within a further two working days and a copy provided to the City.
6. Based on the evidence provided in Clause 4 above, the value in Rand inserted in column (C) of on the schedule titled **"Price Basis for Imported Resources"** shall be recalculated using the forward cover rate obtained, and any increase or decrease in the Rand value defined in this clause shall be adjusted accordingly, subject to Clause 7 below.
7. The adjustments shall be calculated upon the value in foreign currency in the Supplier's **forward cover contract**, provided that, should this value exceed the value in foreign currency inserted in column (A) of on the schedule titled **"Price Basis for Imported Resources"**, then the value in column (A) shall be used.
8. Any increase or decrease in the Rand value between the amounts of Customs Surcharge and Customs Duty inserted in on the schedule titled **"Price Basis for Imported Resources"** and those amounts actually paid to the Customs and Excise Authorities, which are due to changes in the percentage rates applicable or to the foreign exchange rate used by the authorities, shall be adjusted accordingly.
9. The Tenderer shall state the Customs Duty Tariff Reference applicable to each item and the Supplier shall advise the CCT's Agent of any changes which occur.
10. Contractors shall take out Forward Cover covering the foreign exchange component of the cost of any imported portion of the Goods ordered on each purchase order issued by the Employer.
11. The process to be followed by Contractors for claims for Rate of Exchange Variations shall be as follows:
 - a) On receipt of a purchase order the Contractor shall arrange for a quotation for Forward Cover from their banking institution.

- b) This Forward Cover quotation shall be submitted to the Employer for approval of the Forward Cover rate within seven working days from date of receipt of the purchase order.
- c) Only once the Forward Cover rate is approved may the Contractor engage in a formalised contract with their banking institution and submit the Forward Cover contract to the Employer. This shall be done within two working days from the City's approval.
- d) The Forward Cover Contract shall refer to the purchase order number, shall be signed by both parties (the Contractor and the Banking Institution) and shall be valid until such time as the goods are delivered to the Employer.

12. On delivery of the goods to the City the Contractor shall submit the following documentation:

- a) The Bill of Lading/Waybill/Customs Invoice (clearly indicating the items as identified on the purchase order).
- b) Calculations detailing the difference in the rate of exchange at the time of entry and the date of tender. These shall be submitted on a covering letter.
- c) The invoice / credit note for the Rate of Exchange adjustment applicable to the specific order.

1.1.5 SUPPLIER / MANUFACTURER PRICE LIST VARIATIONS

- 1. This section is applicable to **Tenderers that are NOT the manufacturer** of the tendered Goods.
- 2. This section is **also applicable to** Tenderers that are importing overseas manufactured component parts for assembly into tendered goods that are locally manufactured.
- 3. If the contract is subject to variation based on **SUPPLIER / MANUFACTURER PRICE LISTS**, the following will be applicable:
- 4. Contractors shall make the application for contract price adjustment prior to the date upon which the price adjustment would become effective.
- 5. The effective date of any price adjustment granted will be the first day of the month following the month during which the fully substantiated application for contract price adjustment is submitted and approved or, by agreement between the Contractor and the Employer, a subsequent date on which the price adjustment will become effective.
- 6. In instances where the Contractor's price adjustment claimed is less than entitled, the lesser price will be accepted.
- 7. Purchase orders placed prior to the effective date of any price increase shall be placed at the previously agreed price, not the claimed adjusted price.
- 8. Only the difference in cost may be adjusted and under no circumstances may the Contractor increase their profit margin.
- 9. The process to be followed by the Contractor for claims for contract price adjustment shall be as follows:
- 10. The Contractor shall submit all of the documentation indicated below a minimum of two weeks prior to the effective date of the contract price adjustment.

11. The Employer will consider the proposed contract price adjustment and based on the documentary evidence, the Employer may approve the adjustment.
12. A letter authorising the price adjustment will be issued to the Contractor.
All purchase orders issued subsequent to the effective date of the contract price adjustment will be issued at the approved adjusted contract price.

The Contractor shall supply the following documentation when applying for a contract price adjustment:

1. The price list that the tender was based upon clearly indicating the items numbered according to the tender pricing schedule.
2. The new price list from the same Supplier / Manufacturer as originally tendered and clearly indicating the items numbered according to the tender pricing schedule and the revised price applicable to each item.
3. Detailed calculations indicating how the new price has been established.
4. A covering letter on the Contractor's letterhead requesting the contract price adjustment.
5. All documentation is to be signed by the Supplier / Manufacturer and by the Contractor.
6. In the event of a Contractor changing their Supplier / Manufacturer during the tenure of the contract, no request for price variations will be considered unless the Contractor has obtained prior approval from the City for the change of Supplier / Manufacturer. Such approval shall include technical approval by the Engineer of the goods supplied by the replacement Supplier / Manufacturer. Technical approval by the Engineer shall be a prerequisite for any change of Supplier / Manufacturer.

1.1.6 SUPPLIER PRICE LIST VARIATIONS FOR CONTRACTORS SUPPLYING IMPORTED GOODS BY ANOTHER PARTY

Tenderers that intend to purchase the goods from another supplier who is in turn importing the goods shall obtain Firm Prices from the supplier and shall submit the price list in accordance with the process outlined in Clause 8.4.2 above. The updated pricelist shall be submitted to the City within seven calendar days of the date of the purchase order date. The City reserves the right the request further supporting documents to substantiate the claimed adjustments.

1.1.7 CONSUMER PRICE INDEX PRICE ADJUSTMENT MECHANISM (CPA)

1. The Contract Price as per GCC shall remain **Firm** for the first 12 months from date of commencement of the contract and no claims for contract price adjustment will be considered for the first 12 months' subject to the provisions in the price schedule.
2. Subject to 8.11.1. Above, Contract Price Adjustment will be applicable as from commencement of the 13 month. Contractors shall be entitled to claim contract price adjustment as follows:
 - 2.1 **10%** of the **tendered** rate will remain fixed for the duration of the contract.
 - 2.2 **90%** of the year on year rate will be subject to adjustment **annually** based on the average percentage of 12 months as published by STATSSA: Consumer Price Index (P0141–Table B2 – CPI headline year-on-year rates) as follows:

From start of 13th month to the end of the 24th month: Subject to contract price adjustment in accordance with the **Consumer Price Index (P0141–Table B2 – CPI headline year-on-year rates)**. **Base month** for the price adjustment shall be three (3) calendar months prior to the date of commencement. The **end month** shall be three (3) calendar months prior to the 12th month.

From start of 25th month to end of the 36th month: Subject to the contract price adjustment in accordance with the **Consumer Price Index (P0141–Table B2 – CPI headline year-on-year rates)**. **Base month** for the price adjustment shall be three (3) calendar months prior to the 13th month. The **end month** shall be three (3) calendar months prior to 24th month.

From start of 37th month to end 48 month: Subject to the contract price adjustment in accordance with the **Consumer Price Index (P0141–Table B2 – CPI headline year-on-year rates)**. **Base month** for the price adjustment shall be three (3) calendar months prior to the 25th month. The **end month** shall be three (3) calendar months prior to 36th month.

From start of 49th month to end 60 month: Subject to the contract price adjustment in accordance with the **Consumer Price Index (P0141–Table B2 – CPI headline year-on-year rates)**. **Base month** for the price adjustment shall be three (3) calendar months prior to the 37th month. The **end month** shall be three (3) calendar months prior to 48th month.

The **average CPI** will be calculated, the base month to the end month (both included) divided by the number of months.

Example:

The claim will be based on the **average** between the “base month” and the “end month”
e.g.: $7+6+9+6 = 28$ ($28/4$) = 7 therefore the claim will be 7%.

1.1.8 ADJUSTMENT FOR VARIATIONS IN CUSTOMS SURCHARGE AND CUSTOMS DUTY

(a) Any increase or decrease in the Rand value between the amounts of Customs Surcharge and Customs Duty inserted in on the schedule titled “**Price Basis for Imported Resources**” and those amounts actually paid to the Customs and Excise Authorities, which are due to changes in the percentage rates applicable or to the foreign exchange rate used by the authorities, shall be adjusted accordingly.

(b) The Tenderer shall state the Customs Duty Tariff Reference applicable to each item and the Supplier shall advise the CCT's Agent of any changes which occur.

1.1.9 ADJUSTMENT FOR VARIATION IN LABOUR AND MATERIAL COSTS

If the prices for imported Plant and Materials are not fixed, the Supplier shall in his Tender specify the formula for calculating Contract Price Adjustments normally used in the country of manufacture and the indices and relative proportions of labour and material on which his Tender prices are based. Evidence of the indices applicable shall be provided with each claim. The indices applicable 42 days before contractual dispatch date from the factory will be used for the purposes of Contract Price Adjustment.

Failure to specify a formula in the Tender shall mean that the prices are fixed or shall be deemed to be fixed.

1.1.10 CONTRACT PRICE ADJUSTMENT – GENERAL

All requests for variation in the contract price shall be submitted in writing as follows:

- By letter to: Director Supply Chain Management, City of Cape Town, P O Box 655, Cape Town, 8000, or
- by email to: CPA.Request@capetown.gov.za

prior to the date upon which the price adjustment would become effective.

17.4.10.1 When submitting an application for contract price adjustment the Contractor shall provide the applicable month's actual indices for the SEIFSA Table No's and Descriptions detailed in Annexure A of Schedule 8 or the supplier's actual published pricelists applicable to the particular month, and the actual revised rate proposed for each item. A mere notification of an application for contract price adjustment without stating the adjusted price claimed for each item shall, for the purpose of this clause, not be regarded as a valid claim.

17.4.10.2 The Employer reserves the right to request the Contractor to submit auditor's certificates or such other documentary proof as it may require in order to verify a claim for contract price adjustment. Should the supplier fail to submit such auditor's certificates or other documentary proof to the City of Cape Town within a period of 30 (thirty) days from the date of the request, it shall be presumed that the supplier has abandoned his claim.

Annexure A: Contract Price Adjustment

BASE MATERIAL AND LABOUR PRICES (APPLICABLE TO MANUFACTURERS ONLY AND TO SOUTH AFRICAN CONTENT ONLY)

Where Tender prices are subject to adjustment the prices quoted shall be subject to price variation based upon the SEIFSA base prices per metric ton or indices for materials and labour detailed below. For the purposes of this tender the **base month** shall be **January 2023**.

	COPPER	OTHER: _____	OTHER: _____	OTHER: _____	OTHER: _____	LABOUR
SEIFSA Table No:						
SEIFSA ITEM DESCRIPTION:						

ITEM NO.	DESCRIPTION	MATERIAL					LABOUR	FIXED PORTION OF TENDER PRICE (Min 10%) (%)
		The percentage contributions of specific materials to the total price per item are as follows:-					Proportion of Price Attributed to Labour Cost (%)	
		COPPER	OTHER (AS ABOVE)	OTHER (AS ABOVE)	OTHER (AS ABOVE)	OTHER (AS ABOVE)		
		Proportion of Price (%)	Proportion of Price (%)	Proportion of Price (%)	Proportion of Price (%)	Proportion of Price (%)		
1								
2								
3								
4								
5								
6								
7								

Schedule 9: Certificate of Independent Tender Determination

I, the undersigned, in submitting this tender 298S/2022/23: PROVISION OF MAINTENANCE AND PARTS FOR MOTOR CONTROL CENTRES AND ASSOCIATED ELECTRICAL CONTROL GEAR AT VARIOUS ENGINEERING AND ASSET MANAGEMENT (EAM) REGION 3 WATER AND SANITATION CITY OF CAPE TOWN SITES

in response to the tender invitation made by THE CITY OF CAPE TOWN, do hereby make the following statements, which I certify to be true and complete in every respect:

TENDER DESCRIPTION:

I certify, on behalf of : _____ (Name of tenderer)

That:

1. I have read and I understand the contents of this Certificate;
2. I understand that this tender will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorised by the tenderer to sign this Certificate, and to submit this tender, on behalf of the tenderer;
4. Each person whose signature appears on this tender has been authorised by the tenderer to determine the terms of, and to sign, the tender on behalf of the tenderer;
5. For the purposes of this Certificate and this tender, I understand that the word 'competitor' shall include any individual or organisation other than the tenderer, whether or not affiliated with the tenderer, who:
 - (a) has been requested to submit a tender in response to this tender invitation;
 - (b) could potentially submit a tender in response to this tender invitation, based on their qualifications, abilities or experience; and
 - (c) provides the same goods and services as the tenderer and/or is in the same line of business as the tenderer.
6. The tenderer has arrived at this tender independently from and without consultation, communication, agreement or arrangement with any competitor. However, communication between partners in a joint venture or consortium¹ will not be construed as collusive price quoting.
7. In particular, without limiting the generality of paragraphs 5 and 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:
 - (a) prices;
 - (b) geographical area where product or service will be rendered (market allocation);
 - (c) methods, factors or formulas used to calculate prices;
 - (d) the intention or decision to submit or not to submit a tender;
 - (e) the submission of a tender which does not meet the specifications and conditions of the tender; or
 - (f) tendering with the intention not to win the contract.
8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this tender invitation relates.
9. The terms of this tender have not been and will not be disclosed by the tenderer, directly or indirectly, to any competitor, prior to the date and time of the official tender opening or of the awarding of the contract.
10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to tenders and contracts, tenders that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of section 59 of the Competition Act, Act 89 of 1998, and/or may be reported to the National Prosecuting Authority (NPA) for criminal investigation, and/or may be restricted from conducting business with the public sector for a period not exceeding 10 (ten) years in terms of the Prevention and Combating of Corrupt Activities Act, Act 12 of 2004, or any other applicable legislation.

Signature

Date

Name (PRINT)

(For and on behalf of the Tenderer (duly authorised))

⁽¹⁾ Consortium: Joint venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.)

Schedule 10: Price Basis for Imported Resources

[illegible]

*** State Customs Duty Tariff Reference for each item**

Note:

Note that any Resources not inserted in this Returnable Schedule shall be deemed to be manufactured / supplied in South Africa for the purposes of Contract Price Adjustment. The BASE DATE referred to in column (B) will be 7 calendar days before tender closing.

SIGNED ON BEHALF OF TENDERER:

Schedule 11: Schedule of Pre-Qualification Criteria Sub-Contractors

Not applicable to this tender

Schedule 12: List of other documents attached by tenderer
--

The tenderer has attached to this schedule, the following additional documentation:

	Date of Document	Title of Document or Description (refer to clauses / schedules of this tender document where applicable)
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		

Attach additional pages if more space is required.

 Signature
 Print name:
 On behalf of the tenderer (duly authorised)

 Date

Schedule 13: Record of Addenda to Tender Documents

We confirm that the following communications received from the Employer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:

	Date	Title or Details
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		
10.		

Attach additional pages if more space is required.

SIGNED ON BEHALF OF TENDERER:

Schedule 14: Information to be provided with the tender

The tenderer shall provide information for sub-contracting resources set in the tender conditions.

a) List subcontractors

Schedule 14: SUB CONTRACTORS

Page number: _____

Number	Sub-contractor Name/ Registered company name	Nature of sub-contracting/ What services does the company specialise in.	Is the sub- contractor a subsidiary of the main contractor? Y / N
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			

SIGNED ON BEHALF OF TENDERER:

Schedule 15: Information to be provided with the tender
--

The following information shall be provided with the Tender

- a. Failure to provide all information **IN THIS TENDER SUBMISSION AT TIME OF CLOSING OF TENDER** will result in the tenderer not being able to achieve eligibility and thus declared non-responsive.

SIGNED ON BEHALF OF TENDERER:

SCHEDULE 15 Key Staff Personnel Requirement (Complete a duplicate page if required, for more staff) Page no. _____						
Complete all the relevant sections				Region name and number: _____		
No.	Designation	Name and Surname	Qualification offered of listed person	Qualification as per tender specification	Years of experience offered	Years of experience as per tender specification
A1.1	Installation Electrician (with SANS 10142-1 Wiring Regulations for low voltage electrical installations) Installation Electrician with SANS 10142-1 Wiring Regulations Region 3			Passed certificate and completion of theory course in Wiring Regulations of Electrical Installations below 1000VAC. Department of labour registration certificate as an Installation Electrician in terms of Wiring Regulations SANS 10142-1		>3 Years Post Registration as an Installation Electrician registered with Department of Labour
A1.2	Master Installation with SANS 10142-1 Wiring Regulations for low voltage electrical installations) Region 3			Trade tested Masters Electrician Passed certificate and completion of theory course in Wiring Regulations of Electrical Installations below 1000VAC. Department of labour registration certificate as a Master Installation Electrician in terms of Wiring Regulations SANS 10142-1. It may be the same person – Installation Electrician		>3 Years Post Registration as a Master Installation Electrician registered with Department of Labour
B1.1.1	Supervisor/Site foreman/Site agent			• >3 Years Post Qualification. • Supervision of electrician staff • Scoping and estimating of electrical work • Quality assurance of electrical construction works		>3 Years Refer to key personnel minimum requirement

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				- Quoting on estimates of work - Knowledge of Occupational Health and Safety Act and Regulations 85 of 1993 - Multi-disciplinary skilled would be advantageous		
B1.1.2	Supervisor/Site foreman/Site agent for MV works			The following certificates for the Cable Jointer and Supervisor/Site foreman/Site agent shall be required at commencement of contract: - Responsible Persons certificate in terms of NRS 040 – High Voltage Operating Regulations - SAQA US ID: 242766: Demonstrate knowledge and understanding of Operating Regulation for High Voltage Systems - Basic Fire Fighting - First Aid level two		
No.	Designation	Name and Surname	Qualification offered of listed person	Qualification as per tender specification	Years of experience offered	Years of experience as per tender specification
B1.2.1	Electrician 1			Trade tested RSA Red Seal or SAQA equivalent certified for foreign nationals Electrician (three phase)		>3 Years Post Qualification
B1.2.2	Electrician 2			Trade tested RSA Red Seal or SAQA equivalent certified for foreign nationals Electrician (three phase)		>3 Years Post Qualification

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B1.3	Panel wireman			Trade related experience. This includes relevant experience working at building and wiring electrical panels from CAD drawing designs in a workshop and or in the field.		>3 years In-service job experience
B1.4	Electrical cable jointer			Must have the following: ▪ 2 years' experience in MV cable jointing and termination or similar experience. Certified competent by a recognized major cable joint manufacturer or certified competent in terms of South African Qualification Authority (SAQA) Further Education and Training Certificate: Cable Jointing and Termination , SAQA QUAL ID: 58204 or certified competent in terms of a similar MV cable jointing and termination certification or certified competent by the City of Cape Town Technical Training Centre. Previous Experience (This will be amplified in the CV of such a person) Tenderers shall have experience in each of the following aspects: ▪ Medium Voltage Cable Jointing ▪ Medium Voltage Cable Termination ▪ MV Aerial Bundle Conductor Jointing ▪ MV Aerial Bundle Conductor Termination		>2 Years Post Qualification
B1.5	PLC, HMI & SCADA Programmer			N6 or National Diploma in Electrical/Electronic Engineering or Software related programming or OEM Certification. City of Cape		>3 Years Post Qualification

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				Town requires a system integrator with ability programming Schneider PLC and ADROIT SCADA coding.		
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	Key Staff Personnel Requirement (Complete a duplicate page if required, for more staff) Page no. _____					
	Complete all the relevant sections			Region name and number: _____		
No.	Designation	Name and Surname	Qualification offered of listed person	Qualification as per tender specification	Years of experience offered	Years of experience as per tender specification
B1.6	Instrumentation Technician/Artisan			N6 or National Diploma in Electrical/Electronic/Instrumentation Engineering/Trade Tested in Instrumentation or OEM Certification		>3 Years Post Qualification
B1.7.1	Electrician's Assistant 1			No tertiary qualification. Trade related experience will be advantageous for the position.		>1 year In-service job experience
B1.7.2	Electrician's Assistant 2			No tertiary qualification. Trade related experience will be advantageous for the position.		>1 year In-service job experience
B1.8	Draughtsman			AutoCAD or similar drafting course qualification.		>1 year In-service job experience
B1.9	Contractor's Health and Safety Officer (GMR8.5)			Occupational Health and Safety Act 85 of 1993 and Regulations		>1 year In-service job experience
B1.10	Certified Mechanical Handling (Rigger)			Mechanical handling. Rigging and Slings. Crane operator.		>1 year In-service job experience
B1.11	Technician/Artisan– LV Switchgear and circuit breaker services (Make: Schneider/Merlin Gerin, ABB and CBI) or equivalent			Trade related experience or certified by OEM Representative		>3 Years Post Qualification

	Key Staff Personnel Requirement (Complete a duplicate page if required, for more staff) Page no. _____					
	Complete all the relevant sections			Region name and number: _____		
No.	Designation	Name and Surname	Qualification offered of listed person	Qualification as per tender specification	Years of experience offered	Years of experience as per tender specification
B1.12	Service Technician/Artisan/Assistant – <u>Low Voltage 230/440 VAC</u> Electronic Soft starter and Variable Speed drive services (WEG, Yaskawa, Delta, ABB, Allan Bradley, or equivalent))			Trade related experience or certified by OEM Representative		>3 Years Post Qualification
B1.13	Service Engineer – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)			Trade related experience or certified by OEM Representative		>3 Years Post Qualification
B1.14	Service Technician/Artisan/Assistant – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)			Trade related experience or certified by OEM Representative		>3 Years Post Qualification
B1.15	Technician/Artisan – Electrical valve actuator (Make: AUMA)			Trade related experience or certified by OEM Representative		>3 Years Post Qualification
B1.16	Technician/Artisan – Electrical valve actuator (Make: Greytork)			Trade related experience or certified by OEM Representative		>3 Years Post Qualification
B1.17	Technician/Artisan – Electrical valve actuator (Make: ROTORK)			Trade related experience or certified by OEM Representative		>3 Years Post Qualification

	Key Staff Personnel Requirement (Complete a duplicate page if required, for more staff) Page no. _____					
	Complete all the relevant sections			Region name and number: _____		
No.	Designation	Name and Surname	Qualification offered of listed person	Qualification as per tender specification	Years of experience offered	Years of experience as per tender specification
B1.18	Technician/Artisan – Dynamic Power Factor Correction specialist (Impact Power Innovations & Belco)			Trade related experience or certified by OEM Representative		>3 Years Post Qualification
B1.19	Technician/Artisan – - generator engine controllers and changeover (Deep Sea and Lovato or equivalent)			Trade related experience or certified by OEM Representative		>3 Years Post Qualification
B1.20	Technician/Artisan – Uninterruptable Power Supply (Riello, Schneider Electric, APC or equivalent)			Trade related experience or certified by OEM Representative		>3 Years Post Qualification
B1.21	Air-conditioned and dry air de-humidifier service technician (Dehu Tech or equivalent)			Trade related experience or certified by OEM Representative		>3 Years Post Qualification

SIGNED ON BEHALF OF TENDERER:

The table below lists all the vehicles/fleet required during the contract period. The tenderer is required to complete the portfolio of evidence in support of all the listed vehicles/fleet.

Number				
B2 Vehicles requirement per ENGINEERING AND ASSET MANAGEMENT (EAM) Region or all Regions selected. Page no. _____				
No.	Vehicles required per ENGINEERING AND ASSET MANAGEMENT (EAM) Region or all Regions selected. (Complete a duplicate page if required, for more information)	Minimum requirement	Vehicles offered with tender Make, Model, load capacity, registration number, Owned or Sub-Contracted	
			OWNED	HIRED/ LETTER OF INTENT
B2.1.1	0.5 ton LDV or panel van no.1	X2 (Two) required per and for each region.		
B2.1.2	0.5 ton LDV or panel van no.2	X2 (Two) required per and for each region.		
B2.2	1.0 ton LDV or panel van no.1	x1 (One) required per and for each region.		
B2.3	Truck, 3 ton flatbed 5 Ton truck mounted crane	x1 (One) required. Included a copy of registration document for each indicating owner. If none of these vehicles are owned, the tenderer need to prove to the City of Cape Town that such fleet can be acquired by means of rental or agreement or intent to rent with a fleet rental supplier etc.		

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B2.4	Truck mounted or mobile 15 meter aerial platform (Cherry picker)	x1 (One) required. Included a copy of registration document for each indicating owner. If none of these vehicles are owned, the tenderer need to prove to the City of Cape Town that such fleet can be acquired by means of rental or agreement or intent to rent with a fleet rental supplier etc.		
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SIGNED ON BEHALF OF TENDERER:

TENDER DOCUMENT GOODS AND SERVICES		 CITY OF CAPE TOWN ISIXEKO SASEKAPA STAD KAAPSTAD	
SUPPLY CHAIN MANAGEMENT			
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TENDER NO: 298S/2022/23:

TENDER DESCRIPTION: PROVISION OF MAINTENANCE OF MOTOR CONTROL CENTRES AT VARIOUS WATER AND SANITATION, CITY OF CAPE TOWN SITES IN ENGINEERING AND ASSET MANAGEMENT (EAM) REGION 3

CONTRACT PERIOD: THREE YEAR TERM TENDER FROM COMMENCEMENT DATE TO 30 JUNE 2026

VOLUME 3: DRAFT CONTRACT

TENDERER	
NAME of Company/Close Corporation or Partnership / Joint Venture/ Consortium or Sole Proprietor /Individual	
TRADING AS (if different from above)	

NATURE OF TENDER OFFER (please indicate below)	
Main Offer (see clause 2.2.11.1)	
Alternative Offer (see clause 2.2.11.1)	

VOLUME 3: DRAFT CONTRACT

(7) SPECIAL CONDITIONS OF CONTRACT

The following Special Conditions of Contract, referring to the National Treasury – Conditions of Contract (revised July 2010), are applicable to this Contract:

1. Definitions

Delete Clause 1.15 and substitute with the following

- 1.15 The word 'Goods' is to be replaced everywhere it occurs in the GCC with the phrase 'Goods and / or Services' which means all of the equipment, machinery, materials, services, products, consumables, etc. that the supplier is required to deliver to the purchaser under the contract. This definition shall also be applicable, as the context requires, anywhere where the words "supplies" and "services" occurs in the GCC.

Delete Clause 1.19 and substitute with the following

- 1.19 The word 'Order' is to be replaced everywhere it occurs in the GCC with the words 'Purchase Order' which means the official purchase order authorised and released on the purchaser's SAP System

Delete Clause 1.21 and substitute with the following:

- 1.21 'Purchaser' means the **City of Cape Town**. The address of the Purchaser is **12 Hertzog Boulevard, Cape Town, 8001**.

Add the following after Clause 1.25:

- 1.26 'Supplier' means any provider of goods and / or services with whom the contract is concluded
- 1.27 "Intellectual Property" means any and all intellectual property rights of any nature anywhere in the world whether registered, registerable or otherwise, including patents, trademarks, registered designs and domain names, applications for any of the foregoing, trade or business names, copyright and rights in the nature of copyright, design rights, rights in databases, know-how, trade secrets and any other intellectual property rights which subsist in computer software, computer programs, websites, documents, information, techniques, business methods, drawings, logos, instruction manuals, lists and procedures and particulars of customers, marketing methods and procedures and advertising literature, including the "look and feel" of any websites

3. General Obligations

Delete Clause 3.2 in its entirety and replace with the following clauses.

- 3.2 The parties will be liable to each other arising out of or in connection with any breach of the obligations detailed or implied in this contract, subject to clause 28.
- 3.3 All parties in a joint venture or consortium shall be jointly and severally liable to the purchaser in terms of this contract and shall carry individually the minimum levels of insurance stated in the contract, if any.
- 3.4 The parties shall comply with all laws, regulations and bylaws of local or other authorities having jurisdiction regarding the delivery of the goods and give all notices and pay all charges required by such authorities.
- 3.4.1 The parties agree that this contract shall also be subject to the CCT's Supply Chain Management Policy ('SCM Policy') that was applicable on the date the bid was advertised, **save that if the Employer adopts a new SCM Policy which contemplates that any clause therein would apply to the contract emanating from this tender, such clause shall also be applicable to that contract.** Please refer to this document contained on the CCT's website.
- 3.4.2 Abuse of the supply chain management system is not permitted and may result in cancellation of the contract, restriction of the supplier, and/or the exercise by the City of any other remedies available to it as described in the SCM Policy.

3.5 The **supplier** shall:

3.5.1 Arrange for the documents listed below to be provided to the Purchaser prior to the issuing of the order:

- a) Proof of Insurance (Refer to Clause 11) or Insurance Broker's Warrantee
- b) Letter of good standing from the Compensation Commissioner, or a licensed compensation insurer (Refer to Clause 11)
- c) Initial delivery programme
- d) Other requirements as detailed in the tender documents

3.5.2 Only when notified of the acceptance of the bid by the issuing of the order, the supplier shall commence with and carry out the delivery of the goods in accordance with the contract, to the satisfaction, of the purchaser

3.5.3 Provide all of the necessary materials, labour, plant and equipment required for the delivery of the goods including any temporary services that may be required

3.5.4 Insure his workmen and employees against death or injury arising out of the delivery of the goods

3.5.5 Be continuously represented during the delivery of the goods by a competent representative duly authorised to execute instructions;

3.5.6 In the event of a loss resulting in a claim against the insurance policies stated in clause 11, pay the first amount (excess) as required by the insurance policy

3.5.7 Comply with all written instructions from the purchaser subject to clause 18

3.5.8 Complete and deliver the goods within the period stated in clause 10, or any extensions thereof in terms of clause 21

3.5.9 Make good at his own expense all incomplete and defective goods during the warranty period

3.5.10 Pay to the purchaser any penalty for delay as due on demand by the purchaser. The supplier hereby consents to such amounts being deducted from any payment to the supplier.

3.5.11 Comply with the provisions of the OHAS Act & all relevant regulations.

3.5.12 Comply with all laws relating to wages and conditions generally governing the employment of labour in the Cape Town area and any applicable Bargaining Council agreements.

3.5.13 Deliver the goods in accordance with the contract and with all reasonable care, diligence and skill in accordance with generally accepted professional techniques and standards.

3.6 The **purchaser** shall:

3.6.1 Issue orders for the goods required under this Contract. No liability for payment will ensue for any work done if an official purchase order has not been issued to the supplier.

3.6.2 Make payment to the **supplier** for the goods as set out herein.

3.6.3 Take possession of the goods upon delivery by the supplier.

3.6.4 Regularly inspect the goods to establish that it is being delivered in compliance with the contract.

3.6.5 Give any instructions and/or explanations and/or variations to the supplier including any relevant advice to assist the supplier to understand the contract documents.

3.6.6 Grant or refuse any extension of time requested by the supplier to the period stated in clause 10.

3.6.7 Inspect the goods to determine if, in the opinion of the purchaser, it has been delivered in compliance with the contract, alternatively in such a state that it can be properly used for the purpose for which it was intended.

3.6.8 Brief the supplier and issue all documents, information, etc. in accordance with the contract.

5. Use of contract documents and information; inspection, copyright, confidentiality, etc.

Add the following after clause 5.4:

5.5 Copyright of all documents prepared by the supplier in accordance with the relevant provisions of the copyright Act (Act 98 of 1978) relating to contract shall be vested in the purchaser. Where copyright is vested in the supplier, the purchaser shall be entitled to use the documents or copy them only for the purposes for which they are intended in regard to the contract and need not obtain the supplier's permission to copy for such use. Where copyright is vested in the purchaser, the supplier shall not be liable in any way for the use of any of the information other than as originally intended for the contract and the purchaser hereby indemnifies the supplier against any claim which may be made against him by any party arising from the use of such documentation for other purposes.

The ownership of data and factual information collected by the supplier and paid for by the purchaser shall, after payment, vest with the purchaser

5.6 Publicity and publication

The supplier shall not release public or media statements or publish material related to the services or contract within two (2) years of completion of the services without the written approval of the purchaser, which approval shall not be unreasonably withheld.

5.7 Confidentiality

Both parties shall keep all information obtained by them in the context of the contract confidential and shall not divulge it without the written approval of the other party.

5.8 Intellectual Property

5.8.1 The supplier acknowledges that it shall not acquire any right, title or interest in or to the Intellectual Property of the Employer.

5.8.2 The supplier hereby assigns to the Employer, all Intellectual Property created, developed or otherwise brought into existence by it for the purposes of the contract, unless the Parties expressly agree otherwise in writing.

5.8.3 The supplier shall, and warrants that it shall:

5.8.3.1 not be entitled to use the Employer's Intellectual Property for any purpose other than as contemplated in this contract;

5.8.3.2 not modify, add to, change or alter the Employer's Intellectual Property, or any information or data related thereto, nor may the supplier produce any product as a result of, including and/or arising from any such information, data and Intellectual Property, and in the event that it does produce any such product, the product shall be, and be deemed in law to be, owned by the Employer;

5.8.3.3 not apply for or obtain registration of any domain name, trademark or design which is similar to any Intellectual Property of the Employer;

5.8.3.4 comply with all reasonable directions or instructions given to it by the Employer in relation to the form and manner of use of the Employer Intellectual Property, including without limitation, any brand guidelines which the Employer may provide to the supplier from time to time;

5.8.3.5 procure that its employees, directors, members and contractors comply strictly with the provisions of clauses 5.8.3.1 to 5.8.3.3 above;

unless the Employer expressly agrees thereto in writing after obtaining due internal authority.

5.8.4 The supplier represents and warrants to the Employer that, in providing goods, services or both, as the case may be, for the duration of the contract, it will not infringe or make unauthorised use of the Intellectual Property rights of any third party and hereby indemnifies the Employer from any claims,

liability, loss, damages, costs, and expenses arising from the infringement or unauthorised use by the supplier of any third party's Intellectual Property rights.

- 5.8.5 In the event that the contract is cancelled, terminated, ended or is declared void, any and all of the Employer's Intellectual Property, and any and all information and data related thereto, shall be immediately handed over to the Employer by the supplier and no copies thereof shall be retained by the supplier unless the Employer expressly and in writing, after obtaining due internal authority, agrees otherwise.

7. Performance Security

'Not Applicable. Tenderers must disregard **Form of Guarantee / Performance Security** and are not required to complete same.

8. Inspections, tests and analyses

Delete Clause 8.2 and substitute with the following:

- 8.2 If it is a bid condition that supplies to be produced or services to be rendered should at any stage during production or execution or on completion be subject to inspection, the premises of the bidder or contractor shall be open, at all reasonable hours, for inspection by a representative of the purchaser or an organisation acting on behalf of the purchaser.

10. Delivery and documents

Delete clauses 10.1 and 10.2 and replace with the following:

- 10.1 Delivery of the goods shall be made by the supplier in accordance with the terms specified in the contract. The time for delivery of the goods shall be the date as stated on the order. Orders for the supply and delivery of goods may be raised up until the expiry of a framework agreement bid, provided that the goods can be delivered within 30 days of expiry of the framework contract. All orders, other than for the supply and delivery of goods, must be completed prior to the expiry of the contract period.
- 10.2 The purchaser shall determine, in its sole discretion, whether the goods have been delivered in compliance with the contract, alternatively in such a state that it can be properly used for the purpose for which it was intended. When the purchaser determines that the goods have been satisfactorily delivered, the purchaser must issue an appropriate certification, or written approval, to that effect. Invoicing may only occur, and must be dated, on or after the date of acceptance of the goods.

11. Insurance

Add the following after clause 11.1:

- 11.2 Without limiting the obligations of the supplier in terms of this contract, the supplier shall effect and maintain the following additional insurances:
- a) Public liability insurances, in the name of the supplier, covering the supplier and the purchaser against liability for the death of or injury to any person, or loss of or damage to any property, arising out of or in the course of this Contract, in an amount not less than **R20 million** for any single claim;
 - b) Motor Vehicle Liability Insurance, in respect of all vehicles owned and / or leased by the supplier, comprising (as a minimum) "Balance of Third Party" Risks including Passenger Liability Indemnity;
 - c) Registration / insurance in terms of the Compensation for Occupational Injuries and Disease Act, Act 130 of 1993. This can either take the form of a certified copy of a valid Letter of Good Standing issued by the Compensation Commissioner, or proof of insurance with a licenced compensation insurer, from either the bidder's broker or the insurance company itself (see **Proof of Insurance / Insurance Broker's Warranty** section in document for a pro forma version).
 - d) Professional indemnity insurance providing cover in an amount of not less than R5 million in respect of each and every claim during the contract period.

In the event of under insurance or the insurer's repudiation of any claim for whatever reason, the CCT will retain its right of recourse against the supplier.

- 11.3 The supplier shall be obliged to furnish the CCT with proof of such insurance as the CCT may require from time to time for the duration of this Contract. Evidence that the insurances have been effected in terms of this clause, shall be either in the form of an insurance broker's warranty worded precisely as per the pro forma version contained in the **Proof of Insurance / Insurance Broker's Warranty** section of the document or copies of the insurance policies.

15. Warranty

Add to Clause 15.2:

- 15.2 This warranty for every Works Package during the term of this contract shall remain valid for **six (6) months** after the goods have been supplied, delivered or installed.

16. Payment

Delete Clause 16.1 in its entirety and replace with the following:

- 16.1 A monthly payment cycle will be the norm. All invoices which are dated on or before the 20th of a particular month will typically be paid between the 23rd and 26th of the following month. The supplier may submit a fully motivated application regarding more frequent payment to the Employer's Director: Expenditure for consideration. Requests for more frequent payments will be considered at the sole discretion of the Employer and is not a right in terms of this contract.

Delete Clause 16.2 in its entirety and replace with the following:

- 16.2 The supplier shall furnish the purchaser's Accounts Payable Department with an original tax invoice, clearly showing the amount due in respect of each and every claim for payment.

Add the following after clause 16.4

- 16.5 Notwithstanding any amount stated on the order, the supplier shall only be entitled to payment for goods actually delivered in terms of the Project Specification and Drawings, or any variations in accordance with clause 18. Any contingency sum included shall be for the sole use, and at the discretion, of the purchaser.

The CCT is not liable for payment of any invoice that pre-dates the date of delivery of the goods.

- 16.6 The purchaser will only make advanced payments to the supplier in strict compliance with the terms and details as contained on **Proforma Advanced Payment Guarantee** and only once the authenticity of such guarantee has been verified by the City's Treasury Department.

17. Prices

Add the following after clause 17.1

- 17.2 If as a result of an award of a contract beyond the original tender validity period, the contract execution will be completed beyond a period of twelve (12) months from the expiry of the original tender validity period, then the contract may be subject to contract price adjustment for that period beyond such twelve (12) months. An appropriate contract price adjustment formula will be determined by the Director: Supply Chain Management if such was not included in the bid documents.

- 17.3 If as a result of any extension of time granted the contract execution will be completed beyond a period of twelve (12) months from the expiry of the original tender validity period, then contract price adjustment may apply to that period beyond such twelve (12) months. An appropriate contract price adjustment formula will be determined by the Director: Supply Chain Management if such was not included in the bid documents.

17.4 The prices for the goods delivered and services performed shall be subject to contract price adjustment and the following conditions will be applicable:

17.4.1 PRICING INSTRUCTIONS

8. The Tenderer is required to use one or more of the Contract Price Adjustment mechanisms and/or provisions relating to the line items and indicate their preference which line items are relevant to a particular CPA mechanism. The Tenderer is required to use and apply only one Contract Price Adjustment Mechanism (CPA) for a selected line item. This implies that a tender line item cannot have more than one CPA mechanism.
9. The tenderer is required to fill in all schedules for all line items at and before the time of tender to be eligible for CPA for one or more contract price line item/s.
10. The tenderer may submit schedules and copies of their own indicating which line items are relevant to a particular CPA mechanism.
11. The Contract Price Adjustment mechanisms and/or provisions relating to Rate of Exchange Variation contained in this schedule are compulsory and binding on all tenderers.
12. Failure to complete this schedule or any part thereof may result in the tender offer being declared non-responsive.
13. Tenderers are not permitted to amend, vary, alter or delete this schedule or any part thereof unless otherwise stated in this schedule, failing which the tender offer shall be declared non-responsive.
14. Tenderers are not permitted to offer firm prices. If the tenderer offers firm prices in contravention of this clause the tender offer shall be declared non-responsive.

The prices tendered on the pricing schedule shall be subject to price adjustment as follows:

17.4.2 SUPPLIER / MANUFACTURER CONTRACT PRICE ADJUSTMENT

Tenderers that are NOT Manufacturers of the Tendered Items (If more than one manufacturer are used please supply the additional manufacturer's information.

Tenderers that are **NOT** manufacturers of the tendered items are subject to contract price adjustment based on the SUPPLIER'S / MANUFACTURER'S PRICE LISTS from the supplier or manufacturer of the tendered items, as detailed in Clause 8.4.2 of Schedule 8, and shall complete the following:

The tenderer may submit schedules and copies of their own indicating which line items are relevant to supplier's / manufacturer's price lists CPA mechanism.

Supplier: _____

Date of Price List/Quotation upon which tender is based _____

Price List/Quotation Reference Number _____

N.B.

- The above information must be provided for each item supplied to the Tenderer.
- Copies of price lists on which tender prices are based shall be enclosed for all items. The items referenced on the Pricing Schedule must be clearly identified on the Price List.
- Tenderers will be entitled to claim only the difference between the cost of the product at the time of tendering and the new cost. Documentation to this effect must be submitted with each claim.

18.1.5 Tenderers that are MANUFACTURERS of the Tendered Items (Complete paragraph a, b or a combination or both):

Tenderers that are manufacturers of the tendered items are subject to contract price adjustment based on SEIFSA INDICES and/or MATERIALS SUPPLIER'S PRICE LISTS, and shall complete only the following options:

b) SEIFSA Index based Contract Price Variations

Published indices shall be applied quarterly to determine a fixed rate for the following quarter, as detailed below.

Material and labour price variation shall be calculated based upon the SEIFSA base material and labour prices / indices and the stipulated price proportions as detailed in Annexure A of Schedule 8, which shall be completed in full.

A minimum of 10% of the tender price shall be fixed and free of variation for the duration of the contract.

The SEIFSA contract price adjustment formula shall apply, unless otherwise detailed.

This section is applicable to **Tenderers that ARE the manufacturer** of the tendered Goods.

Only Contractors that are the manufacturers of the Goods may claim SEIFSA Index based contract price adjustments.

For items that are subject to ROE, the SEIFSA index based CPA **shall apply only to the South African Content portion**, column (F) of the above table.

The contract price per item shall be adjusted **quarterly** in advance of placement of orders, and the adjusted contract price shall be applicable for purchase orders placed during the following three full calendar months.

Fluctuations in the prices of raw materials and labour will be acceptable for the Contract Price Adjustment calculations for the tendered Goods.

The base month for Contract Price Adjustment calculations shall be the calendar month prior to the month of the closing date for tenders, and published indices applicable to this month shall be used.

Adjusted contract prices per item shall be calculated based upon the SEIFSA indices published in the calendar month of application for the amended equipment contract prices.

Material and labour price variation shall be calculated based upon the SEIFSA base material and labour indices and the stipulated price proportions as detailed in Annexure A of Schedule 8.

A minimum of 10% of the **South African Content portion** of the tender price per item (column (F) of the above table) shall be fixed and free of variation for the duration of the contract.

The process to be followed by Contractors for claims for contract price adjustment in terms of SEIFSA shall be as follows:

- l) The Contractor shall approach the Employer in writing prior to the third Friday of each of **February, May, August and November** month with an application for the amended unit prices of the Goods to be applicable to the contract during the following month.
- m) The application shall be based upon the SEIFSA indices published during the calendar month of application (published before the end of the third week of the month and detailing the latest available indices) and shall detail the proposed adjusted unit prices for the Goods

and include detailed calculations indicating how the adjusted unit prices per item have been established.

- n) Calculations of the contract price adjustment shall use the original tendered unit rates, the base indices, the indices published in the calendar month of application and the SEIFSA formula and shall contain no other factors or adjustments.
- o) The Employer will check and approve the proposed unit prices for the following month prior to the last Friday of the month of application. The Employer will notify the Contractor in writing of approval of the adjusted prices. Any communications regarding approval of the proposed adjusted prices shall be completed before the last Friday of the month of application for the amended unit prices for the Goods.
- p) The Employer will update the SAP Contract records at the end of the month with the approved amended unit prices for the following three months.
- q) All purchase orders for the contracted Goods issued during a quarterly period shall be issued, invoiced and paid at the contract unit prices approved for that quarterly period and no further contract price adjustment claims will be considered, irrespective of the actual month of delivery and whether or not deliveries were subject to any manufacturing or delivery delays.
- r) The required delivery dates for orders for the contracted Goods placed by the Employer will be determined based upon the date of issue of the purchase order and the contract delivery period.
- s) Failure by the Contractor to submit claims for Contract Price Adjustment within the timeframes detailed above will result in the unit rates for the Goods concerned being determined by the Employer in accordance with the published SEIFSA indices. The Employer however reserves the right in such a case not to amend the unit rates for the Goods if it is not to the Employer's advantage.
- t) The successful Contractor shall immediately upon notification of the commencement date of contract submit written application for approval of adjusted unit prices for the Goods that shall be applicable during the first calendar month of the contract. This application will be assessed in accordance with the process laid out above in order to determine approved contract prices for the first calendar month of the contract.
- u) Failure to submit such application within one working week of commencement of contract shall result in the tendered unit prices being applied for orders placed during the first calendar month of the contract.
- v) Application for Contract Price Adjustment thereafter shall follow the process detailed above.

b) Increase using Material Supplier Price Lists

The tender price shall be subject to adjustment based on Supplier's Price Lists for the materials supplied for the manufacture of the tendered items.

Supplier: _____ rate of Price List/Quotation
upon which tender is based _____

Price List/Quotation Reference Number _____
N.B.

- The above information must be provided for each item supplied to the Tenderer.
- Copies of price lists on which tender prices are based shall be enclosed for all items.
- Tenderers will be entitled to claim only the difference between the cost of the product at the time of tendering and the new cost. Documentation to this effect must be submitted with each claim.

18.1.6 RATE OF EXCHANGE VARIATIONS

(a) The value in foreign currency inserted in column (A) shall be subject to clause (h) below when recalculating the Rand value.

(b) The rate of exchange inserted in column (B) shall be the closing spot selling rate quoted by Council's main banker, NEDBANK, on the Base Date, rounded to the second decimal place, subject to sub-paragraph (c) below.

(c) If the rate of exchange inserted by the Tenderer differs from the NEDBANK rate referred to above, then the NEDBANK rate shall apply and the Rand value in columns (C) and (F) shall be recalculated accordingly, without altering the price in the Price Schedule for the relevant items.

(d) If a tender from a supplier or sub-contractor provides for variations in rates of exchange, the Supplier may **only** claim for variations in rates of exchange if he binds the supplier or sub-contractor to the same provision to take out forward cover as described in sub-paragraph (e) below.

(e) The Supplier (or sub-contractor) shall within five working days from the date of placing a firm order on an overseas supplier, cover or recover forward by way of a contract with a bank which is an authorised foreign exchange dealer, the foreign exchange component of the cost of any imported Plant and Materials inserted by the Tenderer on the schedule titled **"Price Basis for Imported Resources"**.

(f) When the Supplier (or sub-contractor) so obtains forward cover, the Supplier shall immediately notify the CCT of the rate obtained and furnish the CCT with a copy of the foreign exchange contract note.

(g) Based on the evidence provided in sub-paragraph (f) above, the value in Rand inserted in column (C) of on the schedule titled **"Price Basis for Imported Resources"** shall be recalculated using the forward cover rate obtained, and any increase or decrease in the Rand value defined in this clause shall be adjusted accordingly, subject to sub-paragraph (h) below.

(h) The adjustments shall be calculated upon the value in foreign currency in the Supplier's (or sub-contractor's) **forward cover contract**, provided that, should this value exceed the value in foreign currency inserted in column (A) of on the schedule titled **"Price Basis for Imported Resources"**, then the value in column (A) shall be used.

TABLE 17.4.4: PRICE BASIS FOR IMPORTED RESOURCES

Item No.	Value in foreign currency	Rate of exchange as at 7 days prior to date of tender	Value in Rand, of foreign currency content (columns AxB)	Customs Surcharge		Customs Duty		Amount of South African Content	Total in Rand of columns C+D+E+F (Total Tender Price) (Excl. VAT)
				%	R	%	R		
	(A)	(B)	(C)		(D)		(E)	(F)	(G)

[illegible]

13. Companies to list the items numbers which is applicable as per the pricing schedule copies to be made if more space is needed.
14. If the Contract price is subject to variations in RATES OF EXCHANGE the Tenderer SHALL complete the appropriate section, failing which no claim for contract price adjustment on the basis of rate of exchange variations will be considered.
15. Only Contractors that are directly importing the tendered Goods or component parts of the tendered Goods may claim rate of exchange variations.
16. If price adjustment for variations in the cost of plant and materials imported from outside of South Africa is provided for in the contract, such adjustment shall be based on the information contained on the schedule titled **"Price Basis for Imported Resources"** and as below. For the purposes of this clause the Rand value of imported Plant and Materials inserted on the schedule titled **"Price Basis for Imported Resources"** (column (F) shall be the value in foreign currency (column (A)

converted to South African Rand (column (C) by using the closing spot selling rate quoted by **CCT's** main banker, NEDBANK, on the Base Date (seven calendar days before tender closing date) rounded to the second decimal place (column(B), to which shall be added any Customs Surcharge and Customs Duty applicable at that date (columns (D) and (E).

17. The Supplier shall within seven working days from the date of receipt of the purchase order arrange for cover or recovering forward by way of a contract with a bank which is an authorised foreign exchange dealer, the foreign exchange component of the cost of any imported Plant and Materials inserted by the Tenderer on the scheduled titled "**Price Basis for Imported Resources**", and submit such Forward Cover quotation to the City for approval. Following such approval the forward cover shall be contracted within a further two working days and a copy provided to the City.
18. Based on the evidence provided in Clause 4 above, the value in Rand inserted in column (C) of on the schedule titled "**Price Basis for Imported Resources**" shall be recalculated using the forward cover rate obtained, and any increase or decrease in the Rand value defined in this clause shall be adjusted accordingly, subject to Clause 7 below.
19. The adjustments shall be calculated upon the value in foreign currency in the Supplier's **forward cover contract**, provided that, should this value exceed the value in foreign currency inserted in column (A) of on the schedule titled "**Price Basis for Imported Resources**", then the value in column (A) shall be used.
20. Any increase or decrease in the Rand value between the amounts of Customs Surcharge and Customs Duty inserted in on the schedule titled "**Price Basis for Imported Resources**" and those amounts actually paid to the Customs and Excise Authorities, which are due to changes in the percentage rates applicable or to the foreign exchange rate used by the authorities, shall be adjusted accordingly.
21. The Tenderer shall state the Customs Duty Tariff Reference applicable to each item and the Supplier shall advise the CCT's Agent of any changes which occur.
22. Contractors shall take out Forward Cover covering the foreign exchange component of the cost of any imported portion of the Goods ordered on each purchase order issued by the Employer.
23. The process to be followed by Contractors for claims for Rate of Exchange Variations shall be as follows:
 - e) On receipt of a purchase order the Contractor shall arrange for a quotation for Forward Cover from their banking institution.
 - f) This Forward Cover quotation shall be submitted to the Employer for approval of the Forward Cover rate within seven working days from date of receipt of the purchase order.
 - g) Only once the Forward Cover rate is approved may the Contractor engage in a formalised contract with their banking institution and submit the Forward Cover contract to the Employer. This shall be done within two working days from the City's approval.
 - h) The Forward Cover Contract shall refer to the purchase order number, shall be signed by both parties (the Contractor and the Banking Institution) and shall be valid until such time as the goods are delivered to the Employer.
24. On delivery of the goods to the City the Contractor shall submit the following documentation:
 - 18.1.6.1.1 The Bill of Lading/Waybill/Customs Invoice (clearly indicating the items as identified on the purchase order).

18.1.6.1.2 Calculations detailing the difference in the rate of exchange at the time of entry and the date of tender. These shall be submitted on a covering letter.

18.1.6.1.3 The invoice / credit note for the Rate of Exchange adjustment applicable to the specific order.

18.1.7 Supplier / Manufacturer Price List Variation claims

13. This section is applicable to **Tenderers that are NOT the manufacturer** of the tendered Goods.
14. This section is **also applicable to** Tenderers that are importing overseas manufactured component parts for assembly into tendered goods that are locally manufactured.
15. If the contract is subject to variation based on **SUPPLIER / MANUFACTURER PRICE LISTS**, the following will be applicable:
16. Contractors shall make the application for contract price adjustment prior to the date upon which the price adjustment would become effective.
17. The effective date of any price adjustment granted will be the first day of the month following the month during which the fully substantiated application for contract price adjustment is submitted and approved or, by agreement between the Contractor and the Employer, a subsequent date on which the price adjustment will become effective.
18. In instances where the Contractor's price adjustment claimed is less than entitled, the lesser price will be accepted.
19. Purchase orders placed prior to the effective date of any price increase shall be placed at the previously agreed price, not the claimed adjusted price.
20. Only the difference in cost may be adjusted and under no circumstances may the Contractor increase their profit margin.
21. The process to be followed by the Contractor for claims for contract price adjustment shall be as follows:
22. The Contractor shall submit all of the documentation indicated below a minimum of two weeks prior to the effective date of the contract price adjustment.
23. The Employer will consider the proposed contract price adjustment and based on the documentary evidence, the Employer may approve the adjustment.
24. A letter authorising the price adjustment will be issued to the Contractor.
All purchase orders issued subsequent to the effective date of the contract price adjustment will be issued at the approved adjusted contract price.

The Contractor shall supply the following documentation when applying for a contract price adjustment:

7. The price list that the tender was based upon clearly indicating the items numbered according to the tender pricing schedule.

8. The new price list from the same Supplier / Manufacturer as originally tendered and clearly indicating the items numbered according to the tender pricing schedule and the revised price applicable to each item.
9. Detailed calculations indicating how the new price has been established.
10. A covering letter on the Contractor's letterhead requesting the contract price adjustment.
11. All documentation is to be signed by the Supplier / Manufacturer and by the Contractor.
12. In the event of a Contractor changing their Supplier / Manufacturer during the tenure of the contract, no request for price variations will be considered unless the Contractor has obtained prior approval from the City for the change of Supplier / Manufacturer. Such approval shall include technical approval by the Engineer of the goods supplied by the replacement Supplier / Manufacturer. Technical approval by the Engineer shall be a prerequisite for any change of Supplier / Manufacturer.

18.1.8 Supplier Price List Variations for Contractors Supplying Imported Goods by Another Party).

Tenderers that intend to purchase the goods from another supplier who is in turn importing the goods shall obtain Firm Prices from the supplier and shall submit the price list in accordance with the process outlined in Clause 8.4.2 above. The updated pricelist shall be submitted to the City within seven calendar days of the date of the purchase order date. The City reserves the right the request further supporting documents to substantiate the claimed adjustments.

17.4.7 Consumer Price Index Price Adjustment Mechanism (CPI)

3. The Contract Price as per GCC shall remain **Firm** for the first 12 months from date of commencement of the contract and no claims for contract price adjustment will be considered for the first 12 months' subject to the provisions in the price schedule.
4. Subject to 8.11.1. Above, Contract Price Adjustment will be applicable as from commencement of the 13 month. Contractors shall be entitled to claim contract price adjustment as follows:
 - 1.2 **10%** of the **tendered** rate will remain fixed for the duration of the contract.
 - 1.3 **90%** of the year on year rate will be subject to adjustment **annually** based on the average percentage of 12 months as published by STATSSA: Consumer Price Index (P0141–Table B2 – CPI headline year-on-year rates) as follows:

From start of 13th month to the end of the 24th month: Subject to contract price adjustment in accordance with the **Consumer Price Index (P0141–Table B2 – CPI headline year-on-year rates)**. **Base month** for the price adjustment shall be three (3) calendar months prior to the date of commencement. The **end month** shall be three (3) calendar months prior to the 12th month.

From start of 25th month to end of the 36th month: Subject to the contract price adjustment in accordance with the **Consumer Price Index (P0141–Table B2 – CPI headline year-on-year rates)**. **Base month** for the price adjustment shall be three (3) calendar months prior to the 13th month. The **end month** shall be three (3) calendar months prior to 24th month.

From start of 37th month to end 48 month: Subject to the contract price adjustment in accordance with the **Consumer Price Index (P0141–Table B2 – CPI headline year-on-year rates)**. **Base month** for the price adjustment shall be three (3) calendar months prior to the 25th month. The **end month** shall be three (3) calendar months prior to 36th month.

From start of 49th month to end 60 month: Subject to the contract price adjustment in accordance with the **Consumer Price Index (P0141–Table B2 – CPI headline year-on-year**

rates). **Base month** for the price adjustment shall be three (3) calendar months prior to the 37th month. The **end month** shall be three (3) calendar months prior to 48th month.

The **average CPI** will be calculated, the base month to the end month (both included) divided by the number of months.

Example:

The claim will be based on the **average** between the “base month” and the “end month”
e.g.: $7+6+9+6 = 28$ ($28/4$) = 7 therefore the claim will be 7%.

17.4.8 Adjustment for variations in customs surcharge and customs duty

(a) Any increase or decrease in the Rand value between the amounts of Customs Surcharge and Customs Duty inserted in on the schedule titled “**Price Basis for Imported Resources**” and those amounts actually paid to the Customs and Excise Authorities, which are due to changes in the percentage rates applicable or to the foreign exchange rate used by the authorities, shall be adjusted accordingly.

(b) The Tenderer shall state the Customs Duty Tariff Reference applicable to each item and the Supplier shall advise the CCT’s Agent of any changes which occur.

17.4.9 Adjustment for variation in labour and material Costs

If the prices for imported Plant and Materials are not fixed, the Supplier shall in his Tender specify the formula for calculating Contract Price Adjustments normally used in the country of manufacture and the indices and relative proportions of labour and material on which his Tender prices are based. Evidence of the indices applicable shall be provided with each claim. The indices applicable 42 days before contractual dispatch date from the factory will be used for the purposes of Contract Price Adjustment.

Failure to specify a formula in the Tender shall mean that the prices are fixed or shall be deemed to be fixed.

17.4.11 Contract Price Adjustment – General

17.4.11.1 All requests for variation in the contract price shall be submitted in writing as follows:

- By letter to: Director Supply Chain Management, City of Cape Town, P O Box 655, Cape Town, 8000, or
- by email to: CPA.Request@capetown.gov.za

prior to the date upon which the price adjustment would become effective.

17.4.11.2 When submitting an application for contract price adjustment the Contractor shall provide the applicable month’s actual indices for the SEIFSA Table No’s and Descriptions detailed in Annexure A of Schedule 8 or the supplier’s actual published pricelists applicable to the particular month, and the actual revised rate proposed for each item. A mere notification of an application for contract price adjustment without stating the adjusted price claimed for each item shall, for the purpose of this clause, not be regarded as a valid claim.

17.4.11.3 The Employer reserves the right to request the Contractor to submit auditor’s certificates or such other documentary proof as it may require in order to verify a claim for contract price adjustment. Should the supplier fail to submit such auditor’s certificates or other documentary proof to the City

of Cape Town within a period of 30 (thirty) days from the date of the request, it shall be presumed that the supplier has abandoned his claim.

Annexure A: Contract Price Adjustment

BASE MATERIAL AND LABOUR PRICES (APPLICABLE TO MANUFACTURERS ONLY AND TO SOUTH AFRICAN CONTENT ONLY)

Where Tender prices are subject to adjustment the prices quoted shall be subject to price variation based upon the SEIFSA base prices per metric ton or indices for materials and labour detailed below. For the purposes of this tender the **base month** shall be **May 2022**.

	COPPER	OTHER: _____	OTHER: _____	OTHER: _____	OTHER: _____	LABOUR
SEIFSA Table No:						
SEIFSA ITEM DESCRIPTION:						

ITEM NO.	DESCRIPTION	MATERIAL					LABOUR	FIXED PORTION OF TENDER PRICE (Min 10%)
		The percentage contributions of specific materials to the total price per item are as follows:-					Proportion of Price Attributed to Labour Cost (%)	
		COPPER	OTHER (AS ABOVE)	OTHER (AS ABOVE)	OTHER (AS ABOVE)	OTHER (AS ABOVE)		
		Proportion of Price (%)	Proportion of Price (%)	Proportion of Price (%)	Proportion of Price (%)	Proportion of Price (%)		
1								
2								
3								
4								
5								
6								
7								

18. Contract Amendments and Variations

Add the following to clause 18.1:

Variations means changes to the goods, extension of the duration or expansion of the value of the contract that the purchaser issues to the supplier as instructions in writing, subject to prior approval by the purchaser's delegated authority. Should the supplier deliver any goods not described in a written instruction from the purchaser, such work will not become due and payable until amended order has been issued by the purchaser.

20. Subcontracts

Add the following after clause 20.1:

- 20.2 The supplier shall be liable for the acts, defaults and negligence of any subcontractor, his agents or employees as fully as if they were the acts, defaults or negligence of the supplier.
- 20.3 Any appointment of a subcontractor shall not amount to a contract between the CCT and the subcontractor, or a responsibility or liability on the part of the CCT to the subcontractor and shall not relieve the supplier from any liability or obligation under the contract.

21. Delays in the supplier's performance

Delete Clause 21.2 in its entirety and replace with the following:

- 21.2 If at any time during the performance of the contract the supplier or its sub-contractors should encounter conditions beyond their reasonable control which impede the timely delivery of the goods, the supplier shall notify the purchaser in writing, within 7 Days of first having become aware of these conditions, of the facts of the delay, its cause(s) and its probable duration. As soon as practicable after receipt of the supplier's notice, the purchaser shall evaluate the situation, and may at his discretion extend the time for delivery.

Where additional time is granted, the purchaser shall also determine whether or not the supplier is entitled to payment for additional costs in respect thereof. The principle to be applied in this regard is that where the purchaser or any of its agents are responsible for the delay, reasonable costs shall be paid. In respect of delays that were beyond the reasonable control of both the supplier and the purchaser, additional time only (no costs) will be granted.

The purchaser shall notify the supplier in writing of his decision(s) in the above regard.

- 21.3 No provision in a contract shall be deemed to prohibit the obtaining of goods from a national department, provincial department, or a local authority.

22. Penalties

Delete clause 22.1 and replace with the following:

- 22.1 Subject to GCC Clause 25, if the supplier fails to deliver any or all of the goods within the period(s) specified in the contract, the purchaser shall, without prejudice to its other remedies under the contract, deduct from the contract price, as a penalty, a sum as stated herein for each day of the delay until actual delivery or performance.

The penalty for this contract shall be for failing to provide the following per Works Package and Purchase Order;

A. Maintenance Schedule:

- A1. A penalty will be imposed upon the supplier for late commencement of work after 48 hours of receipt of a purchase order, where the purchaser requires and instructs the supplier to commence with a Works Project due to operational requirements.
R1000.00 per day and it may be up to the total value of the Purchase Order depending on the value of the Purchase Order per Works Package.

- A2. A penalty will be imposed upon the supplier for failing to respond to a call out or emergency work, within 12 hours of the official notification for work required.
R5000.00 per day and it may be up to the total value of the Purchase Order depending on the value of the Purchase Order per Works Package.

B. Quotation:

- B1. A penalty will be imposed upon the supplier for failing to provide a quotation within 7 calendar days after work has been scoped, specified agreed by both parties.
R1000.00 per day and it may be up to the total value of the Purchase Order depending on the value of the Purchase Order per Works Package.

C. Maintenance and Service reports:

- C1. A penalty will be imposed upon the supplier for failing to provide service and maintenance reports within 7 calendar days after services or maintenance repairs has been done.
R1000.00 per day and it may be up to the total value of the Purchase Order depending on the value of the Purchase Order per Works Package.

D. Equipment:

- D1. Subject to GCC Clause 21.2 a penalty will be imposed upon the supplier should goods and services not be supplied within 7 calendar days after receipt of a purchase order, unless agreed upon in writing by both purchasing parties.
R1000.00 per day and it may be up to the total value of the Purchase Order depending on the value of the Purchase Order per Works Package.

- 22.2 The purchaser shall, without prejudice to its other remedies under the contract, deduct from the contract price, financial penalties as contained on the **Preference Schedule** relating to breaches of the conditions upon which preference points were awarded.

23. Termination for default

Delete the heading of clause 23 and replace with the following:

23. Termination

Add the following to the end of clause 23.1:

if the supplier fails to remedy the breach in terms of such notice

Add the following after clause 23.7:

- 23.8 In addition to the grounds for termination due to default by the supplier, the contract may also be terminated:
- 23.8.1 Upon the death of the supplier who was a Sole Proprietor, or a sole member of a Close Corporation, in which case the contract will terminate forthwith.
- 23.8.2 The parties by mutual agreement terminate the contract.
- 23.8.3 If an Order has been issued incorrectly, or to the incorrect recipient, the resulting contract may be terminated by the purchaser by written notice
- 23.8.4 If a material irregularity vitiates the procurement process leading to the conclusion of the contract, rendering the procurement process and the conclusion of the resulting contract unfair, inequitable, non-transparent, uncompetitive or not cost-effective, provided the City Manager follows the processes as described in the purchasers SCM Policy.
- 23.8.5 After providing notice to the supplier, if the implementation of the contract may result in reputational risk or harm to the City as a result of (inter alia):

- 23.8.5.1 reports of poor governance and/or unethical behaviour;
- 23.8.5.2 association with known family of notorious individuals;
- 23.8.5.3 poor performance issues, known to the Employer;
- 23.8.5.4 negative social media reports; or
- 23.8.5.5 adverse assurance (e.g. due diligence) report outcomes..

- 23.9 If the contract is terminated in terms of clause 23.8, all obligations that were due and enforceable prior to the date of the termination must be performed by the relevant party.

26. Termination for insolvency

Delete clause 26.1 and replace with the following:

- 26.1 The purchaser may make either of the following elections to ensure its rights are protected and any negative impact on service delivery is mitigated:
- 26.1.1 accept a supplier proposal (via the liquidator) to render delivery utilising the appropriate contractual mechanisms; or
- 26.1.2 terminate the contract, as the liquidator proposed supplier is deemed unacceptable to the purchaser, at any time by giving written notice to the supplier (via the liquidator).
- 26.2 Termination will be without compensation to the supplier, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the purchaser.

27. Settlement of Disputes

Amend clause 27.1 as follows:

- 27.1 If any dispute or difference of any kind whatsoever, with the exception of termination in terms of clause 23.1(c), arises between the purchaser and the supplier in connection with or arising out of the contract, the parties shall make every effort to resolve such dispute or difference amicably, by mutual consultation.

Delete Clause 27.2 in its entirety and replace with the following:

- 27.2 Should the parties fail to resolve any dispute by way of mutual consultation, either party shall be entitled to refer the matter for mediation before an independent and impartial person appointed by the City Manager in accordance with Regulation 50(1) of the Local Government: Municipal Finance Management Act, 56 of 2003 – Municipal Supply Chain Management Regulations (Notice 868 of 2005). Such referral shall be done by either party giving written notice to the other of its intention to commence with mediation. No mediation may be commenced unless such notice is given to the other party.

Irrespective whether the mediation resolves the dispute, the parties shall bear their own costs concerning the mediation and share the costs of the mediator and related costs equally.

The mediator shall agree the procedures, representation and dates for the mediation process with the parties. The mediator may meet the parties together or individually to enable a settlement.

Where the parties reach settlement of the dispute or any part thereof, the mediator shall record such agreement and on signing thereof by the parties the agreement shall be final and binding.

Save for reference to any portion of any settlement or decision which has been agreed to be final and binding on the parties, no reference shall be made by or on behalf of either party in any subsequent court proceedings, to any outcome of an amicable settlement by mutual consultation, or the fact that any particular evidence was given, or to any submission, statement or admission made in the course of amicable settlement by mutual consultation or mediation.

28. Limitation of Liability

Delete clause 28.1 (b) and replace with the following:

- (b) the aggregate liability of the supplier to the purchaser, whether under the contract, in tort or otherwise, shall not exceed the sums insured in terms of clause 11 in respect of insurable events, or where no such amounts are stated, to an amount equal to twice the contract price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment.

Add the following after clause 28.1:

- 28.2 Without detracting from, and in addition to, any of the other indemnities in this contract, the supplier shall be solely liable for and hereby indemnifies and holds harmless the purchaser against all claims, charges, damages, costs, actions, liability, demands and/or proceedings and expense in connection with:

- a) personal injury or loss of life to any individual;
- b) loss of or damage to property;

arising from, out of, or in connection with the performance by the supplier in terms of this Contract, save to the extent caused by the gross negligence or wilful misconduct of the purchaser.

- 28.3 The supplier and/or its employees, agents, concessionaires, suppliers, sub-contractors or customers shall not have any claim of any nature against the purchaser for any loss, damage, injury or death which any of them may directly or indirectly suffer, whether or not such loss, damages, injury or death is caused through negligence of the purchaser or its agents or employees.
- 28.4 Notwithstanding anything to the contrary contained in this Contract, under no circumstances whatsoever, including as a result of its negligent (including grossly negligent) acts or omissions or those of its servants, agents or contractors or other persons for whom in law it may be liable, shall any party or its servants (in whose favour this constitutes a *stipulatio alteri*) be liable for any indirect, extrinsic, special, penal, punitive, exemplary or consequential loss or damage of any kind whatsoever, whether or not the loss was actually foreseen or reasonably foreseeable), sustained by the other party, its directors and/or servants, including but not limited to any loss of profits, loss of operation time, corruption or loss of information and/or loss of contracts.
- 28.5 Each party agrees to waive all claims against the other insofar as the aggregate of compensation which might otherwise be payable exceeds the aforesaid maximum amounts payable.

31. Notices

Delete clauses 31.1 and 31.2 and replace with the following:

- 31.1 Any notice, request, consent, approvals or other communications made between the Parties pursuant to the Contract shall be in writing and forwarded to the addresses specified in the contract and may be given as set out hereunder and shall be deemed to have been received when:
- a) hand delivered – on the working day of delivery
 - b) sent by registered mail – five (5) working days after mailing
 - c) sent by email or telefax – one (1) working day after transmission

32. Taxes and Duties

Delete the final sentence of 32.3 and replace with the following:

In this regard, it is the responsibility of the supplier to submit documentary evidence in the form of a valid Tax Clearance Certificate issued by SARS to the CCT at the Supplier Management Unit located within the Supplier Management / Registration Office, 2nd Floor (Concourse Level), Civic Centre, 12 Hertzog Boulevard, Cape Town (Tel 021 400 9242/3/4/5).

Add the following after clause 32.3:

- 32.4 The **VAT registration** number of the City of Cape Town is **4500193497**.

ADDITIONAL CONDITIONS OF CONTRACT

Add the following Clause after Clause 34:

35. Reporting Obligations.

- 35.1 The supplier shall complete, sign and submit with each delivery note, all the documents as required in the Specifications. Any failure in this regard may result in a delay in the processing of any payments.

36. Resources

36.1 Health and Safety File:

The Contractor shall submit a Generic Health and Safety file to the City of Cape Town's Contract Manager within 14 calendar days after date of award of the contract.

Failure to comply with the instruction may result GCC Clause 23 Termination for default.

1. Content and specification of generic health and safety file:

- 1.1 Template of Notice of Construction work – DOL
- 1.2 City of Cape Town, Health and Safety Specification
- 1.3 HSSE Plan & Risk Assessment (reviewed annually)
- 1.4 Letter of Good standing. Issued by the office of the compensation commissioner
- 1.5 BBBEE rating scorecard
- 1.6 City of Cape Town vendor registration certificate or copy of confirmation
- 1.7 Unemployment Insurance Fund (UIF) certificate of compliance
- 1.8 Electrical Construction Association registration certificate
- 1.9 Department of labour registration as an electrical contractor (Entity representing the tenderer)
- 1.10 Company policies:
 - 1.10.1 Alcohol and drug policy
 - 1.10.2 Environmental policy
 - 1.10.3 Health and Safety policy
 - 1.10.4 Smoking policy
 - 1.10.5 Disciplinary code
- 1.11 Contact numbers/ Emergency
- 1.12 Health and Safety appointment letters
- 1.13 Records of Health and Safety induction training
- 1.14 Records of Toolbox talks
- 1.15 Training certificates
 - 1.15.1 Health and Safety induction
 - 1.15.2 Health and Safety and Environmental Representative
 - 1.15.3 Fire awareness
 - 1.15.4 First Aid
 - 1.15.5 ORHVS Responsible person course Modules 1, 2, 3, 4, 7
 - 1.15.6 Erection, dismantling and handling of prefabricated scaffolding
 - 1.15.7 Truck mounted crane operator certificate
 - 1.15.8 Workshop crane operator certificate
- 1.16 Health and Safety Inspection registers
 - 1.16.1 Ladder inspections

1.16.2 PPE

1.16.3 Scaffold inspections

1.16.4 Hand tool inspection

1.16.5 Portable electrical equipment

1.16.6 Crane truck load test certificate (COF)

1.16.7 Workshop crane load test certificate/s

1.17 Procedures

1.17.1 Safe Working Procedures (vendor to supply an audited copy of safe working procedures for;

1.17.1.1 Drilling of metal with a portable handheld drilling machine

1.17.1.2 Erection and dismantling of prefabricated aluminium alloy scaffold

1.17.1.3 Use of 6 foot and 8-foot aluminium step ladders

1.17.1.4 Use of electrical powered power tools

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1.17.1.16 Atmospheric gas testing and monitoring procedure

1.18 Occupational Health and Safety Act 85 of 1993 as amended by OHS Act, no.181 of 1993. Copy of **OHS Act and Regulations 8, 9 and 14 of the Act** printed.

36.2 Compulsory resources for this contract.

The Contractor shall submit a file with comprehensive and accurate returnable schedules detailing all resources available and dedicated for this contract. The file shall be supplied to the City of Cape Town's Contract Manager within 7 calendar days after date of award of the contract as contained in the Project Specifications, SCC's and Schedule 14 and Schedule 15 of this tender document.

Failure to comply with the instruction may result in GCC Clause 23 Termination for default.

36.2.1 Plant materials and equipment

The Contractor shall supply all the plant and equipment required and all plant and equipment shall comply with the requirements as stipulated in the Environmental and Occupational Health and Safety Act and the Construction Regulation Act (2014).

The rates and services supplied under this contract shall include compliance with the Health and Safety Specification and Regulations, Hepatitis A and B injections for contractor's staff. Compliance with the requirements of the Occupational Health and Safety Act, 85 of 1993 and Construction Regulations, 2014. Provision of and adherence to a Health and Safety Specification and Plan. Liaison, co-ordination and chairing of meetings in respect of Health and Safety requirements. Any other Health and Safety expenses incurred in complying with the requirements of the contract. Compliance with the Environmental Management Specification in the Scope of Work and Environmental Management expenses incurred in complying with the requirements of the contract. The Contractor shall submit a Safety File to the City of Cape Town's Contract Manager within 7 calendar days after date of award of the contract.

36.2.2 Key Staff Personal and labour resources

The Contractor shall supply all key staff labour and resources required for when work is required. This labour component may or may not be in the permanent employment of the contractor. Sourced labour shall be declared and listed in the sub-contractor declaration returnable Schedule 16.

The contractor shall within 7 calendar days after award of the contract supply the City of Cape Town's project manager a detailed list of all Key Staff and Labour resources appointed and intended to be used for the contract period. This include all staff and labour resources that could not be deemed as eligibility at the time of tendering. The tenderer shall supply proof of key staff resources available for this tender and individual Work Projects by way of a condensed Curriculum Vitae clearly indicating relevant years of and experience and relevant qualifications as per the specifications.

36.2.3 Workshop and office facilities

The Contractor shall supply all workshop and office facilities required for when work is required. This component may or may not be in the permanent possession of the contractor. Sourced workshop and office facilities shall be declared and listed in the respective declaration returnable Schedule 16.

The contractor shall within 7 calendar days after award of the contract supply the City of Cape Town's project manager a detailed list of all Workshop and Office facilities resources intended to be used for the contract period. This include all workshop and office facilities resources that could not be deemed as eligibility criteria at the time of tendering.

The tenderer shall supply proof of Workshop and office facilities available for this tender and individual Work Projects by way of a condensed Curriculum Vitae or Company profile, clearly indicating the location and the nature of the business of the company as per the specifications.

36.2.4 Vehicles plant and equipment

The Contractor shall supply all vehicles plant and equipment resources required for when work is required. This component may or may not be in the permanent possession of the contractor. Sourced vehicles plant and equipment shall be declared and listed in the respective declaration returnable Schedule 16.

The contractor shall within 7 calendar days after award of the contract supply the City of Cape Town's project manager a detailed list of all Vehicles plant and equipment intended to be used for the contract period. This include all vehicles plant and equipment that could not be deemed as eligibility criteria at the time of tendering.

The tenderer shall supply proof of vehicles plant and equipment resources available for this tender and individual Work Projects by way of a registration papers of a memorandum of agreement between parties, clearly indicating the availability and suitability of the resources for this tender.

36.2.5 Joint Venture staff labour and resources

The Contractor shall supply all joint venture staff, labour and resources required for when work is required. This component may or may not be in the permanent employment of the contractor. Sourced labour and resources shall be declared and listed in the respective declaration returnable Schedule 16.

The contractor shall within 7 calendar days after award of the contract supply the City of Cape Town's project manager a detailed list of all joint venture staff and labour resources appointed and intended to be used for the contract period. This include all Staff and Labour resources that could not be deemed as eligibility criteria at the time of tendering included in a detailed and motivated Memorandum of Understanding (MOU) between all affected parties and individuals.

The tenderer shall supply proof of joint venture and/or staff resources available for this tender and individual Work Projects by way of a condensed Curriculum Vitae clearly indicating relevant years of and experience and relevant qualifications as per the specifications.

37. Protection of personal information

The supplier acknowledges that it will be processing personal information as defined in the Protection of Personal Information Act No. 4 of 2013 relating to City customers, on behalf of the City. Accordingly, it undertakes to ensure compliance with the Act in respect of its processing activities. In particular, it undertakes to keep such information confidential and not to disclose it unless required by law or in the course of the proper performance of its duties. Furthermore, it undertakes to maintain security measures as envisaged in Sections 19 and 21 of the Act. The requirements of this apply to all agents and subcontractors acting on behalf of tenderers and must be included in all contracts between tenderers and their agents or subcontractors.

(8) GENERAL CONDITIONS OF CONTRACT

(National Treasury - General Conditions of Contract (revised July 2010))

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1. Definitions

1. The following terms shall be interpreted as indicated:

- 1.1 'Closing time' means the date and hour specified in the bidding documents for the receipt of bids.
- 1.2 'Contract' means the written agreement entered into between the purchaser and the supplier, as recorded in the contract form signed by the parties, including all attachments and appendices thereto and all documents incorporated by reference therein.
- 1.3 'Contract price' means the price payable to the supplier under the contract for the full and proper performance of his or her contractual obligations.
- 1.4 'Corrupt practice' means the offering, giving, receiving, or soliciting of anything of value to influence the action of a public official in the procurement process or in contract execution.
- 1.5 'Countervailing duties' are imposed in cases in which an enterprise abroad is subsidised by its government and encouraged to market its products internationally.

- 1.6 'Country of origin' means the place where the goods were mined, grown or produced or from which the services are supplied. Goods are produced when, through manufacturing, processing or substantial and major assembly of components, a commercially recognised new product results that is substantially different in basic characteristics or in purpose or utility from its components.
- 1.7 'Day' means calendar day.
- 1.8 'Delivery' means delivery in compliance with the conditions of the contract or order.
- 1.9 'Delivery ex stock' means immediate delivery directly from stock actually on hand.
- 1.10 'Delivery into consignee's store or to his site' means delivered and unloaded in the specified store or depot or on the specified site in compliance with the conditions of the contract or order, the supplier bearing all risks and charges involved until the supplies are so delivered and a valid receipt is obtained.
- 1.11 'Dumping' occurs when a private enterprise abroad markets its goods on its own initiative in the RSA at lower prices than that of the country of origin, and which action has the potential to harm the local industries in the RSA.
- 1.12 'Force majeure' means an event beyond the control of the supplier, not involving the supplier's fault or negligence, and not foreseeable. Such events may include, but are not restricted to, acts of the purchaser in its sovereign capacity, wars or revolutions, fires, floods, epidemics, quarantine restrictions and freight embargoes.
- 1.13 'Fraudulent practice' means a misrepresentation of facts in order to influence a procurement process or the execution of a contract to the detriment of any bidder, and includes collusive practice among bidders (prior to or after bid submission) designed to establish bid prices at artificial, non-competitive levels and to deprive the bidder of the benefits of free and open competition.
- 1.14 'GCC' means the General Conditions of Contract.
- 1.15 'Goods' means all of the equipment, machinery, and/or other materials that the supplier is required to supply to the purchaser under the contract.
- 1.16 'Imported content' means that portion of the bidding price represented by the cost of components, parts or materials which have been or are still to be imported (whether by the supplier or his subcontractors) and which costs are inclusive of the costs abroad, plus freight and other direct importation costs such as landing costs, dock dues, import duty, sales duty or other similar tax or duty at the South African place of entry as well as transportation and handling charges to the factory in the Republic where the supplies covered by the bid will be manufactured.
- 1.17 'Local content' means that portion of the bidding price which is not included in the imported content, provided that local manufacture does take place.
- 1.18 'Manufacture' means the production of products in a factory using labour, materials, components and machinery, and includes other, related value-adding activities.
- 1.19 'Order' means an official written order issued for the supply of goods or works or the rendering of a service.
- 1.20 'Project site', where applicable, means the place indicated in bidding documents.
- 1.21 'Purchaser' means the organisation purchasing the goods.
- 1.22 'Republic' means the Republic of South Africa.
- 1.23 'SCC' means the Special Conditions of Contract.

1.24 'Services' means those functional services ancillary to the supply of the goods, such as transportation and any other incidental services, such as installation, commissioning, provision of technical assistance, training, catering, gardening, security, maintenance, and other such obligations of the supplier covered under the contract.

1.25 'Written' or 'in writing' means handwritten in ink or any form of electronic or mechanical writing.

2. Application

2.1 These general conditions are applicable to all bids, contracts and orders, including bids for functional and professional services, sales, hiring, letting and the granting or acquiring of rights, but excluding immovable property, unless otherwise indicated in the bidding documents.

2.2 Where applicable, special conditions of contract are also laid down to cover specific supplies, services or works.

2.3 Where such special conditions of contract are in conflict with these general conditions, the special conditions shall apply.

3. General

3.1 Unless otherwise indicated in the bidding documents, the purchaser shall not be liable for any expense incurred in the preparation and submission of a bid. Where applicable, a non-refundable fee for documents may be charged.

3.2 With certain exceptions, invitations to bid are only published in the Government Tender Bulletin. The Government Tender Bulletin may be obtained directly from the Government Printer, Private Bag X85, Pretoria 0001, or accessed electronically from www.treasury.gov.za.

4. Standards

4.1 The goods supplied shall conform to the standards mentioned in the bidding documents and specifications.

5. Use of contract documents and information; inspection.

5.1 The supplier shall not, without the purchaser's prior written consent, disclose the contract, or any provision thereof, or any specification, plan, drawing, pattern, sample, or information furnished by or on behalf of the purchaser in connection therewith, to any person other than a person employed by the supplier in the performance of the contract. Disclosure to any such employed person shall be made in confidence and shall extend only so far as may be necessary for the purposes of such performance.

5.2 The supplier shall not, without the purchaser's prior written consent, make use of any document or information mentioned in GCC clause 5.1, except for purposes of performing the contract.

5.3 Any document, other than the contract itself, mentioned in GCC clause 5.1 shall remain the property of the purchaser and shall be returned (all copies) to the purchaser on completion of the supplier's performance under the contract if so required by the purchaser.

5.4 The supplier shall permit the purchaser to inspect the supplier's records relating to the performance of the supplier and to have them audited by auditors appointed by the purchaser, if so required by the purchaser.

6. Patent rights

6.1 The supplier shall indemnify the purchaser against all third-party claims of infringement of patent, trademark, or industrial design rights arising from the use of the goods or any part thereof by the purchaser.

7. Performance Security

7.1 Within 30 (thirty) days of receipt of the notification of contract award, the successful bidder shall furnish to the purchaser the performance security of the amount specified in the SCC.

- 7.2 The proceeds of the performance security shall be payable to the purchaser as compensation for any loss resulting from the supplier's failure to complete his obligations under the contract.
- 7.2 The performance security shall be denominated in the currency of the contract or in a freely convertible currency acceptable to the purchaser, and shall be in one of the following forms:
- a) a bank guarantee or an irrevocable letter of credit issued by a reputable bank located in the purchaser's country or abroad, acceptable to the purchaser, in the form provided in the bidding documents or another form acceptable to the purchaser; or
 - b) a cashier's or certified cheque.
- 7.4 The performance security will be discharged by the purchaser and returned to the supplier not later than 30 (thirty) days following the date of completion of the supplier's performance obligations under the contract, including any warranty obligations, unless otherwise specified in the SCC.

8. Inspections, tests and analyses

- 8.1 All pre-bidding testing will be for the account of the bidder.
- 8.2 If it is a bid condition that supplies to be produced or services to be rendered should at any stage during production or execution or on completion be subject to inspection, the premises of the bidder or contractor shall be open, at all reasonable hours, for inspection by a representative of the Department or an organisation acting on behalf of the Department.
- 8.3 If there are no inspection requirements indicated in the bidding documents and no mention of such is made in the contract, but during the contract period it is decided that inspections shall be carried out, the purchaser shall itself make the necessary arrangements, including payment arrangements with the testing authority concerned.
- 8.4 If the inspections, tests and analyses referred to in clauses 8.2 and 8.3 show the supplies to be in accordance with the contract requirements, the cost of the inspections, tests and analyses shall be defrayed by the purchaser.
- 8.5 Where the supplies or services referred to in clauses 8.2 and 8.3 do not comply with the contract requirements, irrespective of whether such supplies or services are accepted or not, the cost in connection with these inspections, tests or analyses shall be defrayed by the supplier.
- 8.6 Supplies and services which are referred to in clauses 8.2 and 8.3 and which do not comply with the contract requirements may be rejected.
- 8.7 Any contract supplies may on or after delivery be inspected, tested or analysed and may be rejected if found not to comply with the requirements of the contract. Such rejected supplies shall be held at the cost and risk of the supplier, who shall, when called upon, remove them immediately at his own cost and forthwith substitute them with supplies which do comply with the requirements of the contract. Failing such removal, the rejected supplies shall be returned at the suppliers cost and risk. Should the supplier fail to provide the substitute supplies forthwith, the purchaser may, without giving the supplier further opportunity to substitute the rejected supplies, purchase such supplies as may be necessary at the expense of the supplier.
- 8.8 The provisions of clauses 8.4 to 8.7 shall not prejudice the right of the purchaser to cancel the contract on account of a breach of the conditions thereof, or to act in terms of Clause 23 of the GCC.

9. Packing

- 9.1 The supplier shall provide such packing of the goods as is required to prevent their damage or deterioration during transit to their final destination, as indicated in the contract. The packing shall be sufficient to withstand, without limitation, rough handling during transit and exposure to extreme temperatures, salt and precipitation during transit, and open storage. Packing, case size and weights shall take into consideration, where appropriate, the remoteness of the goods' final destination and the absence of heavy handling facilities at all points in transit.

- 9.2 The packing, marking, and documentation within and outside the packages shall comply strictly with such special requirements as shall be expressly provided for in the contract, including additional requirements, if any, specified in the SCC, and in any subsequent instructions ordered by the purchaser.

10. Delivery and documents

- 10.1 Delivery of the goods shall be made by the supplier in accordance with the terms specified in the contract. The details of shipping and/or other documents to be furnished by the supplier are specified in the SCC.

- 10.2 Documents to be submitted by the supplier are specified in the SCC.

11. Insurance

- 11.1 The goods supplied under the contract shall be fully insured, in a freely convertible currency, against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner specified in the SCC.

12. Transportation

- 12.1 Should a price other than an all-inclusive delivered price be required, this shall be specified in the SCC.

13. Incidental Services

- 13.1 The supplier may be required to provide any or all of the following services, including additional services (if any) specified in the SCC:
- (a) performance or supervision of on-site assembly, and/or commissioning of the supplied goods;
 - (b) furnishing of tools required for the assembly and/or maintenance of the supplied goods;
 - (c) furnishing of a detailed operations and maintenance manual for each appropriate unit of the supplied goods;
 - (d) performance or supervision or maintenance and/or repair of the supplied goods, for a period of time agreed by the parties, provided that this service shall not relieve the supplier of any warranty obligations under this contract; and
 - (e) training of the purchaser's personnel, at the supplier's plant and/or on-site, in assembly, start-up, operation, maintenance, and/or repair of the supplied goods.
- 13.2 Prices charged by the supplier for incidental services, if not included in the contract price for the goods, shall be agreed upon in advance by the parties and shall not exceed the prevailing rates charged to other parties by the supplier for similar services.

14. Spare parts

- 14.1 As specified in the SCC, the supplier may be required to provide any or all of the following materials, notifications, and information pertaining to spare parts manufactured or distributed by the supplier:
- (a) such spare parts as the purchaser may elect to purchase from the supplier, provided that this election shall not relieve the supplier of any warranty obligations under the contract; and
 - (b) in the event of termination of production of the spare parts:
 - (i) Advance notification to the purchaser of the pending termination, in sufficient time to permit the purchaser to procure needed requirements; and
 - (ii) following such termination, furnishing at no cost to the purchaser, the blueprints, drawings, and specifications of the spare parts, if requested.

15. Warranty

- 15.1 The supplier warrants that the goods supplied under the contract are new, unused, of the most recent or current models, and that they incorporate all recent improvements in design and materials unless provided otherwise in the contract. The supplier further warrants that all goods supplied under this contract shall have no defect arising from design, materials, or workmanship (except when the design and/or material is required by the purchaser's specifications), or from any act or omission of the supplier, that may develop under normal use of the supplied goods in the conditions prevailing in the country of final destination.

15.2 This warranty shall remain valid for 12 (twelve) months after the goods, or any portion thereof, as the case may be, have been delivered to and accepted at the final destination indicated in the contract, or for 18 (eighteen) months after the date of shipment from the port or place of loading in the source country, whichever period concludes earlier, unless specified otherwise in the SCC.

15.3 The purchaser shall notify the supplier promptly, in writing, of any claims arising under this warranty.

15.4 Upon receipt of such notice, the supplier shall, within the period specified in the SCC and with all reasonable speed, repair or replace the defective goods or parts thereof, without costs to the purchaser.

15.5 If the supplier, having been notified, fails to remedy the defect(s) within the period specified in the SCC, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expense and without prejudice to any other rights which the purchaser may have against the supplier under the contract.

16. Payment

16.1 The method and conditions of payment to be made to the supplier under this contract shall be specified in the SCC.

16.2 The supplier shall furnish the purchaser with an invoice accompanied by a copy of the delivery note and upon fulfilment of any other obligations stipulated in the contract.

16.3 Payments shall be made promptly by the purchaser, but in no case later than 30 (thirty) days after submission of an invoice or claim by the supplier.

16.4 Payment will be made in Rand unless otherwise stipulated in the SCC.

17. Prices

17.1 Prices charged by the supplier for goods delivered and services performed under the contract shall not vary from the prices tendered by the supplier in his bid, with the exception of any price adjustments authorized in the SCC or in the purchaser's request for bid validity extension, as the case may be.

18. Contract Amendments

18.1 No variation in or modification of the terms of the contract shall be made except by written amendment signed by the parties concerned.

19. Assignment

19.1 The supplier shall not assign, in whole or in part, its obligations to perform under the contract, except with the purchaser's prior written consent.

20. Subcontracts

20.1 The supplier shall notify the purchaser in writing of all subcontracts awarded under this contract if not already specified in the bid. Such notification, in the original bid or later, shall not relieve the supplier from any liability or obligation under the contract.

21. Delays in the supplier's performance

21.1 Delivery of the goods and performance of services shall be made by the supplier in accordance with the time schedule prescribed by the purchaser in the contract.

21.2 If at any time during the performance of the contract, the supplier or its subcontractor(s) should encounter conditions impeding timely delivery of the goods and performance of services, the supplier shall promptly notify the purchaser in writing of the fact of the delay, its likely duration and its cause(s). As soon as practicable after receipt of the supplier's notice, the purchaser shall evaluate the situation and may at his or her discretion extend the supplier's time for performance, with or without the imposition of penalties, in which case the extension shall be ratified by the parties by amendment of contract.

- 21.3 No provision in a contract shall be deemed to prohibit the obtaining of supplies or services from a national department, provincial department, or a local authority.
- 21.4 The right is reserved to procure, outside of the contract, small quantities of supplies; or to have minor essential services executed if an emergency arises, or the supplier's point of supply is not situated at or near the place where the supplies are required, or the supplier's services are not readily available.
- 21.5 Except as provided under GCC Clause 25, a delay by the supplier in the performance of its delivery obligations shall render the supplier liable to the imposition of penalties, pursuant to GCC Clause 22, unless an extension of time is agreed upon pursuant to GCC Clause 21.2 without the application of penalties.
- 21.6 Upon any delay beyond the delivery period in the case of a supplies contract, the purchaser shall, without cancelling the contract, be entitled to purchase supplies of a similar quality and up to the same quantity in substitution of the goods not supplied in conformity with the contract and to return any goods delivered later at the supplier's expense and risk, or to cancel the contract and buy such goods as may be required to complete the contract and, without prejudice to his other rights, be entitled to claim damages from the supplier.

22. Penalties

- 22.1 Subject to GCC Clause 25, if the supplier fails to deliver any or all of the goods or to perform the services within the period(s) specified in the contract, the purchaser shall, without prejudice to its other remedies under the contract, deduct from the contract price, as a penalty, a sum calculated on the delivered price of the delayed goods or unperformed services, using the current prime interest rate, calculated for each day of the delay until actual delivery or performance. The purchaser may also consider termination of the contract pursuant to GCC Clause 23.

23. Termination for default

- 23.1 The purchaser, without prejudice to any other remedy for breach of contract, by written notice of default sent to the supplier, may terminate this contract in whole or in part:
- (a) if the supplier fails to deliver any or all of the goods within the period(s) specified in the contract, or within any extension thereof granted by the purchaser pursuant to GCC Clause 21.2;
 - (b) if the supplier fails to perform any other obligation(s) under the contract; or
 - (c) if the supplier, in the judgment of the purchaser, has engaged in corrupt or fraudulent practices in competing for or in executing the contract.
- 23.2 In the event the purchaser terminates the contract in whole or in part, the purchaser may procure, upon such terms and in such manner as it deems appropriate, goods, works or services similar to those undelivered, and the supplier shall be liable to the purchaser for any excess costs for such similar goods, works or services. However, the supplier shall continue performance of the contract to the extent not terminated.
- 23.3 Where the purchaser terminates the contract in whole or in part, the purchaser may decide to impose a restriction penalty on the supplier by prohibiting such supplier from doing business with the public sector for a period not exceeding 10 years.
- 23.4 If a purchaser intends imposing a restriction on a supplier or any person associated with the supplier, the supplier will be allowed a time period of not more than 14 (fourteen) days to provide reasons why the envisaged restriction should not be imposed. Should the supplier fail to respond within the stipulated 14 (fourteen) days the purchaser may regard the intended penalty as not objected against and may impose it on the supplier.
- 23.5 Any restriction imposed on any person by the Accounting Officer/Authority will, at the discretion of the Accounting Officer/Authority, also be applicable to any other enterprise or any partner, manager, director or other person who wholly or partly exercises or exercised or may exercise control over the enterprise of the first-mentioned person, and with which enterprise or person the first-mentioned person is or was, in the opinion of the Accounting Officer/Authority, actively associated.

23.6 If a restriction is imposed, the purchaser must, within 5 (five) working days of such imposition, furnish the National Treasury with the following information:

- (i) the name and address of the supplier and/or person restricted by the purchaser;
- (ii) the date of commencement of the restriction;
- (iii) the period of restriction; and
- (iv) the reasons for the restriction.

These details will be loaded in the National Treasury's central database of suppliers or persons prohibited from doing business with the public sector.

23.7 If a court of law convicts a person of an offence as contemplated in sections 12 or 13 of the Prevention and Combating of Corrupt Activities Act, Act 12 of 2004, the court may also rule that such person's name be endorsed on the Register for Tender Defaulters. When a person's name has been endorsed on the Register, the person will be prohibited from doing business with the public sector for a period of not less than five years and not more than 10 years. The National Treasury is empowered to determine the period of restriction, and each case will be dealt with on its own merits. According to section 32 of the Act the Register must be open to the public. The Register can be perused on the National Treasury website.

24. Anti-dumping and countervailing duties and rights

24.1 When, after the date of bid, provisional payments are required, or anti-dumping or countervailing duties are imposed, or the amount of a provisional payment or anti-dumping or countervailing right is increased in respect of any dumped or subsidised import, the State is not liable for any amount so required or imposed, or for the amount of any such increase. When, after the said date, such a provisional payment is no longer required or any such anti-dumping or countervailing right is abolished, or where the amount of such provisional payment or any such right is reduced, any such favourable difference shall, on demand, be paid forthwith by the contractor to the State, or the State may deduct such amounts from moneys (if any) which may otherwise be due to the contractor in regard to supplies or services which he or she delivered or rendered, or is to deliver or render in terms of the contract or any other contract or any other amount which may be due to him or her.

25. Force majeure

25.1 Notwithstanding the provisions of GCC Clauses 22 and 23, the supplier shall not be liable for forfeiture of its performance security, damages, or termination for default if, and to the extent that, his delay in performance or other failure to perform his obligations under the contract is the result of an event of force majeure.

25.2 If a force majeure situation arises, the supplier shall notify the purchaser promptly, in writing, of such condition and the cause thereof. Unless otherwise directed by the purchaser in writing, the supplier shall continue to perform its obligations under the contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the force majeure event.

26. Termination for insolvency

26.1 The purchaser may at any time terminate the contract by giving written notice to the supplier if the supplier becomes bankrupt or otherwise insolvent. In this event, termination will be without compensation to the supplier, provided that such termination will not prejudice or affect any right of action or remedy which has accrued or will accrue thereafter to the purchaser.

27. Settlement of Disputes

27.1 If any dispute or difference of any kind whatsoever arises between the purchaser and the supplier in connection with or arising out of the contract, the parties shall make every effort to resolve such dispute or difference amicably, by mutual consultation.

27.2 If, after 30 (thirty) days, the parties have failed to resolve their dispute or difference by such mutual consultation, then either the purchaser or the supplier may give notice to the other party of his intention to commence with mediation. No mediation in respect of this matter may be commenced unless such notice is given to the other party.

27.3 Should it not be possible to settle a dispute by means of mediation, it may be settled in a South African court of law.

27.4 Mediation proceedings shall be conducted in accordance with the rules of procedure specified in the SCC.

27.5 Notwithstanding any reference to mediation and/or court proceedings herein,

- (a) the parties shall continue to perform their respective obligations under the contract unless they otherwise agree; and
- (b) the purchaser shall pay the supplier any monies due to the supplier.

28. Limitation of Liability

28.1 Except in cases of criminal negligence or wilful misconduct, and in the case of infringement pursuant to Clause 6:

- (a) the supplier shall not be liable to the purchaser, whether in contract, tort, or otherwise, for any indirect or consequential loss or damage, loss of use, loss of production, or loss of profits or interest costs, provided that this exclusion shall not apply to any obligation of the supplier to pay penalties and/or damages to the purchaser; and
- (b) the aggregate liability of the supplier to the purchaser, whether under the contract, in tort or otherwise, shall not exceed the total contract price, provided that this limitation shall not apply to the cost of repairing or replacing defective equipment.

29. Governing language

29.1 The contract shall be written in English. All correspondence and other documents pertaining to the contract that is exchanged by the parties shall also be written in English.

30. Applicable Law

30.1 The contract shall be interpreted in accordance with South African laws, unless otherwise specified in the SCC.

31. Notices

31.1 Every written acceptance of a bid shall be posted to the supplier concerned by registered or certified mail, and any other notice to him shall be posted by ordinary mail, to the address furnished in his bid or to the address notified later by him in writing; and such posting shall be deemed to be proper service of such notice.

31.2 The time mentioned in the contract documents for performing any act after such aforesaid notice has been given, shall be reckoned from the date of posting of such notice.

32. Taxes and Duties

32.1 A foreign supplier shall be entirely responsible for all taxes, stamp duties, licence fees, and other such levies imposed outside the purchaser's country.

32.2 A local supplier shall be entirely responsible for all taxes, duties, licence fees, etc., incurred until delivery of the contracted goods to the purchaser.

32.3 No contract shall be concluded with any bidder whose tax matters are not in order. Prior to the award of a bid the Department must be in possession of a tax clearance certificate submitted by the bidder. This certificate must be an original issued by the South African Revenue Services.

33. National Industrial Participation (NIP) Programme

33.1 The NIP Programme administered by the Department of Trade and Industry shall be applicable to all contracts that are subject to the NIP obligation.

34 Prohibition of Restrictive practices

34.1 In terms of section 4 (1) (b) (iii) of the Competition Act, Act 89 of 1998, as amended, an agreement between or concerted practice by firms, or a decision by an association of firms, is prohibited if it is between parties in a horizontal relationship and if a bidder(s) is/are or a contractor(s) was/were involved in collusive bidding (or bid rigging).

- 34.2 If a bidder(s) or contractor(s), based on reasonable grounds or evidence obtained by the purchaser, has/have engaged in the restrictive practice referred to above, the purchaser may refer the matter to the Competition Commission for investigation and possible imposition of administrative penalties as contemplated in the Competition Act, Act 89 of 1998.
- 34.3 If a bidder(s) or contractor(s) has/have been found guilty by the Competition Commission of the restrictive practice referred to above, the purchaser may, in addition and without prejudice to any other remedy provided for, invalidate the bid(s) for such item(s) offered, and/or terminate the contract in whole or part, and/or restrict the bidder(s) or contractor(s) from conducting business with the public sector for a period not exceeding 10 (ten) years and/or claim damages from the bidder(s) or contractor(s) concerned.

(9) FORM OF GUARANTEE / PERFORMANCE SECURITY

Not applicable to this tender

ANNEXURE**LIST OF APPROVED FINANCIAL INSTITUTIONS**

The following financial institutions are currently (as at 12 October 2021) approved for issue of contract guarantees to the City:

National Banks

ABSA Bank Ltd.
FirstRand Bank Ltd.
Investec Bank Ltd.
Nedbank Ltd.
Standard Bank of SA Ltd.

International Banks (with branches in SA)

Barclays Bank plc.
Citibank NA
Credit Agricole Corporate and Investment Bank
HSBC Bank plc.
JP Morgan Chase Bank
Societe Generale
Standard Chartered Bank

Insurance Companies

Bryte Insurance Company Limited
Coface SA
Compass Insurance Company Limited
Constantia Insurance Co.
Credit Guarantee Insurance Corporation of Africa
Limited Guardrisk Insurance Co.
Hollard Insurance Company Ltd.
Infiniti Insurance Limited
Lombard Insurance Company Limited
New National Assurance Company Limited.
PSG Konsult Ltd (Previously Absa Insurance)
Regent Insurance Company Limited
Renasia Insurance Company Limited
Santam Limited

(10) FORM OF ADVANCE PAYMENT GUARANTEE

Not applicable

(10.1) ADVANCE PAYMENT SCHEDULE

Not applicable

(11) OCCUPATIONAL HEALTH AND SAFETY AGREEMENT**AGREEMENT MADE AND ENTERED INTO BETWEEN THE CITY OF CAPE TOWN (HEREINAFTER CALLED THE "CCT") AND**

..... ,
 (Supplier/Mandatar/Company/CC Name)

IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, 85 OF 1993 AS AMENDED.

I, , representing

..... , as an employer
 in its own right, do hereby undertake to ensure, as far as is reasonably practicable, that all work will be performed, and all equipment, machinery or plant used in such a manner as to comply with the provisions of the Occupational Health and Safety Act (OHSA) and the Regulations promulgated thereunder.

I furthermore confirm that I am/we are registered with the Compensation Commissioner and that all registration and assessment monies due to the Compensation Commissioner have been fully paid or that I/We are insured with an approved licensed compensation insurer.

COID ACT Registration Number:

OR Compensation Insurer: Policy No.:

I undertake to appoint, where required, suitable competent persons, in writing, in terms of the requirements of OHSA and the Regulations and to charge him/them with the duty of ensuring that the provisions of OHSA and Regulations as well as the Council's Special Conditions of Contract, Way Leave, Lock-Out and Work Permit Procedures are adhered to as far as reasonably practicable.

I further undertake to ensure that any subcontractors employed by me will enter into an occupational health and safety agreement separately, and that such subcontractors comply with the conditions set.

I hereby declare that I have read and understand the Occupational Health and Safety Specifications contained in this tender and undertake to comply therewith at all times.

I hereby also undertake to comply with the Occupational Health and Safety Specification and Plan submitted and approved in terms thereof.

Signed aton the.....day of.....20....

Witness

Mandatar

Signed at on the.....day of.....20

 Witness

 for and on behalf of
 City of Cape Town

(12) INSURANCE BROKER'S WARRANTY (PRO FORMA)

Logo

Letterhead of supplier's Insurance Broker

Date _____

CITY OF CAPE TOWN
City Manager
Civic Centre
12 Hertzog Boulevard
Cape Town
8000

Dear Sir

TENDER NO.: 298S/2022/23

TENDER DESCRIPTION: PROVISION OF MAINTENANCE AND PARTS FOR MOTOR CONTROL CENTRES AND ASSOCIATED ELECTRICAL CONTROL GEAR AT VARIOUS ENGINEERING AND ASSET MANAGEMENT (EAM) REGION 3 WATER AND SANITATION CITY OF CAPE TOWN SITES

NAME OF SUPPLIER: _____

I, the undersigned, do hereby confirm and warrant that all the insurances required in terms of the abovementioned contract have been issued and/or in the case of blanket/umbrella policies, have been endorsed to reflect the interests of the CITY OF CAPE TOWN with regard to the abovementioned contract, and that all the insurances and endorsements, etc., are all in accordance with the requirements of the contract.

I furthermore confirm that all premiums in the above regard have been paid.

Yours faithfully

Signed: _____

For: _____ (Supplier's Insurance Broker)

(13) SPECIFICATION(S)**TRADE NAMES OR PROPRIETARY PRODUCTS**

TENDERERS MUST NOTE THAT WHEREVER THIS DOCUMENT REFERS TO ANY PARTICULAR TRADE MARK, NAME, PATENT, DESIGN, TYPE, SPECIFIC ORIGIN OR PRODUCER, SUCH REFERENCE SHALL BE DEEMED TO BE ACCOMPANIED BY THE WORDS ‘OR EQUIVALENT’

1. INTRODUCTION

This three-year Framework Rates Based Agreement Contract is part and an extension of the electrical automation systems maintenance program ensuring the City of Cape Town makes provision for a service provider/s to provide and maintain existing installed motor control centres and associated plant automation electrical equipment at various City of Cape Town site. The tender is required for operational and management purposes and is a mechanism to improve service delivery and product quality within the City of Cape Town – Water and Waste Directorate.

The City of Cape Town promotes and encourages their service providers to conform to statutory and legal requirements. In addition, the City of Cape Town embraces the protection of the environment.

The City of Cape Town has a vast array of plant, machinery and equipment in operation at Water and Sanitation facilities.

The City of Cape Town reserves the right to select service providers closest to the sites where the service is required. This is to ensure equipment removed from site can be inspected by City of Cape Town maintenance staff employed by ENGINEERING AND ASSET MANAGEMENT (EAM) before work resumes and to inspect the serviced or repaired equipment on completion of repair before being delivered to a City of Cape Town facility. It has to be understood that out of City of Cape Town boundary visits and trip authority for potentially multiple Work Orders per week is both impractical and not cost effective should the above mentioned not be available within the boundary of the City of Cape Town Metro.

The service provider/contractor shall provide all tools, equipment and consumables for work to be conducted. Therefore the liability of tools and equipment is that of the suppliers and the contractor.

Every maintenance program and works project has to adhere to the existing design, control philosophy, integration and compatibility when equipment are selected during maintenance and replacement programs with no authorised and approved modifications to existing equipment and design. Where the tenderer priced alternative parts and equipment without taking into consideration of the existing infrastructure design, all work from design, approval, potential re-wire and modifications will for the full account of the appointed contractor of the contract.

1. TYPE OF WORKS PROJECTS AND MAINTANANCE ACTIVITIES ACCOCIATED WITH AUTOMATED PLANT MAINTENANCE

Engineering and Asset Management maintains a vast array and varied complex plant automation and electrical controls systems, therefore the company tendering will be required to have extensive experience, skills, resources and equipment available to successfully comply with the scope of work and conditions of the contract for ALL the types of work described further.

The City of Cape Town intends to open a section of this tender and contract for work in the entire City of Cape Town Metropolitan geographical area to the awarded contractor/s. This Goods and Services works packages may comprise of **Uninterruptable Power Supplies (UPS) Grid Tied hybrid inverter battery back-up power solutions and Solar PV Grid Tied hybrid inverter battery back-up**

systems, components, power supply systems and associated electrical protection and distribution equipment.

The City of Cape Town intends to implement hybrid inverter and battery back-up systems where it is impractical or preferred over the use of diesel drive standby generators sets.

The following type of work will be executed through the contract of this tender.

- 1.4 **Electrical motor control systems** – Electrical motors of a vast range of size and types are installed to treat, pump, transport, lift, lower mostly sewerage, potable, and treated effluent water. This is achieved with level control and pressure, varied level and pressure etc. and very often with complex control systems. Electrical motor control is achieved with automation systems such as programmable logic controllers (PLC's) interfacing with field devices such as pressure, level, flow, temperature transmitters, sensors and relays.
- 1.5 **Motor Control systems panels** – Motor Control Centres (MMC's) are installed on every treatment and pumping facility to control a vast array of automated systems. These MCC's vary in size from small 3 phase wall mount panels, sewerage pump station outside kiosks, to very large industrial MCC's of up to 3000 ampere, 3 phase, 50kA fault level. These MCC's requires periodic maintenance of all or most of the maintainable internal components and that of the steel structure of the MCC. The MCC's are designed and operate at specific electrical fault ratings and fault currents. Only 3 phase low voltage, qualified, trained and certified electrical personnel may work on or inside MCC's.
The company's personnel need to be skilled and qualified to design electrical control system boards and panels complying with SANS regulations for low voltage control MCC's of up to 65 kA, 420V, 50 Hz, 3 phase. A draftsman is required with CAD design electronic software to design and draft complex electrical control systems normally associated with plant automation systems.
- 1.6 **Electrical cable supplies and support systems** – Every part and component of field equipment and devices are supplied and/or controlled by means of either both or a combination of underground, overhead or surface mount cables. Surface mount cables are installed on light to heavy duty cable support systems. Supply, installation and maintenance of cables and cable support systems.
- 1.7 **Main electrical supply circuit breakers** – Every MCC is internally supplied by means of small moulded case circuit breakers to very large rack mount withdrawable circuit breakers and racking cradles. The aforementioned requires periodic maintenance by skilled and qualified people with very specific training and testing equipment to provide a maintenance service and stipulated by the OEM (Original Equipment Manufacturer). Very specific and complex testing equipment and maintenance procedures and test reports will be required as per OEM recommendations and requirements.
- 1.8 **UPS (Uninterruptable Power Supply Systems)** – Small to large 3 phase UPS systems are installed in MCC's which requires periodic installations and maintenance by skilled and qualified personnel with very specific training and testing equipment to provide a maintenance service and reports specified by the OEM (Original Equipment Manufacturer)
- 1.9 **Electronic motor starter systems** – These comprises mostly of electronic variable voltage soft starters and electronic variable frequency speed drives, ranging between 2.2 kW to 400 kW , 400 Volt, 3 phase.
For all of the above the City of Cape Town have a number of makes and models of each type of controller and control system. At design stage standard engineering specifications and standards for Electrical, Mechanical, PLC and Instrumentation design specifications were adhered to in the selection of specific products. This process ensure a fully integrated system of electrical control systems. Installation and maintenance will be a requirement.
- 1.10 **Atmospheric ventilation systems for Motor Control Centres** – This would include panel ventilation fans, de- humidifiers, positive pressure fans and ducting etc. Installation and maintenance will be a requirement.
- 1.11 **Motor control** – Protection, signalling and control systems, metering, power quality. Installation and maintenance will be a requirement. Motor control systems are integrated with other automation equipment such as PLC's, interfacing with field devices such as pressure, level, flow, temperature transmitters, sensors and relays.
- 1.12 **Electrical actuators** – automated flow controlled by electrical actuators of a few makes and many models. Electrical actuators interface for PLC's and instrumentation equipment during plant automation systems. Fault-finding, installation, servicing and repairs are a requirement.

- 1.13 Power factor and Dynamic Power Factor Correction systems** – The City of Cape Town has a large install base of capacitive type PF equipment and a number of Dynamic Power Correction systems requiring very specific maintenance by highly skilled, experienced and trained staff which will include contractors or sub-contracting personal. These systems are unique at a few Water and Sanitation treatment facilities where testing, maintenance and repairs are required as per the OEM requirements and recommendations. Personnel skilled, trained and with the correct testing equipment will be required to work on the Impact Power Innovations ELSPEC Dynamic Power Factor Correction Equipment (DPFC).
- 1.14 Plant automation** - Achieved with Schneider PLC's, Adroit SCADA and telemetry all of which interfaces with field devices such as pressure, level, flow, temperature transmitters, sensors and relays. The scope of work of the contract does not cover Schneider PLC's, Adroit SCADA work and instrumentation, but the contractor would need a very thorough knowledge who plant automation systems are integrated.
- 1.15 Solar and hybrid inverter battery power back up systems** – The City of Cape Town intends to install battery back-up systems at a number of Water and Sanitation facilities such as at sewer pump stations. The contractors shall ensure to dedicate and appoint trained, highly skilled, experienced staff which will or may include suppliers, contractors or sub-contracting personal.
- 2.13 Streetlight maintenance and repairs** - The City of Cape Town in the Technical Services Department have many plants where streetlights are installed that require periodic and ad hoc maintenance and repairs. The contractor shall ensure to make available all resources to comply with Works Package QCP specifications where streetlights require repairs and maintenance. This would include a qualified electrician, electrician's assistant, truck mounted aerial platform, truck driver and MEWP operator. Street lights are generally not installed higher than 15 meter above ground level.
- 2.14 Overhead line maintenance** - The City of Cape Town in the Technical Services Department have many plants where overhead electrical cables on poles are installed that require periodic and ad hoc maintenance and repairs. The contractor shall ensure to make available all resources to comply with Works Package QCP specifications where overhead lines require repairs and maintenance. This would include a qualified electrician, electrician's assistant, truck mounted aerial platform, truck driver and MEWP operator. Overhead lines are generally not installed higher than 15 meter above ground level.

SPECIFICATIONS

City of Cape Town

CONTRACT NO: 298S/2022/23

PROVISION OF MAINTENANCE AND PARTS FOR MOTOR CONTROL CENTRES AND ASSOCIATED ELECTRICAL CONTROL GEAR AT VARIOUS WATER AND SANITATION CITY OF CAPE TOWN SITES

CONTENTS

1. SCOPE OF WORK
2. WORKS EXECUTION
3. PROJECT SPECIFICATIONS
4. MEASUREMENT AND PAYMENT
5. HEALTH AND SAFETY SPECIFICATION AND PLAN

1. SCOPE OF WORK

1.1 Employer's objectives

The purpose of this contract is to provide, through the services of a competent and experienced Contractor, the ad hoc supply, installation, servicing, repairing and reconditioning of existing installed electrical automation control and switchgear and associated electrical infrastructure that are vital to the functioning of the City's water infrastructure.

1.2 Scope of Work

All services will be co-ordinated and managed by City of Cape Town, Engineering and Asset Management staff.

The- scope of work may include:

Type of works projects and maintenance activities associated with automated plant maintenance.

Engineering and Asset Management maintains a vast array and varied complex plant automation and electrical controls systems;

Electrical motor control systems – Electrical motors of a vast range of size and types are installed to treat, pump, transport, lift, lower mostly sewerage, potable, and treated effluent water. This is achieved by constant level control and pressure, varied level and pressure etc. and very often with complex control systems.

Motor Control systems panels – Motor Control Centres (MMC's) are installed on every treatment and pumping facility to control a vast array of automated systems. These MCC's vary in size from small 3 phase wall mount panels, sewerage pump station outside kiosks, to very large industrial MCC's of up to 3000 ampere, 3 phase, 50kA fault level. These MCC's requires periodic maintenance of all or most of the maintainable internal components and that of the steel structure of the MCC.

Electrical cable supplies and support systems – Every part and component of field equipment and devices are supplied and/or controlled by means of either both or a combination of underground, overhead or surface mount cables. Surface mount cables are installed on light to heavy duty cable support systems

Main electrical supply circuit breakers – Every MCC is internally supplied by means of small moulded case circuit breakers to very large rack mount withdrawable circuit breakers and racking cradles. The aforementioned requires periodic maintenance by skilled and qualified people with very specific training and testing equipment to provide a maintenance service and stipulated by the OEM (Original Equipment Manufacturer)

UPS (Uninterruptable Power Supply Systems) – Small to large 3 phase UPS systems are installed in MCC's which requires periodic maintenance by skilled and qualified people with very specific training and testing equipment to provide a maintenance service and stipulated by the OEM (Original Equipment Manufacturer)

Electronic motor starter systems – These comprises mostly of electronic variable voltage soft starters and electronic variable frequency speed drives.

For all of the above the City of Cape Town have a number of makes and models of each type of controller and control system. At design stage standard engineering specifications and standards for Electrical, Mechanical, PLC and Instrumentation design specifications were adhered to in the selection of specific products. This process ensures a fully integrated system of electrical control systems.

Every maintenance program has to adhere to the design, control philosophy, integration and compatibility when equipment are selected during maintenance and replacement programs.

Atmospheric ventilation systems for Motor Control Centres – This would include panel ventilation fans, de-humidifiers, positive pressure fans and ducting etc.

Motor control – Protection, signalling and control systems, metering, power quality.

Electrical actuators – automated flow controlled by electrical actuators of a vast array and types of mechanical valves.

Power factor and Dynamic Power Factor Correction systems – The City of Cape Town has a large install base of capacitive type PF equipment and a number of Dynamic Power Correction systems requiring very specific maintenance by highly skilled, experienced and trained staff which will include contractors or sub-contracting personal.

Plant automation - Achieved with Schneider PLC's, Adroit SCADA and telemetry all of which interfaces with field devices such as pressure, level, flow, temperature transmitters, sensors and relays. The scope of work of the contract does not cover Schneider PLC's, Adroit SCADA work and instrumentation, but the contractor would need a very thorough knowledge who plant automation systems are integrated.

Solar and hybrid inverter battery power back-up systems – The City of Cape Town intends to install battery back-up systems at a number of Water and Sanitation facilities such as at sewer pump stations. The contractors shall ensure to dedicate and appoint trained, highly skilled, experienced staff which will or may include suppliers, contractors or sub-contracting personal.

Without creating expectations or commitments to any person, organisation, company, vendor or contractor, the City of Cape Town will be exploring to install these systems through this tender contract to approximately 200 installations in and around the Metropole.

Streetlight maintenance and repairs - The City of Cape Town in the Technical Services Department have many plants where streetlights are installed that require periodic and ad hoc maintenance and repairs. The contractor shall ensure to make available all resources to comply with Works Package QCP specifications where streetlights require repairs and maintenance. This would include a qualified electrician, electrician's assistant, truck mounted aerial platform, truck driver and MEWP operator. Street lights are generally not installed higher than 15 meter above ground level.

Overhead line maintenance - The City of Cape Town in the Technical Services Department have many plants where overhead electrical cables on poles are installed that require periodic and ad hoc maintenance and repairs. The contractor shall ensure to make available all resources to comply with Works Package QCP specifications where overhead lines require repairs and maintenance. This would include a qualified electrician, electrician's assistant, truck mounted aerial platform, truck driver and MEWP operator. Overhead lines are generally not installed higher than 15 meter above ground level.

1.3 Location of works

Services during the contract will be at a facility identified by CCT. The Works are located within ENGINEERING AND ASSET MANAGEMENT (EAM)'s operating model in Region 3 within City of Cape Town Metro. Engineering and Asset Management operate in the following Water and Sanitation area map which is divided into three operational regions namely:

Region 1: Schaapkraal. Confined to specific Works Packages applicable to alternative and Inverter Power Supplies only.

Region 2: Blomtuin EAM. Confined to specific Works Packages applicable to alternative and Inverter Power Supplies only.

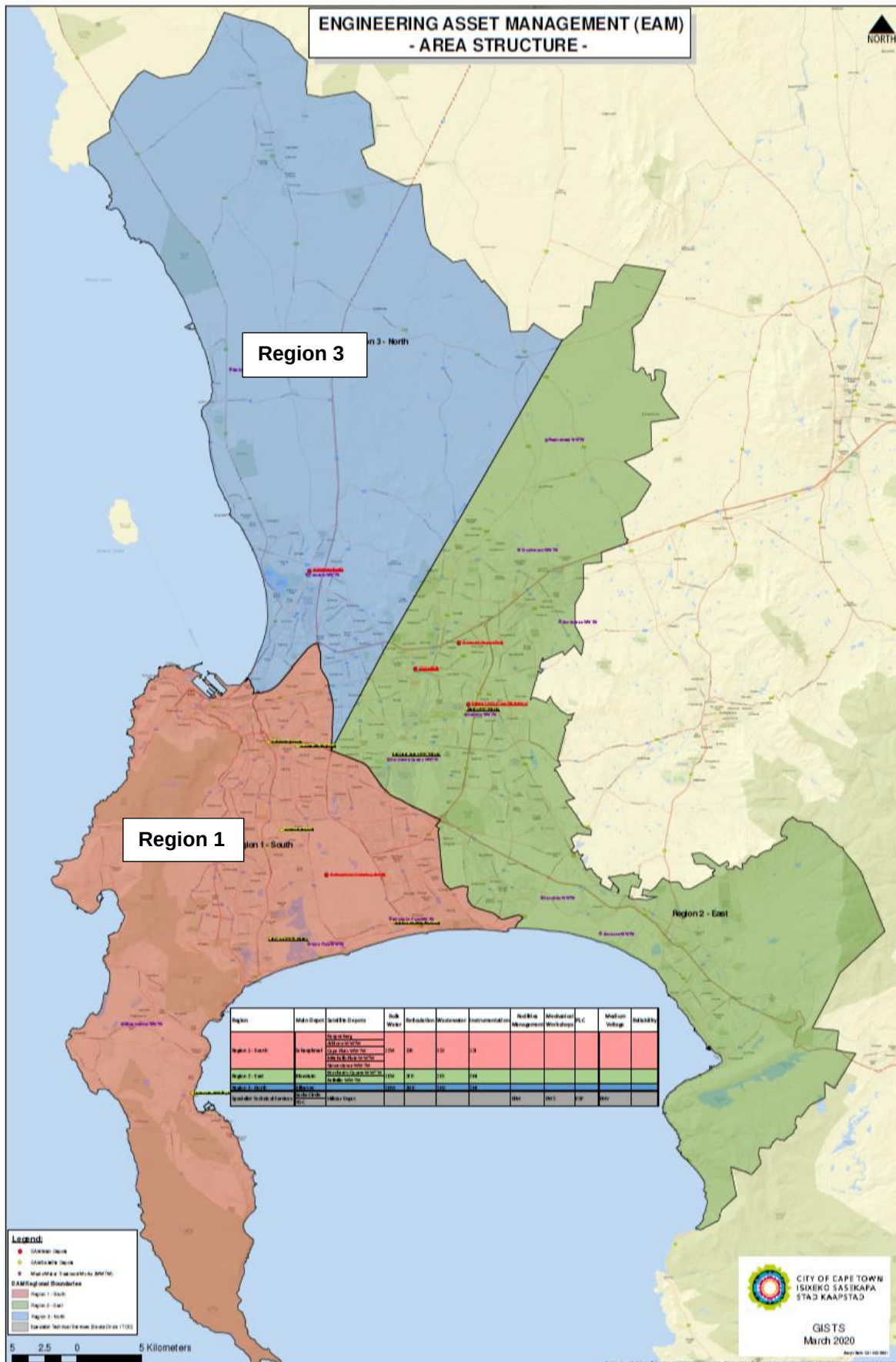
Region 3: Killarney EAM. All Works Packages.

The sites will be the buildings or ground or any other place in or on where work has to be executed. These include Waste Water, Bulk Water, Reticulation and Treated Effluent type facilities owned and operated by the City of Cape Town.

Contractors must acquaint themselves and abide by the applicable site conditions.

Services and units need to be positioned and operated within approved positions on each site. The Contractor shall occupy only such ground as is necessary to carry out the work. He shall provide and maintain such access to the various sections of the Works as he requires for the proper execution of the work.

Facilities are in daily operation 24/7. Shut downs for extended time periods will not be allowed. Shut down of portions of plant may be considered for approval by the CCT when the contractor submits a project plan and method statement. The Contractor shall plan and program his work to ensure downstream Engineering and Asset Management (EAM) operations are not adversely affected.



2. WORK EXECUTION

2.1 Works specifications

This specification should be read in conjunction with reference to Schedule 17: Standard Specifications for Electrical Work

It shall be the responsibility of the Contractor to obtain the most recent copies of the relevant editions of the General Electrical Technical Standards and Specification documents referred to in this document, particular reference is made to the City of Cape Town's Standard Specifications for Electrical Works.

The Contractor shall obtain most recent update copies of the Standard Specifications listed; which are available from the South African Bureau of Standards.

2.2 Statutory regulations pertaining to the execution of electrical works.

The latest edition, including all amendments up to date of tender, of the following Specifications, publications and codes of practice shall be read in conjunction with this specification and shall be deemed to form part thereof.

Except where otherwise specified or implied the contract work and equipment supplied shall comply with the **latest revisions** of the standard specifications listed, including generally:

- a) SANS 10142-1 The wiring of Premises, Part 1: Low voltage installations
- b) SANS 10400-2 The Application of the National Building Regulations, Part A: General principles and requirements
- c) Local Fire Regulations
- d) The Regulations of the Local Supply Authority
- e) The Regulations of the Department of Posts and Telecommunications

Where a SANS Standard does not exist or if not applicable, the relevant IEC or BS Standard shall be applicable.

The equipment supplied and work carried out shall fully meet and comply with the requirements of the Occupational Health and Safety Act (Act 85 of 1993) and the Construction Regulations 2003 issued in terms of Section 43 of the Act, Standards South Africa (a Division of the South African Bureau of Standards {SABS}) and all other statutory regulations and laws insofar as they may apply to an electrical installation of the type contemplated.

In the event of discrepancy between any of the specifications, regulations and codes of practice, the SANS 10142-1 Code of Practice for Wiring of Premises shall take precedence.

All references to "SABS" specifications shall be read as "SANS" in light of the recent changes by the South African Bureau of Standards.

Additionally, the following specifications, whether specifically mentioned within the tender document or not, shall also apply:

STANDARD CODE	DESCRIPTION
SANS 10111-1:2011	Engineering Drawings, Part 1:General Principles
SANS 1091:2012	National colour standards
SANS 156:2007	Moulded case circuit breakers
VC8036:06 Oct 2006	Compulsory specification for circuit breakers
SANS 60269-1	Low-voltage fuses, Part 1: General
SANS 60269-4	Low-voltage fuses, Part 4: Supplementary requirements for fuse-link for the protection of semiconductor devices
SANS 950	Unplasticised polyvinyl chloride rigid conduit use in electrical installations
SANS 1507-1	Electrical cables with extruded solid dielectric insulation for fixed installations (300/500V to 1900/3300V), Part 1: General

STANDARD CODE	DESCRIPTION
SANS 1195	Cover plate
SANS 60439-1	Low voltage switch-gear and control gear assemblies, Part 1: Type-tested and partially type-tested assemblies
SANS 60439-2	Low voltage switch-gear and control gear assemblies, Part 2: Particular requirements for busbar trunking systems (busways)
SANS 61439-3	Low-voltage switchgear and control gear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons
SANS 1973-1	Low voltage switch-gear and control gear assemblies, Part 1: Type-tested assemblies with stated deviation and a short-circuit withstand strength above 10kA
SANS 1973-3	Low voltage switch-gear and control gear assemblies, Part 1: Safety of assemblies with a rated protective short-circuits up to and including 10kA
BS 4070	Performance of A.C. control gear equipment rated up to 660 V for use on high prospective fault-current systems
BS 587	Motor starters and controllers
SANS 60947-1	Low voltage switch-gear and control gear assemblies, Part 1: General rules
SANS 60947-2	Low voltage switch-gear and control gear assemblies, Part 2: Circuit-breakers
SANS 60947-3	Low voltage switch-gear and control gear assemblies, Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units
SANS 60947-4-1	Low voltage switch-gear and control gear assemblies, Part 4-1: Contactors and motor starters – Electromechanical contactors and motor-starters
SANS 60947-4-2	Low voltage switch-gear and control gear assemblies Part 4-1: Contactors and motor starters – AC semiconductor motor controllers and starters
VC8011: 9 July 1999	Compulsory specification of Lamp holders
SANS 475	Luminaires for interior lighting, street lighting and floodlighting – Performance requirements
SANS 10114-1	Interior lighting, Part 1: Artificial lighting of interiors
SANS 10222-5-1-3	Electrical security installations, Part 5-1-3: CCTV installations - CCTV surveillance systems for use in security applications - Installation, planning and implementation requirements.
SANS 60793-1-1 Optical fibres, Part 1-1:	Measurement methods and test procedures - General and guidance
SANS 60794-1-1	Optical fibres cables, Part 1-1General specification – General
SANS 675	Zinc-coated fencing wire

STANDARD CODE	DESCRIPTION
SANS 1373	Chain-link fencing and its wire accessories
SANS 10131	Above-ground storage tanks for petroleum products
SANS 780	Transformer Testing
SANS 1084-1/2	Electric Motor Standards
SANS 10131	Above-ground storage tanks for petroleum products
SANS 10198	The selection, handling and installation of electric power cables of rating not exceeding 33 kV
SANS 10111-1	Engineering drawings
SANS 1186	Symbolic Safety Signs
SANS 10142-1 (Ed.3)	Wiring of premises, Low Voltage 50 VAC – 1000 VAC
SANS 10142-2	Medium Voltage fixed installation above 1000VAC – 22000VAC

Equipment selection procurement and installation shall comply with Utility Electricity By-Laws in terms of;

1. Municipal Requirements for Small Scale Energy Supply Generation. (SSG)
2. Electrical Installation Regulations and Wiring Code SANS 10142-1 Ed 3
3. As per SANS 10142-1 clause 7.12.7.1 - The photovoltaic installation shall comply with SANS/IEC 60364-7-712 - Low voltage electrical installations - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
4. Solar panels shall comply with SANS/IEC 61215 - Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-4: Special requirements for testing of thin-film Cu(In,Ga)(S,Se)₂ based photovoltaic (PV) modules (for poly and monocrystalline) or
5. SANS 61646 - Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval. (for thin-film)
6. NRS 097-2-1
7. NRS 097-2-3
8. Occupational Health and Safety Act 85 of 1993

Solar PV system components are subject to the following standards for selection and installation;

1. Distribution boards – SANS 61439-2 and SANS 60670 relevant part
2. DC circuit breakers – SANS 60947-2
3. DC fuses – SANS 60269-6
4. PV Connectors – IEC 62852
5. Surge Protection Devices (AC) – SANS 61643-11
6. Surge Protection Devices (DC) – IEC 61643-31
7. Assembly insulation according to SANS 61439-1 and SANS 1973-1

2.3 Plant materials and equipment

The Contractor shall supply all the plant and equipment required and all plant and equipment shall comply with the requirements as stipulated in the Environmental and Occupational Health and Safety Act 85 of 1993 (Updated Nov.2021) and the Construction Regulation Act (2014).

The rates and services supplied under this contract shall include compliance with the Health and Safety Specification and Regulations, Hepatitis A and B injections for contractor's staff. Compliance with the requirements of the Occupational Health and Safety Act, 85 of 1993 and Construction Regulations of 2014. Provision of and adherence to a Health and Safety Specification and Plan. Liaison, co-ordination and chairing of meetings in respect of Health and Safety requirements. Any other Health and Safety expenses incurred in complying with the requirements of the contract. Compliance with the Environmental Management Specification in the Scope of Work and Environmental Management expenses incurred in complying with the requirements of the contract.

Parts and equipment selection for existing electrical automation systems shall comply with the following standards and codes;

SANS 61439 - Low-voltage switchgear and control gear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons

SANS 1973-1:2017 - Low-voltage switchgear and control gear ASSEMBLIES Part 1: Type-tested ASSEMBLIES with stated deviations and a rated short-circuit withstand strength above 10 kA

SANS 61439 and SANS 1973-1:2017 implies, that the contractor shall supply the same or equivalent OEM tested, co-ordinated and approved equipment as replacement parts.

2.4 Staff and labour resources

The Contractor/Tenderer shall supply all labour and resources required for all work required. This labour component may or may not be in the permanent employment of the contractor. Sourced sub-contractor labour shall be declared and listed in the sub-contractor declaration returnable Schedule 14. A Memorandum of Agreement to appoint a resource shall be submitted between the tenderer and the sub-contractor clearly indicating the intention to sub-contract with a written and signed agreement between both parties.

Roles and responsibilities of contractor staff in line of duty of typical Work Projects		
Number	Position	Job Description for this tender
A.1.1	Installation Electrician (with SANS 10142-1 Wiring Regulations for low voltage electrical installations)	Passed certificate and completion of theory course in SANS 10142-1 Wiring Regulations for low voltage electrical installations below 1000VAC. Department of labour registration certificate as an Installation Electrician in terms of Wiring Regulations SANS 10142-1. Registration card copy of both sides required >3 Years Post Registration as an Installation Electrician registered with Department of Labour Experience and qualifications to be clearly shown on the CV. The start and end date (Month & Year) of experience, the job title and specific duties performed for each period indicated must be reflected on the CV. CV of each Supervisor/Site foreman/Site agent shall be attached to the Tender Document. Details shall be entered into Returnable Schedule 15. This person shall be responsible to manage and supervise unqualified and un-registered electricians' installations and work. This person shall be responsible to issue an Electrical Compliance Certificate in terms of SANS 10142-1 (Ed.3)
A1.2	Master Installation with SANS 10142-1 Wiring Regulations	Trade tested Masters Electrician Passed certificate and completion of theory course in Wiring Regulations of Electrical Installations below 1000VAC.

	for low voltage electrical installations)	Department of labour registration certificate as a Master Installation Electrician in terms of Wiring Regulations SANS 10142-1. Registration card copy of both sides required >3 Years Post Registration as a Master Electrician registered with Department of Labour Experience and qualifications to be clearly shown on the CV. The start and end date (Month & Year) of experience, the job title and specific duties performed for each period indicated must be reflected on the CV. CV of each Supervisor/Site foreman/Site agent shall be attached to the Tender Document. Details shall be entered into Returnable Schedule 15. This person shall be responsible to issue an Electrical Compliance Certificate in terms of SANS 10142-1 (Ed.3) for electrical installations requiring his qualification in terms of the SANS code.
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Roles and responsibilities of contractor staff in line of duty of typical Work Projects		
Number	Position	Job Description for this tender
B1.1.1	Supervisor/Site foreman/Site agent for basic LV electrical works	This person will be responsible for the multi-disciplinary on-site supervision and management of staff in line with their duties, responsibilities, and ensuring quality and compliant to engineering and safety standards and applicable regulations execution of work. This person need to be able to scope work with the City of Cape Town relevant Works Package Manager, thus implying this person will have the necessary skills and experience to undertake and assessment to plan a Works Package specification for and in conjunction with all the relevant trades involved in this tender and contract. This person need to have sound knowledge and the application of the Occupational Health and Safety Act and Regulations specified in the Health and Safety Specification in this tender. Some Work Packages would require a Health and Safety plan and a Method Statement and in these cases this person will be required for the drafting of the H&S plan and the method statement for review and approval by the City of Cape Town Work Package Manager and others. This person will be the direct contact between the Works Package manager and the contractor staff or any outsourced function. This person will receive instructions from the City of Cape Town Work Package Manager and full compliance to all requests and instructions will be required. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas. Experience and qualifications to be clearly shown on the CV. The start and end date (Month & Year) of experience, the job title and specific duties performed for each period indicated must be reflected on the CV. CV of each Supervisor/Site foreman/Site agent shall be attached to the Tender Document. Details shall be entered into Returnable Schedule 15

B1.1.2	Supervisor/Site foreman/Site agent for MV electrical works	This person will be responsible for the multi-disciplinary on-site supervision and management of staff in line with their duties, responsibilities, and ensuring quality and compliant to engineering and safety standards and applicable regulations execution of work. This person need to be able to scope work with the City of Cape Town relevant Works Package Manager, thus implying this person will have the necessary skills and experience to undertake and assessment to plan a Works Package specification for and in conjunction with all the relevant trades involved in this tender and contract. This person need to have sound knowledge and the application of the Occupational Health and Safety Act and Regulations specified in the Health and Safety Specification in this tender. Some Work Packages would require a Health and Safety plan and a Method Statement and in these cases this person will be required for the drafting of the H&S plan and the method statement for review and approval by the City of Cape Town Work Package Manager and others. This person will be the direct contact between the Works Package manager and the contractor staff or any outsourced function. This person will receive instructions from the City of Cape Town Work Package Manager and full compliance to all requests and instructions will be required. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas. Experience and qualifications to be clearly shown on the CV. The start and end date (Month & Year) of experience, the job title and specific duties performed for each period indicated must be reflected on the CV. CV of each Supervisor/Site foreman/Site agent shall be attached to the Tender Document. Details shall be entered into Returnable Schedule 15 The following certificates for the Supervisor/Site foreman/Site agent shall be required at close of tender and submitted again at commencement of contract. A second site supervisor may be proposed by the tenderer with the following qualifications and experience, since this is a highly skilled and qualified person. ▪ Responsible Persons certificate in terms of NRS 040 – High Voltage Operating Regulations ▪ SAQA US ID: 242766: Demonstrate knowledge and understanding of Operating Regulation for High Voltage Systems ▪ Basic Fire Fighting ▪ First Aid level two
B1.2	Electrician 1 and 2	This will be a trade tested person in term of the Department of Labour. It will be generally accepted the electrician will have received all the relevant legislative training for an electrician that will work on 400 Volt low voltage installations. This will include but not limited to Health and Safety Awareness, Working and Heights, Energy Isolation and Permit to Work, Aerial Platform operator, lifting equipment operator, First Aid.

		Specific workplace hazards may require City of Cape Town on-site workplace safety inductions that will be mandatory to attend upon request. The electrician will be issued by the contractor with all required spark free tools, measuring instruments that may include a multi-meter, voltage tester, insulation resistance tester, phase rotation meter, cable spiking tool and all Personal Protective Equipment for hazards which the Health and Safety Specification highlights. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
B1.3	Panel wireman	This person will be a highly skilled panel wireman able to read and understand complex CAD drawings in order to wire electrical control circuits and electrical main circuits, installing and wide variety of electrical parts and components in electrical panels generally referred to as Motor Control Centre's (MCC's). Panel wiring is considered a rare skill where panels are wired to very standards of accuracy and neatness. This person will also be required to install and wire panels at all the respective Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) area. The person may be required to be part of the installation and commissioning Engineering and Asset Management (EAM) of the contractor when a control panel is serviced, maintained or replaced. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
B1.4	Electrical cable jointer	This person will have the necessary training, skills and experience to make electrical cable joints and terminations ranging 400 Volts – MV cables up to 11 000 Volt AC cables. Medium Voltage (MV) work will require cable joints, terminations and lead cable wipe terminations on joint boxes, transformers and RMU's. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas. Must have the following: 2 years' experience in MV cable jointing and termination or similar experience. Certified competent by a recognized major cable joint manufacturer or certified competent in terms of South African Qualification Authority (SAQA) Further Education and Training Certificate: Cable Jointing and Termination , SAQA QUAL ID: 58204 or certified competent in terms of a similar MV cable jointing and termination certification or certified competent by the City of Cape Town Technical Training Centre. Previous Experience (This will be amplified in the CV of such a person) Tenderers shall have experience in each of the following aspects: - Medium Voltage Cable Jointing - Medium Voltage Cable Termination - MV Aerial Bundle Conductor Jointing - MV Aerial Bundle Conductor Termination - A jointer shall be certified competent by a recognized major cable joint manufacturer or certified competent in terms of South African Qualification Authority (SAQA) Further Education and

		Training Certificate: Cable Jointing and Termination , SAQA QUAL ID: 58204 or equivalent MV cable jointing and termination certification or by the City of Cape Town Training Centre. ▪ The cable jointer must have at least two years relevant work experience in cable jointing and termination; experience must be shown on the CV. ▪ The start and end date (Month & Year) of experience, the job title and specific duties performed for each period indicated must be reflected on the CV. CV and copies of certificates of each Cable Jointer shall be attached to the Tender Document. Details shall be entered into Returnable Schedule 15. ▪ The purpose of a cable jointer is to perform jointing and terminations on Low and Medium Voltage Cables during the Construction Works as specified by City of Cape Town representative. ▪ Must have working knowledge of relevant Safety Legislation and Practices. ▪ Broad knowledge of electrical equipment. ▪ Good communication skills (Oral and written). ▪ Problem solving skills. The following certificates for the Cable Jointer shall be required at at close of tender and submitted again at commencement of contract. ▪ Responsible Persons certificate in terms of NRS 040 – High Voltage Operating Regulations ▪ SAQA US ID: 242766: Demonstrate knowledge and understanding of Operating Regulation for High Voltage Systems ▪ Basic Fire Fighting ▪ First Aid level two
B1.5	PLC, HMI & SCADA Programmer	This person will have the necessary training, skills and experience to program Schneider PLC's and Adriot SCADA machines. These are the installed base of brands of software packages that is part of the installed base and need to be maintained The work will be required once a new MCC in being built, during commissioning and general faultfinding at all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
B1.6	Instrumentation Technician/Artisan	This person will have the necessary training, skills and experience to install, replace, program, fault find on most instrumentation devices measuring and controlling level, pressure, temperature, movement sensors, flow. This will include in line flow meters and flue type flow meters at all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
B1.7	Assistant to artisan 1 and 2	This person is the assistant to the electrician but not limited to. The person will be responsible to assist with the safe execution of all relevant type of jobs in the scope of work. The artisan trade description would be someone trained, skilled and experienced in all the relevant

		staff resources listed in this tender specification. Generally the assistant would have the necessary training, skills and experience to assist the relevant artisan with stripping, fitting, assembling and cleaning of parts and equipment. The assistant would have a very good knowledge of the tools and artisan requires and need in the execution of that person's tasks. The assistant hand and manage the tools required by the artisan and generally ensure the work area is cleaned and tidied upon completion of work. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
Roles and responsibilities of contractor staff in line of duty of typical Work Projects		
Number	Position	Job Description for this tender
B1.8	Draughtsman	This person will have the necessary training, skills and experience to work on Computer Aided Draughting (AutoCAD) software packages. The person will need to interpret existing Water and Sanitation drawings and designs and able to modify or replicate electrical and mechanical drawings when changes or updates are required. This person will have years of experience in the typical design of electrical automation designs integrated with low voltage control systems, plc control, instrumentation monitoring and control using CAD software. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
B1.9	Contractor's Health and Safety Officer (GMR8.5)	This person will have the necessary training, skills and experience to undertake and manage the safety of staff on site. The person need to be able to develop Safe Work Job Procedures or now commonly known as Job Hazard Analysis (JHA), supervisor the work with Planned Job Observations (JHA) and completing a Hazard Identification and Risk Assessment (HIRA) specific to hazardous classified jobs and task steps. The aforementioned by no means limit the responsibility of this person in terms of the Occupational Health and Safety Act and Regulations. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
B1.10	Certified Mechanical Handling (Rigger) Region 3	This person will have the necessary training, skills and experience to work on site and work according to a rigging and lifting plan to safely execute lifting and rigging tasks. This person is generally required on more complex tasks where the hazard and risk required special arrangements for the safety of plant, equipment and personal. The kind of lifting task would involve lifting and moving a control panel into position, lifting and moving of heavy equipment onto or into an elevated position. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
B1.11	Service Technician/Artisan– Switchgear and circuit breaker services (Make: Schneider/Merlin Gerin, ABB and CBI) or equivalent	This person will have the necessary training, skills and experience to work on electrical low voltage switchgear and circuit breakers. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, or whichever of the aforementioned tasks are required. These are the installed base of brands of equipment that need to be maintained. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment specified by the OEM and skilled to operate the

		testing equipment safely and competently. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
B1.12	Service Technician/Artisan/Assistant – <u>Low Voltage 230/440 VAC</u> Electronic Soft starter and Variable Speed drive services (WEG, Yaskawa, Delta, ABB, Allan Bradley, or equivalent)	This person will have the necessary training, skills and experience to work on Low Voltage 230/440 VAC Electronic Soft starter and Variable Speed drive services such as WEG, Yaskawa, Delta, ABB, Allan Bradley, or equivalent. These are the installed base of brands of equipment that need to be maintained. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, or whichever of the aforementioned tasks are required. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment specified by the OEM and skilled to operate the testing equipment safely and competently. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
B1.13	Service Engineer – <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent)	This person will have the necessary training, skills and experience to work on <u>Medium Voltage 3.3 kV</u> Variable Speed drive services (WEG, Yaskawa, or equivalent). These are the installed base of brands of equipment that need to be maintained. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, or whichever of the aforementioned tasks are required. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment specified by the OEM and skilled to operate the testing equipment safely and competently. This person will be fully competent in the tasks required by the Service Technician and will operate on a higher level of competency in terms of product knowledge, maintenance requirements, spares requirements, installation, testing and commissioning and signing off of reports and certificates of conformance where required. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.

Roles and responsibilities of contractor staff in line of duty of typical Work Projects		
Number	Position	Job Description for this tender
B1.14	Service Technician/Artisan/Assistant – <u>Medium Voltage 3.3 kV Variable Speed drive services</u> (WEG, Yaskawa, or equivalent)	This person will have the necessary training, skills and experience to work on <u>Medium Voltage 3.3 kV Variable Speed drive services</u> (WEG, Yaskawa, or equivalent). These are the installed base of brands of equipment that need to be maintained. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, or whichever of the aforementioned tasks are required. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment specified by the OEM and skilled to operate the testing equipment safely and competently. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas. Upon tendering, the tenderer may include more than one person where people are only training, experienced and competent on a specific brand of equipment. Separate CV's for the different people will be acceptable.
B1.15	Technician/Artisan – Electrical valve actuator (Make: AUMA) Region 3	This person will have the necessary training, skills and experience to work on <u>electrical actuators</u> such as <u>AUMA</u>. These are the installed base of brands of equipment that need to be maintained. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, or whichever of the aforementioned tasks are required. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment specified by the OEM and skilled to operate the testing equipment safely and competently. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas. Upon tendering, the tenderer may include more than one person where people are only training, experienced and competent on a specific brand of equipment. Separate CV's for the different people will be acceptable.
B1.16	Technician/Artisan – Electrical valve actuator (Make: Greytork) Region 3	This person will have the necessary training, skills and experience to work on <u>electrical actuators</u> such as <u>Greytork</u>. These are the installed base of brands of equipment that need to be maintained. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, or whichever of the aforementioned tasks are required. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment specified by the OEM and skilled to operate the testing equipment safely and competently. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas. Upon tendering, the tenderer may include more than one person where people are only training, experienced and competent on a specific brand of equipment. Separate CV's for the different people will be acceptable.

Roles and responsibilities of contractor staff in line of duty of typical Work Projects		
Number	Position	Job Description for this tender
B1.17	Technician/Artisan – Electrical valve actuator (Make: ROTORK) Region 3	This person will have the necessary training, skills and experience to work on <u>electrical actuators</u> such as ROTORK. These are the installed base of brands of equipment that need to be maintained. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, or whichever of the aforementioned tasks are required. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment specified by the OEM and skilled to operate the testing equipment safely and competently. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas. Upon tendering, the tenderer may include more than one person where people are only training, experienced and competent on a specific brand of equipment. Separate CV's for the different people will be acceptable.
B1.18	Technician/Artisan – Dynamic Power Factor Correction specialist (Impact Power Innovations & Bellco) Region 3	This person will have the necessary training, skills and experience to work on Dynamic Power Factor Correction (DPFC) equipment. The installed equipment was supplied and installed by Impact Power Innovations & Bellco. This is the existing installed base and brand of equipment that need to be maintained. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, or whichever of the aforementioned tasks are required. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment specified by the OEM and skilled to operate the testing equipment safely and competently. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
B1.19	Technician/Artisan – generator engine controllers and changeover (Deep Sea and Lovato or equivalent) Region 3	This person will have the necessary training, skills and experience to work on generator engine controllers and changeover such as Deep Sea and Lovato. These are the installed base of brands of equipment that need to be maintained. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, programming, faultfinding or whichever of the aforementioned tasks are required. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment and software specified by the OEM and skilled to operate the equipment safely and competently. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.

B1.20	Technician/Artisan – Uninterruptable Power Supply (Riello, Schneider Electric, APC or equivalent) Region 3	This person will have the necessary training, skills and experience to work on Uninterruptable Power Supplies such as Riello, Schneider Electric, APC and others. This is the existing installed base and brand of equipment that need to be maintained. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, or whichever of the aforementioned tasks are required. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment specified by the OEM and skilled to operate the testing equipment safely and competently. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.
Roles and responsibilities of contractor staff in line of duty of typical Work Projects		
Number	Position	Job Description for this tender
B1.21	Air-conditioned and dry air de-humidifier service technician (Dehu Tech or equivalent)	This person will have the necessary training, skills and experience to work on Air-conditioned and dry air de-humidifier equipment. This equipment was supplied and installed by Continental Fans Works (CFW) and is the existing installed base and brand of equipment that need to be maintained. This will include the stripping, removal, dismantling, assembly, fitting, servicing and maintenance of such equipment, or whichever of the aforementioned tasks are required. Where testing of equipment is required as per the OEM requirements and of this tender specification's works packages, this person will have the necessary testing equipment specified by the OEM and skilled to operate the testing equipment safely and competently. Work will take place at contractors or sub-contractors workshops and all Water and Sanitation facilities in the Region 3 ENGINEERING AND ASSET MANAGEMENT (EAM) areas.

2.5 Workshop and office facilities required

The facility and equipment need to be presented upon site inspection/evaluation at the sole discretion of the Bid Evaluation Committee. The tenderer need to disclose full details of the repair facility such as name, location, address, contact details, services offered, what makes the facility and staff competent and experienced to service a particular brand or product, in a Portfolio of Evidence or Company Profile. A minimum of one workshop facility is required for each type of equipment identified for local services and repairs.

The contractor shall make available 14 days after award and commencement of contract the following workshop facilities in the City of Cape Town Metropolitan region. It is assumed that a one stop shop under one roof might not be practical therefore the tenderer shall list available resources in returnable Schedule 15.

The Contractor/Tenderer shall supply all workshop facility and resources required for all work required. This may or may not be in the permanent employment of the contractor. Sourced sub-contractor workshop facilities shall be declared and listed in the sub-contractor declaration returnable Schedule 15A.

A Memorandum of Agreement shall be submitted between the tenderer and the sub-contractor clearly indicating the intention to sub-contract with a written and signed agreement between both parties.

The tenderer will be required to offer workshop facilities for the delivery to, stripping, assessment, services and repairs locally for a range of electrical products and components. The workshops locally shall be resourced with the necessary staff, maintenance, servicing and testing of equipment.

The tenderer shall be required

City of Cape Town, Water and Sanitation Department have an installed base of electrical equipment requiring maintenance and repairs listed below that shall require local workshop facilities.

- 2.5.1 Workshop facility – Switchgear and circuit breaker services for Schneider Electric previously Merlin Gerin
- 2.5.2 Workshop facility – Switchgear and circuit breaker services for CBi
- 2.5.3 Workshop facility – Switchgear and circuit breaker services for ABB
- 2.5.4 Workshop facility – Electronic Soft starter and Variable Speed drive services (WEG)
- 2.5.5 Workshop facility – Electronic Soft starter and Variable Speed drive services (Yaskawa)
- 2.5.6 Workshop facility – Electronic Soft starter and Variable Speed drive services (Delta)
- 2.5.7 Workshop facility – Electronic Soft starter and Variable Speed drive services (Allen Bradley)
- 2.5.8 Workshop facility – Electrical valve actuator (AUMA electrical actuators)
- 2.5.9 Workshop facility – Electrical valve actuator (Greytork electrical actuators)
- 2.5.10 Workshop facility – Electrical valve actuator (ROTORK electrical actuators)
- 2.5.11 Workshop facility – Electrical panel manufacturing and wiring

2.5 Treatment of existing services

The contractor shall familiarise himself with all existing services and liaise with all relevant authorities for the location and detection of existing services. The contractor shall also use all necessary means to locate and expose services without damage to such services, should it be necessary.

2.6 Damage to services

The Contractor shall ensure that his employees do not interfere with, or cause damage to any existing services and he shall instruct them to refrain from entering areas where they are not required to carry out any work related to the contract.

2.7 Reinstatement of services and structure damaged during execution of the works.

The Contractor shall be responsible for the reinstatement of all services damaged as a result of his activities while on site. All reinstatement and repair costs shall be fully borne by the Contractor no claims against the Employer will be entertained.

2.8 Service and facilities provided by the employer

2.8.1 Source of Water Supply

It is not expected that the Contractor may need to obtain his own connection points for the execution of this Contract. The Contractor shall make himself thoroughly acquainted with the regulations relating to the use of water and shall take adequate measures to prevent the wastage of water.

The Employer accepts no responsibility for the shortage of water due to any cause whatsoever, nor additional costs incurred by the Contractor as a result of such shortage or interruption.

The Contractor shall take note that no direct payment will be made for any costs incurred neither for the provision of a water supply point nor for the cost of water drawn.

2.8.2 Source of Power Supply

The Contractor may use the Employer's existing electricity supply and shall not be charged for reasonable use for the execution of tasks that fall under this Contract.

The employer accepts no responsibility for the availability, or lack thereof, of electricity. No payment shall be made for the costs incurred in that regard.

2.8.3 Location of Services and Materials Storage Area

It is not expected that the Contractor may need or require storage areas under this Contract. However, storage areas where required, will be provided on the various sites and shall be indicated to the Contractor on an ad hoc basis. The Contractor shall confine his storage of materials to the areas designated. On completion of the works, the surface of the areas utilised shall be re-instated,

The contractor shall continuously clear up and make good when any service or facility is no longer required. He shall leave the employers facilities in the condition they were before the Contractor first made use of them, with fair wear and tear excepted.

The Contractor shall continuously clear and dispose of waste and surplus materials to maintain the site in a tidy state.

2.9 Vehicles plant and equipment

The Contractor shall be responsible for supplying all vehicles, plant and equipment for the duration of the Contract. Owned and sourced vehicles, plant and equipment shall be listed in the returnable Schedule 14 or 15.

Number	Vehicle Type	Minimum requirement
B2.1	0.5 – 0.75 ton Light Delivery Vehicle (LDV)	2 x (Two) vehicles are required. NO panels van versions of motor car vehicles allowed. Vehicles must be flat bed bakkies, which will be eligible. Included a copy of registration document for each indicating ownership or a letter of intent to hire. No proof supplied
B2.2	1.0 ton Light Delivery Vehicle (LDV)	1 x (One) vehicle is required. NO panel van versions of motor car vehicles allowed. Vehicles must be flat bed bakkies, which will be eligible. Included a copy of registration document for each indicating ownership or a letter of intent to hire. No proof supplied
B2.3	Truck, 3 ton flat bed with 3 or 5 ton truck mounted crane Should the tenderer own or have 24/7 daily access to a 5 ton flat bed with truck mounted crane, there is no requirement to also have a 3 ton flat bed with truck mounted crane in above no. 2	x1 (One) required for an offer in the ENGINEERING AND ASSET MANAGEMENT (EAM) Region. (Any one of the trucks detailed will be eligible. Included a copy of registration document for each indicating ownership or a letter of intent to hire. Proof shall be listed in Schedule 14 or Schedule 15 whichever is applicable If none of these vehicles are owned, the tenderer need to prove to the City of Cape Town that such fleet can be acquired by means of rental or agreement with a fleet supplier etc. No proof supplied
B2.4	Truck mounted or mobile 15 meter aerial platform (Cherry picker)	x1 (One) required. Included a copy of registration document for each indicating owner. If none of these vehicles are owned, the tenderer need to prove to the City of Cape Town that such fleet can be acquired by means of rental or agreement or intent to rent with a fleet rental supplier etc. Proof shall be listed in Schedule 14 or Schedule 15 whichever is applicable

2.9 Advertising rights

All notices, signs and barricades, as well as advertisements; may be used only if approved by the Employer. The Contractor shall be responsible for the supply, erection, maintenance and ultimate removal.

2.10 Site usage

Access to site shall be limited to the contractor and his personnel. The contractor shall be responsible to control unauthorized entry to the site and shall inform the Employer of any breach of such rules. The site shall be managed and used for its intended purpose.

2.11 Site establishment

No site establishment will be required under this Contract.

2.12 Alterations, additions, extensions and modifications to existing works

No alterations, additions, extensions and modifications to Works, general arrangement and design of electrical control systems will be allowed under this Contract, unless specifically instructed so by the Employer.

This implies that all equipment, parts and components offered, supplied, installed and fitted shall be 100% compatible with existing parts and components to ensure that absolutely no unauthorised modification is required when equivalent goods and parts supplied installed and fitted requires a modification which will result in a change or modification impacting on the design and integrity of the electrical design and installation.

Supplied parts and components which form part of an existing electrical control system and installation shall comply with;

Occupational Health and Safety Act 83 of 1993

Electrical Installation Regulations of 2009

SANS 10142-1 (Ed3)

SANS 61439 - Low-voltage switchgear and control gear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons.

SANS 1973-1:2017 - Low-voltage switchgear and control gear ASSEMBLIES Part 1: Type-tested ASSEMBLIES with stated deviations and a rated short-circuit withstand strength above 10 kA.

2.13 General requirements

Standard Specifications for Electrical Works:

2.13.1 CONTRACTORS DRAWINGS

The Contractors drawings shall comply with the following:

- a. Drawings shall be provided in electronic data of AutoCAD format or compatible version indicating the true reflection of as built design.
- b. Drawings shall be prepared in accordance with the latest issue of SANS 10111. The equivalent BS code of Engineering drawing practice will also be acceptable.
- c. Drawings shall be to A1 or A0 size.
- d. Drawings shall be to scale; with both the scale and the drawing being large enough to clearly show all relevant components of the plant and equipment.
- e. In addition to the usual plan and two side elevations, sufficient additional sections shall be included to clearly show the arrangement of all plant and equipment.
- f. Item lists shall be provided on the drawing or on a separate parts list.
- g. Item descriptions shall include the material of construction, quantity and full identification information, including as applicable, brand name, manufacturer's reference number, model number, size, rating, source, duty, quantity, etc.

2.13.2 Training

Where applicable, during the Trial Operation Period, the City of Cape Town's site staff will assist the Contractor in operating the plant and the Contractor shall train these staff in the starting, operating and stopping of the plant and shall train the City of Cape Town's maintenance staff on the maintenance requirements and procedures. The Tenderer shall price for the on-site personal tuition of 3 operational staff members and 3 engineering staff members.

The Contractor shall also provide the trainees with printed copies of the Operating and Training Manual which forms part of the Operation and Maintenance Manual.

The Contractor shall provide tuition with regards to start-up shut-down and operating instruction for all operational modes for the Works. That shall be comprehensive and shall include actions to be taken in the case of all alarm conditions and basic and basic fault finding.

2.13.3 Spares

Spares shall be managed and kept safe by the contractor until it has been supplied or installed, commissioned and handed over to the City of Cape Town.

2.13.4 Modification protocol

Original plant equipment design changes and modifications shall only be authorised by the Engineer. Such changes and modifications may have to be updated in all the volumes of the OEM manuals which will include the specifications, drawings, part lists and the distribution of all the changes to the owners of the manuals at the cost of the tenderer. It is imperative to note that a change of installed parts and components due to the supply of an equivalent offered by the contractor, it shall be deemed as a modification of the original engineering design which will invoke clause 5.8 contained in Section 5, Pricing Schedule.

This implies that all equipment, parts and components offered, supplied, installed and fitted shall be 100% compatible with existing parts and components to ensure that absolutely no unauthorised modification is required when equivalent goods and parts supplied installed and fitted requires a modification which will result in a change or modification impacting on the design and integrity of the electrical design and installation.

Supplied parts and components which form part of an existing electrical control system and installation shall comply with;

Occupational Health and Safety Act 83 of 1993

Electrical Installation Regulations of 2009

SANS 10142-1 (Ed3)

SANS 61439 - Low-voltage switchgear and control gear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons.

SANS 1973-1:2017 - Low-voltage switchgear and control gear ASSEMBLIES Part 1: Type-tested ASSEMBLIES with stated deviations and a rated short-circuit withstand strength above 10 kA.

2.14 Warranty

The warranty for goods and services are specified under this contract in GCC, clause 15.

The contractor is further obligated to provide the City of Cape Town a warranty for supplied goods from date of delivery for the full term specified by the Original Manufacturer's warranty. This warranty may exceed the timeframe of GCC, clause 15.

All workmanship, materials and components shall have a warranty valid for twelve (12) months after the goods and/or services have been delivered. Where products procured will be supplied with the Original Equipment Manufacturer guarantee and warranty, conditions applicable to the specific product may exceed twelve (12) months from date of purchase. The OEM guarantee and warranty conditions shall take preference for the products supplied.

3. PROJECT SPECIFICATIONS

3.1 Scope

This specification covers the supply, installation, servicing, repairing and reconditioning of electrical motor control panels and associated electrical automation switchgear.

3.2 Work Projects Specifications

This specification is a broad outline of activities and tender requirements therefore each Works Project will be detailed by the Works Package Managers in their detailed Works Package Specifications which is specific to each maintenance project.

3.2.1 Low Voltage electric circuit breaker service and maintenance plan specifications:

NOTES:

1. Low voltage circuit breakers are normally of the air, mechanical type, with various mechanical components used for the switching, racking and tripping mechanisms. These circuit breakers are mainly used in 400 volt applications as protection on the incoming and bus-bar side of the Motor Control Centre boards.
2. Maintenance of these types of equipment is of a specialised nature and must be managed as such by Specialist tradesman suitably qualified and recognised by the Origin Equipment Manufacturer.
3. This type of equipment is normally found in panels in a sub-station or an MCC room and should therefore be reasonably well protected against the environmental elements.
4. The frequency of maintenance of low voltage air circuit breakers depends essentially on the conditions of service of the breaker: frequency of operation, tripping on fault, relative humidity and the presence of dust. The mechanical endurance of manually or electrically operated Low Voltage Circuit Breakers is limited according to the manufacturer's specification. Arc chutes and arcing contacts are guaranteed for a certain number of cycles, depending on load at which they trip, which is normally less than the life of the breaker. Thus, these items would have to be replaced from time to time, during the lifetime of the breaker. The main contacts will normally last for the life of the breaker. To guarantee the correct operation of a breaker, manufacturers recommend the following inspection schedule:
 - a) Every 3000 operations
 - b) Every 6 months if exposed to dust and/or high levels of humidity
 - c) After an idle period, greater than 6 months
 - d) Once annually
 - e) Five Yearly.
5. Typical manufacturers of circuit breakers are as follows:
 - a. Low Voltage: Schneider (Merlin Gerin)
ABB
CBI
 - b. Medium Voltage: ABB



400V Incomer CB's on MCC board view



400V CB's and bus coupler



400V CB exploded

Maintenance Plan for: Circuit Breaker- Low Voltage, air type

NOTES:

1. This annual inspection is normally done after the infrared thermographic inspections of the Motor Control Centre panels have been performed. The work is often contracted to specialists or representatives of the manufacturers.
2. In certain cases, where tripping situations have occurred under full load, it would be recommended to open the breaker, inspect the contactors for damage and clean up using suitable electrical contact solvents.
3. See attached appendix, below, for a detailed pro-forma example of a typical Low Voltage Air Circuit Breaker Inspection and Service Report.
4. The task list shown below, serves as a guideline for service work required. See the appendix below, for the detailed contractor's report.
5. Preventative maintenance shall be actioned as per the guidelines supplied by the manufacturer. Periodic maintenance to be performed at intervals suggested by manufacturer of equipment to ensure that the ageing of equipment is not accelerated.
6. Maintenance frequencies to be carried out annually, every two years or every 5 years. Each program and frequency has different tasks and checklist that needs to be completed upon inspection and servicing of circuit breakers.

Device and chassis mechanisms

Mechanical operation of the circuit breaker may be hindered by dust, knocks, and aggressive atmospheres, no greasing or excessive greasing. Operating safety is ensured by dusting and general cleaning, proper greasing and regular opening and closing of the circuit breaker.

Dusting

Dusting is best carried out using a vacuum cleaner.

Cleaning

Cleaning should be carried out using a cloth or brush that is perfectly clean and dry, without using any solvents, avoiding greased parts except for grease on electrical contacts. Application of products under pressure or containing solvents (trichloroethane, trichloroethylene) is strictly forbidden (e.g. WD40).

The main problems of products under pressure are the following:

- a) it may be impossible to re-grease inaccessible lubrication points (greased for the life of the product)
- b) corrosion of points that are not re-greased
- c) damage caused by the pressure of the product
- d) risk of temperature rise, due to the presence of an insulating solvent in the contact zones
- e) elimination of special protection
- f) deterioration of plastic materials.

Greasing

This operation is carried out after cleaning on certain mechanical parts as described in the maintenance procedures, using the various greases recommended by Manufacturer. Grease must not be over applied because the excess, if mixed with dust, may result in mechanism malfunctions. Generally speaking, under normal operating conditions, the pole-operating mechanism does not require any re-greasing (greased for the life of the product).

- a) The clusters and disconnecting-contacts must be greased according to the defined intervals using the greases indicated by the Manufacturer.
- b) The main contacts must not be greased.

Operating cycles

The imperative need to ensure continuity of service in an installation generally means that power circuit breakers are rarely operated. If, on the one hand, an excessive number of operating cycles accelerates device ageing, it is also true that a lack of operation over a long period can result in mechanical malfunctions. Regular operation is required to maintain the normal performance level of each part involved in the opening and closing cycles.

In installations where power circuit breakers are used in source changeover systems, it is necessary to periodically operate the circuit breaker for the alternate source.

Rack mount Circuit Breaker Components and Functionality:

Equipment	Function	Hazard	Maintenance Type	Action
The Case	- Functional insulation between the phases themselves and between the phases and the exposed conductive parts in order to resist transient over-voltages caused by the distribution system. - Barrier avoiding direct user contact with live parts. - Protection against the effects of electrical arcs and overpressures caused by short-circuits.	there should be: - No traces of grime (grease), excessive dust or condensation which all reduce insulation - No signs of burns or cracks which would reduce the mechanical solidity of the case and thus its capacity to withstand short-circuits	- Visual Inspection of its condition and cleaning with a dry cloth or vacuum cleaner. - All cleaning products with solvents are strictly forbidden.	Case must be replaced if there are signs of burns or cracks.
Arc Chutes	- During a short circuit, the arc chute serves to extinguish the arc and to absorb the high level of energy along the entire path of the short circuit. - It also contributes to arc extinction under rated current conditions.	- An arc chute that is not in good condition may not be capable of fully clearing the short-circuit and ultimately result in the destruction of the circuit breaker - The fins of the arc chutes may be blackened (due to the gases produced at In) but must not be significantly damaged. - The filters must not be blocked to avoid internal overpressures	Use a vacuum cleaner rather than a cloth to remove dust from the outside of the arc chutes	The arc chutes must be regularly checked

Auxiliary circuits				
Equipment	Function	Hazard	Maintenance Type	Action
Control Auxiliaries	- MX and XF shunt releases are respectively used to remotely open and close the circuit breaker using an electrical order or by a supervisor via a communication network. - The MN under voltage release is used to break the power circuit if the distribution system voltage drops or fails in order to protect life (emergency off) or property.	Communicating MX and XF releases and MN releases are continuously supplied and the internal electronic components may suffer accelerated ageing if there is temperature rise in the circuit breaker.		Periodically checking operation at minimum values. Whether or not they need to be replaced depends on the operating and environmental conditions.
Auxiliary wiring	Auxiliary wiring is used to transmit orders to the various control devices and to transmit status-condition information.	Incorrect connections or damaged insulation may result in either non-operation of the circuit breaker or nuisance tripping.		Auxiliary wiring must be regularly checked and replaced as needed, particularly if there are vibrations, high ambient temperatures or corrosive atmospheres
Indication contacts	The contacts indicating the status of the circuit-breaker (ON / OFF), of the chassis (CE, CD, CT), a trip due to an electrical fault (SDE) or that the circuit breaker is ready to close (PF) provide the operator with the status information required to react correspondingly.	- Any incorrect indications may result in erroneous device operation that could endanger life and property. - Contact failure (wear, loose connections) may result from vibrations, corrosion or abnormal temperature rise		Check that contacts correctly conduct or isolate according to their positions.

Equipment	Function	Hazard	Maintenance Type	Action
Gear motor	- The gear motor (MCH) automatically recharges the operating-mechanism springs as soon as the circuit breaker is closed. - The gear motor makes it possible to instantaneously reclose the device following an opening. - This function may be indispensable for safety reasons. - The charging lever serves simply as a backup means if the auxiliary voltage fails.	Given the mechanical forces exerted to charge the mechanism, the gear motor wears quickly.		Periodic checks on gear-motor operation and the charging time are required to ensure the device closing function.
Electronic trip unit	If an electric fault occurs in the installation, the electronic trip unit detects the fault and orders the circuit breaker to open and thus protect life and property	Electronic components and circuit boards are sensitive to the environment (ambient temperature, humid and corrosive atmospheres) and to severe operating conditions (magnetic fields, vibrations, etc.)		To ensure correct operation, it is necessary to periodically check: - the chain of action resulting in a trip - the response time as a function of the level of the fault current. - The electronic trip unit need of replacement depends on the operating and environment conditions.
Equipment	Function	Hazard	Maintenance Type	Action
Communication module and accessories	Via the communication bus, the communication option transmits data to a remote site for use by various departments (maintenance,	A break in the transmission of data can result in: production losses due to unawareness concerning the status of a circuit breaker		Periodic checks on the orders (read, write, commands) transmitted by the communication bus are required to maintain a high degree of reliability and

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	management, production, etc.)	• financial losses due to incorrect system management • diagnostic errors		confidence in the communication system.
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Connections	The connections between the various distribution systems in a switchboard (bus bars, cables) and the switchgear are a major source of heat loss. Incorrect tightening may lead to thermal runaway which in turn can provoke damage to the device, the cable insulation and even result in a short-circuit and/or a fire. This type of malfunction is often due to disregard for installation requirements during switchboard assembly.			
Equipment	Function	Hazard	Maintenance Type	Action
Sliding Connections	They are made up of two parts, the clusters and disconnecting contacts.			Requires periodic cleaning in compliance with the described procedures
Fixed Connections	Connections using lugs or bars	- In sulphurous (corrosive) atmospheres (H₂S / SO₂), it is necessary to implement the cleaning procedure using the Thiourea solution, with mandatory re-greasing using the specified fluorinated grease. This type of grease protects the silver and copper-coated contacts against sulphuration. - Because silver or copper sulphide being insulating it provokes an increase in the contact resistance and thus greater temperature rise.		Regularly check the temperature-rise points (change in colour of copper or tinning), dismantle the connections, clean and scrape the contact surfaces, then reassemble the connections using new hardware. Check the terminals

3.2.1.1 Low Voltage air circuit breaker 1-Yearly Service and Inspection

This work may only be performed by authorised or recognised by the OEM as being trained, competent and qualified staff with the tools and testing equipment for a particular brand, make and type of circuit breaker.

1. Obtain work and lock-out permit before commencing any work on the circuit breaker panel
2. Isolate and lock out panel and attach lockout notices
3. Ensure that the correct racking crank handle is stored in the motor control centre. Use this handle to rack out the circuit breaker from its operating to its maintenance position.
4. From the infrared thermographic report, check whether any hotspots or potential problems have been identified in this circuit breaker. Inspect the internals of the circuit breaker accordingly.
5. Check all line and load cables, conductor terminals, connections and fasteners for heat damage and secureness. Re-torque fasteners as needed. Check circuit breaker bus-bar cluster contacts for damages and correct tension
6. **Device**
 - a. Check the general condition of the device
 - b. (escutcheon, control unit, case, chassis, connections)
7. **Mechanism**
 - a) Open/close device manually and electrically
 - b) Charge device electrically
 - c) Check complete closing of device's poles
 - d) Check number of device operating cycles
8. **Breaking unit (arc chutes + contacts)**
 - a) Check the filters cleanliness and the fixing of the arc-chute chambers
9. **Control auxiliaries**
 - a) Check auxiliary wiring and insulation
10. **Control unit**
 - a) Trip control unit using test tool and check operation of contacts SDE1 and SDE2
 - b) Check earth-fault protection function (Micro-logic 6.0) or earth-leakage protection function (Micro-logic 7.0)
11. **Device locking**
 - a) Open and close key-locks installed on device
 - b) Open and close padlocking system installed on device
12. **Chassis (optional)**
 - a) Remove device from chassis and put it back
 - b) Check operation of position contacts (CE, CT, CD, EF)
 - c) Check operation of safety shutters
13. **Chassis locking**
 - a) Open and close key-locks installed on chassis
 - b) Operate padlocking system
14. Do insulation resistance checks, between the various poles, line and load terminals, main and earth as well as control circuit and earth.
15. Check the internal cluster of the breaker for signs of corrosion, overheating and any other damage. Check the wear on all moving and fixed contacts, as well as condition of arc chutes. Properly clean contacts and arc chutes, using approved electro solvent. Replace contacts if wear is significant.
16. Strip circuit breaker, assess condition, clean and continue with annual preventative maintenance.

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17. Check and test the condition and operation of the auxiliary contacts and circuit. Replace any worn or faulty parts.
18. Check condition of charging/spring loading and interlocking mechanisms. Clean and lubricate as needed.
19. Test the lockouts and interlocking mechanisms, lubricate and adjust as needed.
20. Clean and lubricate the breaker racking and rail mechanism.
21. Check the protection relay settings and test accordingly
22. Where cooling fans are installed, clean or replace filter elements, check and clean fan blades, ensure proper functioning.
23. Check the overall external appearance of the breaker housing and covers, checking for breakages or deterioration of the plastic or metal. Repair or replace components as needed.
24. Rack breaker back into operating position, remove lock outs, energize and test system by tripping electrically and mechanically. Reset and put system back into operation.
25. Check that all labels and warning information is in place and correct.
26. Update relevant information on job card, complete breaker service report and attach to completed job card/site service report.

Annual Service Checklist (Low Voltage air circuit breaker)

Minor preventive-maintenance operations such as greasing and operating checks, as well as repairs by standard exchange of certain assemblies, carried out by a certified customer employee according to the manufacturer maintenance instructions.

Check	Tool	Procedure Name
Device Check the general condition of the device (escutcheon, control unit, case, chassis, connections)	None	device NII_1_1
Mechanism Open/close device manually and electrically Charge device electrically Check complete closing of device's poles Check number of device operating cycles	None	mechanism NII_1_1 mechanism NII_1_2 mechanism NII_1_3 mechanism NII_1_4
Breaking unit (arc chutes + contacts) Check the filters cleanliness and the fixing of the arc-chute chambers	Dynamometric Crank	breaking unit NII_1_1
Control auxiliaries Check auxiliary wiring and insulation	None	auxiliaries NII_1_1
Control unit Trip control unit using test tool and check operation of contacts SDE1 and SDE2 Check earth-fault protection function (Micro-logic 6.0) or earth-leakage protection function (Micro-logic 7.0)	HHTK or FFTK	control unit NII_1_1 control unit NII_1_2
Device locking Open and close key locks installed on device Open and close padlocking system installed on device	None	device locking NII_1_1 device locking NII_1_2
Chassis (optional) Remove device from chassis and put it back Check operation of position contacts (CE, CT, CD, EF) Check operation of safety shutters	None	chassis NII_1_1 chassis NII_1_2 chassis NII_1_3
Chassis locking Open and close key locks installed on chassis Operate padlocking system		chassis locking NII_1_1 chassis locking NII_1_2

Example of Low Voltage Air Circuit Breaker Inspection and Service Report

Breaker check list of visual inspection & control

Item	Status	Reading	Notes		
Switch Indicator					
Auxiliary Switch (OF) 1	PASS	0.3Ω			OK
Auxiliary Switch (OF) 2	PASS	0.2Ω			OK
Auxiliary Switch (OF) 3	PASS	0.3Ω			OK
Auxiliary Switch (OF) 4	PASS	0.1Ω			OK
Alarm Switch (SD)	\	\			\
Overcurrent Trip Switch (SDE)	PASS	0.3Ω			OK
Cell Switch (CE/ CD/ CTI)	\	\			\
Auxiliary switch (EF)	\	\			\
Ready to Close Switch (PF)	\	\			\
Early Make/ Break Switch (CAOI CAF)	\	\			\
Programmable Contact Module (M2G/ M5C)	\	\			\
Electrical Accessories	Status	Rating	Notes		
Motor Operator (MOH)	PASS	220-250Vac			OK
Shunt Trip (MK)	PASS	220-250Vac			OK
Shunt Close (XF)	PASS	220-250Vac			OK
Undervoltage Trip (MN)	\	\			\
Electrical Push to Close (BPFE)	\	\			\
Remote Reset (RES)	\	\			\
Mechanical Operation/ General Inspection	N/A	Damaged	Pass	Fail	Recon
Inspect trip bar operation, trip, open & close			X		
Operation Counter	X				
Main Contacts, open gap, contact wear, closing			X		
Closing Latch 1/2 moon			X		
Open Latch 1/2 moon			X		
Arc Chutes			X		
Control Wiring Connections	X				
Inspect, Linkages, pivot points, split pins, circlips			X		
Primary Power Connections			X		
Linkages clean & lubricated			X		
Ground Connection	X				
Inspect mouldings & plastic barriers			X		
Breaker Keylock/ Padlock			X		
Cradle Keylock/ Padlock	X				
Drawout Racking Mechanism			X		
Condition of steel work & plating			X		
Door Interlock	X				
Condition of silver plating			X		
Cable Door Interlock	X				
Mismatch protection	X				
Racking Interlock, pre trip			X		
Nut & bolts				X	
Shutter operation			X		
Pin Jaws Inspection			X		
On/Off Charged/ Discharged rack in/ Rack out labels			X		
Breakers Cable/ Rod Interlock	X				
Breaker mounting hardware			X		
Inspect moving aux racking contacts			X		
Inspect Breaker & Cradle Interlock			X		
Stubs clean & Greased			X		
Insulation test phase to phase			X		
Insulation test phase to earth			X		
All settings recorder & put back to original			X		
Cradle mounting hardware			X		
General Appearance and Cleanliness			X		
Resistance Test - Breaker	N	L1	L2	L3	
Reading recorded	N/A	27μΩ	26μΩ	27μΩ	
Resistance Test - Breaker & Cradle	N	L1	L2	L3	
Reading recorded	N/A	N/A	N/A	N/A	

Comments

There's x1 missing nut for one arc chute.
The breaker was serviced and tested on site and is good to put back into service.

3.2.1.2 Low Voltage air circuit breaker 2-Yearly Service and Inspection

This work may only be performed by authorised or recognised by the OEM as being trained, competent and qualified staff with the tools and testing equipment for a particular brand, make and type of circuit breaker. The City of Cape Town existing install base consists of Schneider Electric, ABB and CBI circuit breakers.

1. Obtain work and lock-out permit before commencing any work on the circuit breaker panel
2. Isolate and lock out panel and attach lockout notices
3. Ensure that the correct racking crank handle is stored in the motor control centre. Use this handle to rack out the circuit breaker from its operating to its maintenance position.
4. From the infrared thermographic report, check whether any hotspots or potential problems have been identified in this circuit breaker. Inspect the internals of the circuit breaker accordingly.
5. Check all line and load cables, conductor terminals, connections and fasteners for heat damage and secureness. Re-torque fasteners as needed. Check circuit breaker bus-bar cluster contacts for damages and correct tension
6. **Mechanism**
 - a) Check gear-motor charging time at 0.85 Un
 - b) Check general condition of mechanism
7. **Breaking unit (arc chutes + contacts)**
 - a) Check condition of breaking unit
8. **Control auxiliaries**
 - a) Check operation of indication contacts
 - b) (OF / PF / MCH)
 - c) Check closing operation of control auxiliary
 - d) XF at 0.85 Un
 - e) Check opening operation of control auxiliary
 - f) MX at 0.70 Un
 - g) Check operation of control auxiliary MN/MNR between
 - h) 0.35 and 0.7 Un
 - i) Check delay of MNR devices at 0.35 and 0.7 Un
 - j) Check MX tripping time
9. **Control unit**
 - a) Check tripping curves using test tool,
 - b) Signaling LED (tripped, overload)
 - c) Save results on PC

10. Chassis (optional)

- a) Dust and re-grease chassis
- b) Re-grease disconnecting-contact clusters and cluster supports
- c) (specific case of corrosive atmospheres)
- d) Check the position of the key on the cluster

11. Power Connections

- a) Check and tighten loose connections
12. Do insulation resistance checks, between the various poles, line and load terminals, main and earth as well as control circuit and earth.
 13. Check the internal cluster of the breaker for signs of corrosion, overheating and any other damage. Check the wear on all moving and fixed contacts, as well as condition of arc chutes. Properly clean contacts and arc chutes, using approved electro solvent. Replace contacts if wear is significant.
 14. Strip circuit breaker, assess condition, clean and continue with annual preventative maintenance.
 15. Check and test the condition and operation of the auxiliary contacts and circuit. Replace any worn or faulty parts.
 16. Check condition of charging/spring loading and interlocking mechanisms. Clean and lubricate as needed.
 17. Test the lockouts and interlocking mechanisms, lubricate and adjust as needed.
 18. Clean and lubricate the breaker racking and rail mechanism.
 19. Check the protection relay settings and test accordingly
 20. Where cooling fans are installed, clean or replace filter elements, check and clean fan blades, ensure proper functioning.
 21. Check the overall external appearance of the breaker housing and covers, checking for breakages or deterioration of the plastic or metal. Repair or replace components as needed.
 22. Rack breaker back into operating position, remove lock outs, energize and test system by tripping electrically and mechanically. Reset and put system back into operation.
 23. Check that all labels and warning information is in place and correct.
 24. Update relevant information on job card, complete breaker service report and attach to completed job card/site service report.

Bi Annual Service Checklist (Low Voltage air circuit breaker)

General preventive-maintenance operations such as general adjustments, trouble-shooting and diagnosis of breakdowns, repairs by exchange of components or functional parts, minor mechanical repairs, carried out by a qualified customer technician using the tools and measurement/setting devices specified in the manufacturer maintenance instructions.

Check	Tool	Procedure Name
Mechanism Check gear-motor charging time at 0.85 Un Check general condition of mechanism	Stop watch + external power supply Screwdriver	mechanism NIII_2_1 mechanism NIII_2_2
Breaking unit (arc chutes + contacts) Check condition of breaking unit	Screwdriver	breaking unit NIII_2_1
Control auxiliaries Check operation of indication contacts (OF / PF / MCH) Check closing operation of control auxiliary XF at 0.85 Un Check opening operation of control auxiliary MX at 0.70 Un Check operation of control auxiliary MN/MNR between 0.35 and 0.7 Un Check delay of MNR devices at 0.35 and 0.7 Un Check MX tripping time	Ohm Meter External power supply External power supply External power supply External power supply Tester	auxiliaries NIII_2_1 auxiliaries NIII_2_2 auxiliaries NIII_2_3 auxiliaries NIII_2_4 auxiliaries NIII_2_5 auxiliaries NIII_2_6
Control unit Check tripping curves using test tool, signaling LED (tripped, overload) Save results on PC	FFTK FFTK report generator software	control unit NIII_2_1
Chassis (optional) Dust and re-grease chassis Re-grease disconnecting-contact clusters and cluster supports (specific case of corrosive atmospheres) Check the position of the key on the cluster	Mobilith SHC100 Mobilith SHC100	chassis NIII_2_1 chassis NIII_2_2
Power Connections Check and tighten loose connections	Thermal Camera Torque wrench	power connections NIII_2_1

3.2.1.3 Low Voltage air circuit breaker 5-Yearly Service and Inspection

This work may only be performed by authorised or recognised by the OEM as being trained, competent and qualified staff with the tools and testing equipment for a particular brand, make and type of circuit breaker. The City of Cape Town existing install base consists of Schneider Electric, ABB and CBI circuit breakers.

1. Obtain work and lock-out permit before commencing any work on the circuit breaker panel
2. Isolate and lock out panel and attach lockout notices
3. Ensure that the correct racking crank handle is stored in the motor control centre. Use this handle to rack out the circuit breaker from its operating to its maintenance position.
4. From the infrared thermographic report, check whether any hotspots or potential problems have been identified in this circuit breaker. Inspect the internals of the circuit breaker accordingly.
5. Check all line and load cables, conductor terminals, connections and fasteners for heat damage and secureness. Re-torque fasteners as needed. Check circuit breaker bus-bar cluster contacts for damages and correct tension
6. **Case**
 - a) Measure insulation resistance Do insulation resistance checks, between the various poles, line and load terminals, main and earth as well as control circuit and earth.
7. **Mechanism**
 - a) Check tripping forces (crescent shaped part)
8. **Breaking unit (arc chutes + contacts)**
 - a) Measure resistance of input/output contact
9. **Control auxiliaries**
 - a) Check the service life of the auxiliaries XF, MX, MN
 - b) Control auxiliaries replacement XF, MX, MN (Every 15years)
10. **Micro-logic Control unit**
 - a) Save protection settings, log events (Micro-logic P and H), and edit reports.
 - b) Check continuity of the tripping chain by primary injection for each phase
 - c) Check DIN/DINF tripping using performer test tool
 - d) Check operation of thumbwheels
 - e) Check the service life of control unit
 - f) Micro-logic replacement (every 15years)
11. **Chassis (optional)**
 - a) Clean and re-grease racking screw (NW only)
 - b) Check connection/disconnection torque
12. **Communication module and accessories**
 - a) Test the device control, the uploading of contact status
 - b) (OF, SDE, PF, CH) operation of optical link , by using the communication bus
 - c) Test the uploading of chassis position contacts, the synchronization of the address between BCM and CCM, the forced replication of the BCM address, by using the communication Bus
 - d) Test the writing of data into Micro-logic by using the Communication Bus
13. Check the internal cluster of the breaker for signs of corrosion, overheating and any other damage. Check the wear on all moving and fixed contacts, as well as condition of arc chutes. Properly clean contacts and arc chutes, using approved electro solvent. Replace contacts if wear is significant.
14. Strip circuit breaker, assess condition, clean and continue with annual preventative maintenance.
15. Check and test the condition and operation of the auxiliary contacts and circuit. Replace any worn or faulty parts.
16. Check condition of charging/spring loading and interlocking mechanisms. Clean and lubricate as needed.
17. Test the lockouts and interlocking mechanisms, lubricate and adjust as needed.
18. Clean and lubricate the breaker racking and rail mechanism.
19. Check the protection relay settings and test accordingly
20. Where cooling fans are installed, clean or replace filter elements, check and clean fan blades, ensure proper functioning.

21. Check the overall external appearance of the breaker housing and covers, checking for breakages or deterioration of the plastic or metal. Repair or replace components as needed.
22. Rack breaker back into operating position, remove lock outs, energise and test system by tripping electrically and mechanically. Reset and put system back into operation.
23. Check that all labels and warning information is in place and correct.
24. Update relevant information on job card, complete breaker service report and attach to completed job card/site service report.

5-Yearly_Service Checklist (Low Voltage air circuit breaker)

Check	Tool	Procedure Name
Case Measure insulation resistance	Ohm Meter	device NIV_3_1
Mechanism Check tripping forces (crescent shaped part)	Tester	mechanism NIV_3_1
Breaking unit (arc chutes + contacts) Measure resistance of input/output contact	Ohmmeter + injection unit	breaking unit NIV_3_1
Control auxiliaries Check the service life of the auxiliaries XF, MX, MN Control auxiliaries replacement XF, MX, MN (Every 15years) ⁽¹⁾	"Service life" software	auxiliaries NIV_3_1
Micro-logic Control unit Save protection settings, log events (Micro-logic P and H), and edit reports. Check continuity of the tripping chain by primary injection for each phase Check DIN/DINF tripping using performer test tool Check operation of thumbwheels Check the service life of control unit Micro-logic replacement (every 15years) ⁽¹⁾⁽²⁾	Magic box + SSU software	control unit NIV_3_1
	Injection unit	control unit NIV_3_2
	Performer test kit	control unit NIV_3_3
	RSU "Service life" software RSU	control unit NIV_3_4
Chassis (optional) Clean and re-grease racking screw (NW only) Check connection/disconnection torque	Mobilith SHC100	chassis NIV_3_1
	Dynamometric crank	chassis NIV_3_2

Check	Tool	Procedure Name
Communication module and accessories Test the device control, the uploading of contact status (OF, SDE, PF, CH) operation of optical link , by using the communication Bus Test the uploading of chassis position contacts, the synchronization of the address between BCM and CCM, the forced replication of the BCM address, by using the communication Bus Test the writing of data into Micro-logic by using the communication Bus	Magic box + RCU software Magic box + RSU software Magic box + RSU software	communication-en NIV_3_1 communication-en NIV_3_2 communication-en NIV_3_3
Chassis (optional) Clean and re-grease racking screw (NW only) Check connection/disconnection torque	Mobilith SHC100 Dynamometric crank	chassis NIV_3_1 chassis NIV_3_2
Communication module and accessories Test the device control, the uploading of contact status (OF, SDE, PF, CH) operation of optical link, by using the communication Bus Test the uploading of chassis position contacts, the synchronization of the address between BCM and CCM, the forced replication of the BCM address, by using the communication Bus. Test the writing of data into Micro-logic by using the communication Bus	Magic box + RCU software Magic box + RSU software Magic box + RSU software	communication-en NIV_3_1 communication-en NIV_3_2 communication-en NIV_3_3

(1) For critical power applications it is recommended to replace the Micro-logic control unit and the control auxiliaries after 10 years. In case of severe environmental conditions, it may be required to reduce this time: please refer to the page 10 of this document ("Severe conditions and device not protected").

(2) Each time the Micro-logic is replaced, the performer and the rating and sensor plugs must be replaced.

3.2.2 Dynamic Power Factor Correction (DPFC) service and maintenance plan specifications:

This work may only be performed by authorised or recognised by the OEM as being trained, competent and qualified staff with the tools and testing equipment for a particular brand, make and type of Dynamic Power Factor Correction.

Tenderer may request further documentation and maintenance requirements and recommendations as outlined in the Original Equipment Manufacturers Manual from the Contract Manager or the Works Package Manager after award of the contract.

Dynamic Power Factor Correction (DPFC)		
 DPFC panel and overhead sealed bus bar controller		 DPFC switching modules and controller

The following DPFC equipment is the existing equipment install base. ELSPEC Dynamic Power Factor Correction Equipment. Manufacturer and Distributor of Dynamic Power Factor Correction (DPFC) systems are Impact Power Innovations & Bellco:

- DPFC ELSPEC – Equalizer – Activar Balanced System
- DPFC ELSPEC metering

NOTES:

1. Impact Power Innovations and Bellco supplied and commissioned Dynamic Power Factor Correction Systems (DPFC'S) to the City of Cape Town at Waste Water Treatment Works (WWTW). The primary objectives of the DPFC'S are principal compliance to Voltage and Power Factor (PF) performance during Motor Start and Steady State operations.
2. The internal cooling and room cooling/air conditioning system is critical to the reliability and lifespan of the equipment. The temperature is monitored and the system will shut down if the room temperature exceeds the maximum permissible level.
3. While the systems do not require intensive maintenance schedules and do provide the relevant real-time information on any faults encountered, they do require preventative maintenance and basic system care.
4. See attached appendix, above, for a detailed pro-forma example of a typical DPFC system.
5. The task list shown below, serves as guideline for service work required.

Note: Observe the recommended safety precautions in Section 7.5(a), (b) of OEM manual before working on the system.

Only a qualified electrician and ELSPEC technician trained and authorised by the OEM or an appointed service agent may work on the equipment.

3.2.2.1 DPFC Type A Service:

6 monthly system service, inspection and diagnostic check:

System Diagnostic Check

1. Obtain a Permit to Work from plant
2. Work to be done by a specialists or representatives of the manufacturers
3. Check controller for normal operations
4. Check controllers for error messages
5. Check capacitor groups for error indications
6. Check protection fuses for blown fuses. Inspect and replace faulty components
7. Ensure the date and time is correctly set

Visual Inspections

1. Check for signs of overheating of cables
2. Check proper operation of fans and cleaning thereof
3. Check overall cleanliness of the equipment
4. Check for paint and corrosion damage
5. Check for blown protection fuses indications
6. Check for capacitor indicator module malfunctions

Routine maintenance

Observe the recommended safety precautions in Section 7.5(a), (b) of OEM manual before working on the system

1. Isolate and lock out ELSPEC system
2. Ensure overall cleanliness of the equipment. Free of dust and contaminants
3. Check all control and protection devices
4. Check and ensure all control connections are tight
5. Replace blown protection fuses
6. Ensure all ELSPEC panel fans are working and cleaned bi-annually
7. Replace malfunction capacitor indicator modules
8. Perform an electrical system test as per Section 7.5(a) page 26 of ELSPEC manual, annually

Issue a maintenance breakdown and fault report to the maintenance section

3.2.2.2 DPFC Type B Service:

1 Yearly system service, inspection, diagnostic check, Inspection and metering calibration:

Observe the recommended safety precautions in Section 7.5(a), (b) of OEM manual before working on the system

System Diagnostic Check

1. Obtain a Permit to Work from plant
2. Work to be done by a specialists or representatives of the manufacturers
3. Check controller for normal operations
4. Check controllers for error messages
5. Check capacitor groups for error indications
6. Check protection fuses for blown fuses. Inspect and replace faulty components
7. Ensure the date and time is correctly set

Visual Inspections

1. Check for signs of overheating of cables
2. Check proper operation of fans and cleaning thereof
3. Check overall cleanliness of the equipment
4. Check for paint and corrosion damage
5. Check for blown protection fuses indications
6. Check for capacitor indicator module malfunctions

Routine maintenance

Observe the recommended safety precautions in Section 7.5(a), (b) of OEM manual before working on the system

1. Isolate and lock out ELSPEC system
2. Ensure overall cleanliness of the equipment. Free of dust and contaminants
3. Check all control and protection devices
4. Check and ensure all control connections are tight
5. Replace blown protection fuses
6. Ensure all ELSPEC panel fans are working and cleaned bi-annually
7. Replace malfunction capacitor indicator modules
8. Perform an electrical system test as per Section 7.5(a) page 26 of ELSPEC manual, annually

ELSPEC meter maintenance

1. Calibrate metering to OEM settings and parameters

ELSPEC search

1. Verification of Summary Page measurements
2. Verification of CT/VT configurations and device info
3. Software upgrade included
4. Check and assess system processing folders
5. SQL database and error logs analysis

Data management

1. Data back up
2. Server clean up

ELSPEC Investigator

1. Software upgrade
2. Verify viewable parameters
3. Generate NRS 048 Power Quality Report (PDF)

Issue a maintenance report to the maintenance section

3.2.3 Electrical actuator service and maintenance plans:

3.2.3.1 Type A Service:

6 Monthly Service and Inspection

Maintenance parts required are specialised items and will be quoted on as provisional sum line items. This is a quotation from the OEM and preferably three x quotations.

1. Obtain a Permit to Work from plant
2. Collection and analysis of operational data from actuator through the data logger.
3. Test Bus communication systems for communications, resistance measurements, capacitance and/or leakage etc. and the results are used to identify weaknesses which can then be rectified.
4. External visual inspection of all external surfaces including paint finishes, control knobs and valve stems.
5. The oil level is checked and replenished if necessary.
6. Mounting bolts, nuts, washers and screws are checked for damage and tightness.
7. Confirmation that hand wheel operation is possible and that there is physical movement of the valve if operations allow.
8. Confirmation that local control works in both directions whilst checking for any signs of deterioration (e.g. undue motor noise).
9. Where available (through data loggers) historic performance data is investigated and compared against stored data logger profiles.
10. The terminal cover is removed and the connections are checked for tightness. Additionally, the compartment is checked for water ingress and corrective action taken as necessary.
11. The 'O' ring seal is replaced and if it is an Explosion Proof type actuator the integrity of the flame path is inspected.
12. The motor cover is removed and the motor is checked. The case is checked for any ingress of moisture. The 'O' ring seal is replaced. If the unit is an Explosion Proof actuator the integrity of the flame path is inspected.
13. The electrical cover is removed and the compartment is checked for any ingress of moisture. The status of switches, contactors and electrical apparel are checked. The "O" ring is replaced. If the unit is an Explosion Proof actuator the integrity of the flame path is inspected.
14. All cover screws are greased to enable ease for future removal and protect them from corrosion.
15. On completion both local and remote operation are checked together with the Customer operatives.
16. Check the mode operation button or selector switch
17. Switch the actuator in the manual position and operate the valve the full stroke open and close.
18. Check and test the stop buttons between the open and close cycle.
19. Check that the limit switches are set to the correct open and close positions
20. Clean the spindle
21. Check the drive nut on the spindle for wear.
22. Lubricate the spindle.
23. Ensure the spindle sleeve is not damaged, cracked or broken and the top is sealed with a cap preventing water and dust ingress.
24. Check if fitted, the internal battery voltage and replace if required. In the case of electrical actuators with internal batteries the battery condition is checked and it is replaced based on condition.
25. Set the unit into the automatic position and ensure the operation is as per the operating procedures paying particular attention to the frequency of operations. Too many partial open and close operations may indicate a control system problem
26. Operate the hand wheel if fitted, to ensure the clutch mechanism is operating and releasing

27. Ensure the IP 66 glands are correctly fitted if the unit is underground and in a position of potential water ingress.
28. Ensure all other orifices are sealed from water, dust and moisture ingress.
29. Service provider to complete and submit to client both Corrective Maintenance Report and a Preventative Maintenance Activity Report.
30. For any parts or component of service and repair not covered by the tender specification, will be managed by the provisional sum rate and allowance.

Electrical actuator service and maintenance plans:

3.2.3.2 Type B Service:

Basic electric actuator Service and Inspection

Maintenance parts required are specialised items and will be quoted on as provisional sum line items. This is a quotation from the OEM and preferably three x quotations.

1. Obtain a Permit to Work from plant
2. Functionality test.
3. Electrically and mechanically disconnect and remove the electrical actuator.
4. When an on-site condition assessment warrants an off-site workshop service such as damage to the actuator and/or mechanical such as worn gears and shafts, mechanical housing etc., send the unit to specialists or representatives of the manufacturers
5. Strip and assess the condition of the unit stripped.
6. Clean the spindle
7. Lubricate the spindle
8. Ensure the spindle sleeve is not damaged, cracked or broken and the top is sealed with a cap preventing water and dust ingress.
9. Replace the drive nut on the spindle.
10. If fitted, replace the internal battery.
11. Re - assemble actuator.
12. Re - test actuator to verify functionality and correct output torque.
13. Supply customer with test certificate.
14. Respray actuator to customer spec.
15. Standard parts to include in the service:
 - a) Seal and bearing kit
 - b) 9VDC Display backup battery
 - c) Oil SAE80 or OEM recommended lubricant (Electric Actuators)
16. Test the unit in the representatives of the manufacturers' workshop and issue a maintenance report to the maintenance section.
17. Mechanically install
18. Electrically connect ensuring all cable terminations are well sealed and in good condition.
19. Check the mode operation button or selector switch
20. Switch the actuator in the manual position and operate the valve the full stroke open and close.
21. Check and test the stop buttons between the open and close cycle.
22. Check that the limit switches are set to the correct open and close positions
23. Set the unit into the automatic position and ensure the operation is as per the operating procedures paying particular attention to the frequency of operations. Too many partial open and close operations may indicate a control system problem
24. Operate the hand wheel if fitted, to ensure the clutch mechanism is operating and releasing
25. Ensure the IP 67 glands are correctly fitted if the unit is underground and in a position of potential water ingress.
26. Ensure all other orifices are sealed from water, dust and moisture ingress.
27. For any part or component of service and repair not covered by the tender specification, will be managed by the Non-pricelist items rate.
28. Service provider to complete and submit to client both Corrective Maintenance Report and a Preventative Maintenance Activity Report

3.2.3 Variable Speed (VFD) service and maintenance plans:

Variable Speed Drive (VSD) or Variable Frequency Drive (VFD) has the same meaning. It is referred to differently in some parts of the world or by manufacturers.

3.2.4.1 Type A Service: (Basic repair and maintenance plan)

Low Voltage 400 V AC 50Hz Variable Speed drives (Yaskawa, WEG, Delta, Allen Bradley, ABB, and Schneider Electric)

1. Backup of drive parameters, fault and trip history, issue report to City of Cape Town ENGINEERING AND ASSET MANAGEMENT (EAM) Electrical maintenance section.
2. Cooling system test and inspect. Clean all cooling fans and ducts and perform a functional test and operation. Check the heatsink for dirt and dust accumulation.
3. DC Bus capacitor test and inspect. Measure and inspect for faulty capacitor components.
4. Inspect ribbon cable/s and connections.
5. Inspection of the fault logger, noting any errors that could lead to failure
6. Test and report. After maintenance or repair of industrial controls, always test the control system for proper functioning under controlled conditions.
7. Perform a functional test of the VFD.
8. Where it is found during the maintenance inspection a variable speed drive requires further repairs and replacement of defective components, submit a maintenance and service report to the employer. Submit a complete quotation with OEM recommended parts price list specifying the required component/s required to fully restore the VFD to full functional condition.

3.2.4.2 Type B Service: (Advanced repair and maintenance plan)

Low Voltage 400 V AC 50Hz Variable Speed drives (Yaskawa, WEG, Delta, Allen Bradley, ABB, Schneider Electric)

1. Backup of drive parameters, fault and trip history, issue report to City of Cape Town ENGINEERING AND ASSET MANAGEMENT (EAM) Electrical maintenance section.
2. Remove the VFD from the electrical panel and send to a controlled maintenance workshop, OEM or recognized approved repairer, that has the training and experienced staff to work on a particular brand and type of variable speed drive.
3. Strip and inspect all components as per OEM recommendations.
4. Record all relevant VSD details on a test report and certificate.
5. Investigate and interrogate the fault history.
6. Tests performed without power:
7. Input and output circuit test. Test the input rectifier control circuit components. Test the output inverter control circuit components.
8. Visual inspection of drive and component.
9. Tests performed with power:
 - a) Check display working
 - b) Check DC bus

- c) Save parameters
 - d) Check and test digital inputs and outputs
 - e) Check and test analogue inputs and outputs
10. Cooling system test and inspect. Clean all cooling fans and ducts and perform a functional test and operation. Clean the heatsink thoroughly.
 11. DC Bus capacitor test and inspect. Measure and inspect for faulty capacitor components.
 12. Inspect ribbon cable/s and connections.
 13. Electrostatic discharge protected cleaning of the VFD.
 14. Inspection of the 'emergency stop' circuit where applicable
 15. Inspection of the fault logger, noting any errors that could lead to failure
 16. Operating mechanisms. Check for proper functioning and freedom from sticking or binding. Replace any broken, deformed, or badly worn parts or assemblies according to individual product renewal parts lists. Check and securely re-tighten (if necessary) any loose fasteners. Lubricate (if specified) per individual product instructions.
 17. Contacts and connections. Check contacts for excessive wear and dirt accumulations. Discoloration and slight pitting are acceptable. Do not file contacts. Do not use contact spray cleaners as residues can cause sticking or interfere with electrical continuity. Replace the contacts only after the silver has become badly worn. Always replace contacts in complete sets to avoid misalignment and uneven contact pressure. Check all connections for wear and perform a condition assessment.
 18. Terminals. Loose connections can cause overheating that can lead to equipment malfunction or failure. Check the tightness of all terminals and bus bar connections – securely tighten any loose connections. Replace any parts or wiring that is damaged by overheating. Also check ground connection integrity.
 19. Solid-state Devices. Solid-state devices require little more than a periodic visual inspection. Inspect the printed circuit boards to determine whether they are properly seated in the edge connectors. Board locking tabs must be in place. Necessary replacements must be made only at the personal computer board or plug-in component level. Do not use solvents on printed circuit boards. When blowers are used, air filters must be cleaned or changed periodically depending on the specific environmental conditions encountered.
 20. Replacements. Make any necessary replacements only with OEM renewal parts or kits. Assure that parts are properly matched to the model, series, and revision level of the equipment.
 21. Test and report. After maintenance or repair of industrial controls, always test the control system for proper functioning under controlled conditions.
 22. Perform a functional test of the VFD.
 23. Where it is found during the maintenance inspection a variable speed drive requires further repairs and replacement of defective components, submit a maintenance and service report to the employer. Submit a complete quotation with OEM recommended parts price list specifying the required component/s required to fully restore the VFD to full functional condition.

3.2.4.3 Type C Service: (Basic repair and maintenance plan)

Medium Voltage 3300 V AC 50Hz Variable Speed drives (Yaskawa, WEG, Allen Bradley, ABB, and Schneider Electric)

1. Backup of drive parameters, fault and trip history, issue report to City of Cape Town ENGINEERING AND ASSET MANAGEMENT (EAM) Electrical maintenance section.
2. Cooling system test and inspect. Clean all cooling fans and ducts and perform a functional test and operation. Check the heatsink for dirt and dust accumulation.
3. DC Bus capacitor test and inspect. Measure and inspect for faulty capacitor components.
4. Perform a functional thermal infra-red survey noting specific Permit to Work and Safe Working Procedures. Only to be performed under strict guidance and supervision from the City of Cape Town medium voltage section.
5. Inspect ribbon cable/s and connections.
6. Inspection of the fault logger, noting any errors that could lead to failure
7. Test and report. After maintenance or repair of industrial controls, always test the control system for proper functioning under controlled conditions.
8. Perform a functional test of the VFD.
9. Where it is found during the maintenance inspection a variable speed drive requires further repairs and replacement of defective components, submit a maintenance and service report to the employer. Submit a complete quotation with OEM recommended parts price list specifying the required component/s required to fully restore the VFD to full functional condition.
10. Ensure and test the interlocking mechanisms ensuring the MV section of the VSD is always shielded from workers whilst energized.

3.2.4.4 Type D Service: (Advanced repair and maintenance plan)

Medium Voltage 3300 V AC 50Hz Variable Speed drives (Yaskawa, WEG, Allen Bradley, ABB, and Schneider Electric)

1. Backup of drive parameters, fault and trip history, issue report to City of Cape Town ENGINEERING AND ASSET MANAGEMENT (EAM) Electrical maintenance section.
2. Medium Voltage 3300 V AC 50Hz Variable Speed drives (Yaskawa, WEG, Delta, Allen Bradley, ABB, and Schneider Electric)
3. Remove the VFD from the electrical panel or sections of it, and send to a controlled maintenance workshop, OEM or recognized approved repairer, that has the training and experienced staff to work on a particular brand and type of variable speed drive.
4. Strip and inspect all components as per OEM recommendations
5. Transformer Section
 - Visual inspections and cleaning of the cubicle, door inlet air filters.

- Check cooling fans and clean any dust build-up.
- Clean and check top and side covers.
- Check door latches and locking mechanisms.

6. Power Section

- Visual inspection of the power cell sections and cleaning of the cubicle, door inlet air filters.
- Clean individual power cells and check external components for integrity and proper operation.
- Clean and check top and side covers.
- Check door latches and locking mechanisms.
- Check all internal connections for correct tightness.

7. Control Section

- Visual inspection of the power cell sections and cleaning of the cubicle.
- Check door latches and locking mechanisms.
- Check all internal connections for correct tightness.
- Clean and check top and side covers.

8. Check cooling fans and clean any dust build-up.

9. Record all relevant VSD details on a test report and certificate.

10. Investigate and interrogate the fault history.

11. Tests performed without power:

12. Input and output circuit test. Test the input rectifier control circuit components. Test the output inverter control circuit components.

13. Visual inspection of drive and component.

14. Tests performed with power:

15. Check display working

16. Save parameters

17. Check and test digital inputs and outputs

18. Check and test analogue inputs and outputs

19. Cooling system test and inspect. Clean all cooling fans and ducts and perform a functional test and operation. Clean the heatsink thoroughly.

20. Input and output circuit test. Test the input rectifier control circuit components. Test the output inverter control circuit components.

21. Inspect ribbon cable/s and connections.

22. Electrostatic discharge protected cleaning of the VFD.

23. Inspection of the 'emergency stop' circuit where applicable
24. Inspection of the fault logger, noting any errors that could lead to failure
25. Operating mechanisms. Check for proper functioning and freedom from sticking or binding. Replace any broken, deformed, or badly worn parts or assemblies according to individual product renewal parts lists. Check and securely re-tighten (if necessary) any loose fasteners. Lubricate (if specified) per individual product instructions.
26. Contacts and connections. Check contacts for excessive wear and dirt accumulations. Discoloration and slight pitting are acceptable. Do not file contacts. Do not use contact spray cleaners as residues can cause sticking or interfere with electrical continuity. Replace the contacts only after the silver has become badly worn. Always replace contacts in complete sets to avoid misalignment and uneven contact pressure. Check all connections for wear and perform a condition assessment.
27. Terminals. Loose connections can cause overheating that can lead to equipment malfunction or failure. Check the tightness of all terminals and bus bar connections – securely tighten any loose connections. Replace any parts or wiring that is damaged by overheating. Also check ground connection integrity.
28. Solid-state Devices. Solid-state devices require little more than a periodic visual inspection. Inspect the printed circuit boards to determine whether they are properly seated in the edge connectors. Board locking tabs must be in place. Necessary replacements must be made only at the personal computer board or plug-in component level. Do not use solvents on printed circuit boards. When blowers are used, air filters must be cleaned or changed periodically depending on the specific environmental conditions encountered.
29. Replacements. Make any necessary replacements only with OEM renewal parts or kits. Assure that parts are properly matched to the model, series, and revision level of the equipment.
30. Test and report. After maintenance or repair of industrial controls, always test the control system for proper functioning under controlled conditions.
31. Ensure and test the interlocking mechanisms ensuring the MV section of the VSD is always shielded from workers whilst energized.
32. Perform a functional test of the VFD.
33. Where it is found during the maintenance inspection a variable speed drive requires further repairs and replacement of defective components, submit a maintenance and service report to the employer. Submit a complete quotation with OEM recommended parts price list specifying the required component/s required to fully restore the VFD to full functional condition.

3.2.5.A Electronic Soft Starter (Variable Voltage Starter) service and maintenance plans:

3.2.5.1 Type A Service: (Basic repair and maintenance plan)

Low Voltage 400 V AC 50Hz Soft starter (Yaskawa, WEG, Delta, Allen Bradley, ABB, and Schneider Electric)

1. Cooling system test and inspect. Clean all cooling fans and ducts and perform a functional test and operation. Check the heatsink for dirt and dust accumulation.
2. Measure and inspect for faulty components as per OEM maintenance and test procedures.
3. Inspect ribbon cable/s and connections.
4. Inspection of the fault logger history, noting any errors that could lead to failure.
5. Test and report. After maintenance or repair of industrial controls, always test the control system for proper functioning under controlled conditions.
6. Perform a functional test of the Soft starter.

7. Where it is found during the maintenance inspection a soft starter requires further repairs and replacement of defective components, submit a maintenance and service report to the employer. Submit a complete quotation with OEM recommended parts price list specifying the required component/s required to fully restore the VFD to full functional condition.

3.2.5.2 Type B Service: (Advanced repair and maintenance plan)

Low Voltage 400 V AC 50Hz Soft starter (Yaskawa, WEG, Delta, Allen Bradley, ABB, Schneider Electric)

1. Remove the soft starter from the electrical panel and send to a maintenance workshop, OEM or recognized approved repairer, that has the training and experienced staff to work on a particular brand and type of electronic soft starter.
2. Strip and inspect all components as per OEM recommendations.
3. Record all relevant soft starter details on a test report and certificate.
4. Investigate and interrogate the fault history.
5. Tests performed without power:
6. Input and output firing circuit test.
7. Visual inspection of drive and component.
8. Tests performed with power:
 - a) Check display working
 - b) Transformer
 - c) Firing circuit
 - d) Save parameters
 - e) Check and test digital inputs and outputs
 - f) Where fitted internal by-pass contactor
 - g) Check and test analogue inputs and outputs
9. Cooling system test and inspect. Clean all cooling fans and ducts and perform a functional test and operation. Clean the heatsink thoroughly.
10. Measure and test for faulty components.
11. Inspect ribbon cable/s and connections.
12. Electrostatic discharge protected cleaning of the soft starter.
13. Inspection of the fault logger, noting any errors that could lead to failure
14. Contacts and connections. Check contacts for excessive wear and dirt accumulations. Discoloration and slight pitting are acceptable. Do not file contacts. Do not use contact spray cleaners as residues can cause sticking or interfere with electrical continuity. Replace the contacts only after the silver has become badly worn. Always replace contacts in complete sets to avoid misalignment and uneven contact pressure. Check all connections for wear and perform a condition assessment.

15. Terminals. Loose connections can cause overheating that can lead to equipment malfunction or failure. Check the tightness of all terminals and bus bar connections – securely tighten any loose connections. Replace any parts or wiring that is damaged by overheating. Also check ground connection integrity.
16. Solid-state Devices. Solid-state devices require little more than a periodic visual inspection. Inspect the printed circuit boards to determine whether they are properly seated in the edge connectors. Board locking tabs must be in place. Necessary replacements must be made only at the personal computer board or plug-in component level. Do not use solvents on printed circuit boards. When blowers are used, air filters must be cleaned or changed periodically depending on the specific environmental conditions encountered.
17. Replacements. Make any necessary replacements only with OEM renewal parts or kits. Assure that parts are properly matched to the model, series, and revision level of the equipment.
18. Test and report. After maintenance or repair of industrial controls, always test the control system for proper functioning under controlled conditions.
19. Perform a functional test of the soft starter.
20. Where it is found during the maintenance inspection a soft starter requires further repairs and replacement of defective components, submit a maintenance and service report to the employer. Submit a complete quotation with OEM recommended parts price list specifying the required component/s required to fully restore the soft starter to full functional condition.

3.2.5.B Dry air dehumidifier service and maintenance plan:**Dry air dehumidifier service and maintenance plans:**

Manufacturer and suppliers of DehuTech systems or equivalent:

**NOTES AND GENERAL SAFETY:**

1. Only personnel with adequate knowledge of the dehumidifier should be allowed to operate and service it
2. Only personnel with authorization for electrical installations are allowed to make repair of electrical components.
3. Only personnel with authorization for electrical installations are allowed to make repair of electrical components.
4. Repair of electrical components should be carried out by suitable qualified personnel.
5. The dehumidifier must not be installed in areas where explosion proof equipment is required.
6. Prior to servicing the dehumidifier must be left to cool down for at least 15 minutes after operation.
7. The service panel should remain closed except when servicing is carried out.
8. The dehumidifier can only be used for dehumidification of air at atmospheric pressure.
9. Disconnect the dehumidifier from the mains prior to opening any service panel.
10. Never use the dehumidifier without the filters as the desiccant rotor can become contaminated and lose capacity.
11. Signs and instructions on the dehumidifier should not be removed or altered.
12. All maintenance and control of the dehumidifier should be as per the specified schedule.
13. Use only original equipment manufacturer replacement components and parts.
14. Written permission must be obtained from OEM prior to making any alteration or modification.
15. Observe the recommended safety precautions in OEM manual before working on the system.

Operational options.

Using the operation switch on the dehumidifier, different running options can be selected:

Off_Dehumidifier not in operation.

MANUAL_Dehumidifier in continuous operation.

AUTO_Automatic operation by remote humidistat, or other external start/stop signal.

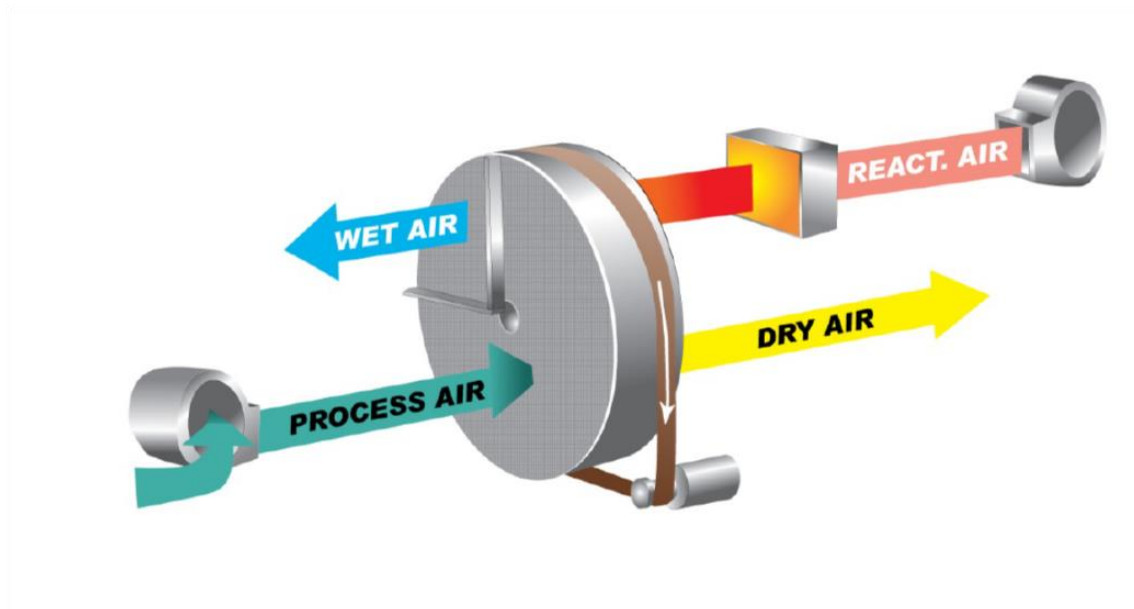
Method of operation of a typical dehumidifier:

The dehumidifier operates with two air streams. A larger air stream to be dehumidified, and a smaller air stream to exhaust the moisture out of the desiccant rotor.

Two fans inside the dehumidifier create air streams which travel through the desiccant rotor in opposite directions.

The larger air volume, the process air, passes through the slowly rotating silica gel rotor. Silica gel is a hygroscopic material adsorbing water vapour direct from the air. When passing through the rotor the humidity of the air is reduced, whilst the moisture content of the rotor material increases. On exiting the rotor, the dried air is introduced into the area, or the process to be dehumidified. The adsorption process works in temperatures from -30°C to $+40^{\circ}\text{C}$.

The smaller air volume, the reactivation air, adsorbs the moisture from the silica gel rotor. This reactivation air is heated by an internal heater to a temperature of approximately $+120^{\circ}\text{C}$. As the reactivation air passes through the rotor, in an opposite direction to the dry air, it will decrease the moisture content of the rotor material. The reactivation air will leave the dehumidifier as warm, moist air, which is then exhausted out from the building.



Design and construction elements:

Casing

The casing of industrial type units are typically fabricated from stainless steel. The top of the dehumidifier has a panel that can be removed for service access. All duct connections to the dehumidifier are designed for connections to standard size spiral ducts.

Rotor

The dehumidifier has a drying rotor fabricated from a desiccant material. The rotor has a matrix of corrugated and flat heat resistant sheets which houses the Silica Gel desiccant agent. This matrix creates a large number of axial flutes through the rotor, which together builds up an immense surface area for moisture adsorption in a small volume. The rotor is manufactured and processed to be able to withstand moisture saturated air without being damaged. This means the rotor can be used in conjunction with a pre- cooling coil. The rotor will not be damaged even if the fan or the heater for reactivation should fail during operation. The rotor is incombustible and non-flammable.

Rotor drive system

The slow rotation of the rotor is achieved by an electrical gear motor and a belt drive. The belt sits on the outer rim of the rotor and is driven by a pulley on the drive motor. A belt tension device keeps the belt in place and maintains tension to prevent belt slip. Correct operation of the drive system, and direction of rotation can be checked by opening the front panel.

Rotor bearings

The centre hub of the rotor is equipped with ball bearings. The rotor shaft could be made from stainless steel.

Filters

The dehumidifier has two separate filters. One in the process air inlet and one in the reactivation air inlet.

Fans for process- and reactivation air

The fans are direct driven radial fans with single phase standard motors, class IP 54, ISO F. The fans are accessible for service behind the panels.

Heater for reactivation air

The reactivation heater is of the PTC-type (Positive Temperature Control), which cannot be overheated, and gives the possibility of a stepless control for 50 - 100 % of the dehumidification capacity. This is achieved by controlling the reactivation air volume.

Electrical panel

The electrical panel is located in a separate compartment at the top of the dehumidifier. Switches and indications for operation are mounted at the front of the dehumidifier.

Dehumidifier maintenance and intervals:

The maintenance intervals for a dehumidifier depend on the surrounding environment and installation site. Recommended maintenance intervals could therefore differ from one installation to another. Incorrect maintenance and service may result in reduced dehumidification capacity.

6 monthly system service, inspection and diagnostic check:

System Diagnostic Check

1. Obtain a Permit to Work from plant
2. Work to be done by a specialists or representatives of the manufacturers
3. Check controller for normal operations
4. Switch off the dehumidifier approximately 15 minutes prior to opening any service panel, allowing the heater to cool down.
5. Disconnect the dehumidifier from main electrical supply by turning the external switch to the off position.
6. Filters

The dehumidifier is equipped with two separate filter banks, one for the process air and the other for the reactivation air. The filters are positioned at the respective inlets and will clean the air prior to entering the dehumidifier.

Intervals for cleaning or replacement of the filters will be determined by the amount of dust and particles in the air at the installation site.

We recommend that the filters are checked at least once a month.

The unit can be equipped with differential pressure measurement for checking the pressure drop over the filters.

Never operate the dehumidifier without the filters, as the rotor can be damaged by dust.
7. Rotor

The rotor is maintenance free. However, should it be necessary to clean the rotor the first choice should be careful use of compressed air. With severe contamination the rotor can be washed with water. Cleaning with water is no routine matter, please contact OEM or local distributor prior to this procedure. Check the rotor bearing and the rotor surface once a year.

8. Electrical motors

The electrical motors are equipped with ball bearings. The bearings are designed to last the life of the motor and therefore no maintenance is required. Check the motors once a year for any abnormal sound.

9. Heater

The reactivation electric heater does not need maintenance, but should be checked twice a year for any mechanical damage to the heating elements.

10. Rotor drive belt

Check the belt tensioning at regular intervals. The tensioning is maintained constantly by the belt tension device, and should not need to be adjusted during normal operation.

3.2.6 Electrical Control Panel (MCC) specifications

3.2.6.1 Electrical Control Panel (MCC) for three pump control

Drawing reference Specification, Section 13 clauses 3.8.1 to 3.8.8 and 3.9, Standard Specifications for Electrical Works latest revision 2023.

Complete design and build specification.

Draughting and design of a motor control centre with a single compartment for the following sections and switchgear supplied and installed;

- 630 Ampere mains incomer 3 phase circuit breaker or alternative, 630 Ampere mains/generator automated source changeover switchgear
 - Bus Bar Sections = to 15kA fault rating
 - Bottom glanding sections
 - Bottom hot dipped U-Channel welded construction galvanized base for entire MCC
 - Metering section measuring all three phases, voltage and current with Power Quality Monitor relay panel/door mounted.
 - Distribution section with miniature circuit breakers for 1 x 63 ampere three phase mains, 1 x single phase earth leakage, 2 x plugs circuits, 2 x lighting circuits, 3 x three phase 20 Ampere ventilation system circuit breakers, 3 x 20 Ampere single phase circuit breakers (Spare), 50 % spare space in the distribution board.
 - Instrumentation section including two 5 x relay ultrasonic level control relay units installed. Supply of 2 x 15 meter ultrasonic level control transducers.
 - Ventilation control panel with 3 x 2.2 kW 3 phase direct on-line internal starters each with AUTO/OFF/MANUAL control. Auto control by means of either PLC control (where plc is specified at scope of works project) or adjustable 24 hour timer controllers.
 - 3.5 kW 3 phase sump pump control panel with AUTO/OFF/MANUAL control. Auto control by means of level control probes Liquid Level Control.
 - 3 x 75 kW Variable Speed Drive control panels with AUTO/OFF/MANUAL control. Compartment ventilation system for VSD application.
 - PLC section with M340 PLC, CPU, Digital Input card, Analogue Input card, Digital Output Card, Analogue Output card
 - Rack mount 3kVa on-line UPS and extended rack mount battery (lithium iron phosphate)
 - 10 Inch HMI in PLC section compartment door
 - Top mount industrial ventilation fans above each tier
 - Telemetry section with the following signals from each pump starter wired to a dedicated telemetry din rail terminal strip (Blue):
 - Motor Run
 - Motor Stopped
 - Motor Tripped
 - AUTO/OFF/MANUAL Selection
 - Motor current 4-20 mA signal
 - Seal fail trip
 - Motor winding temperature trip
- Other:
- Main Failure
 - Intruder
 - Generator Start
 - Generator Stopped
 - Generator on-load
 - Generator Low Fuel
 - Generator Tripped
 - Generator Intruder
 - Generator battery charger failure/alarm
 - Battery inverter failure/alarm

Control philosophy:

Separate site specific application design and priced separately according to Works Package Specifications

Installation:

Separate site specific application costing according to Works Package Specifications

3.2.6.2 Electrical metering panel

Drawing reference Specification, Section 13 clauses 3.8.1 to 3.8.8 and 3.9, Standard Specifications for Electrical Works latest revision 2023.

Complete design and build specification.

Draughting and design of an electrical metering panel for the following sections and switchgear;

- Metering section with chassis
- Bus Bar Section = to 10 kA fault rating
- Main Distribution with three phase, neutral and earth bus bars with chassis
- Main Distribution with CT's measuring each phase
- Glanding section
- Root/base section

3.2.6.3 One pump kiosk type control panel

Drawing reference Specification, Section 13 clauses 3.8.1 to 3.8.10 and 3.9, Standard Specifications for Electrical Works latest revision 2023.

Design parameters:

Draughting and design of a kiosk type motor control centre with a single compartment for the following sections and switchgear;

- Bus Bar Section = to 8 kA fault rating
- 63 Ampere mains incomer 3 phase circuit breaker or alternative,
- 63 Ampere mains/generator source changeover automated switchgear including side mounted Industrial Switched Socket power input
- Bottom glanding sections
- Bottom hot dipped galvanized base for entire MCC
- Rear door mounted metering section measuring all three phases
- Distribution section with miniature circuit breakers for 1 x 63 ampere three phase mains, 1 x single phase earth leakage, 1 x plug circuit, 1 x lighting circuit, 1 x three phase 32 Ampere Industrial Switches Socket Outlet circuit circuit breaker, 2 x Spare spaces
- Instrumentation section including one 5 x relay ultrasonic level control relay units installed
- 1 x 7.5 kW Variable Speed Drive control or Soft starter control or Direct on-line control starter with AUTO/OFF/MANUAL control. Compartment ventilation system for VSD application. This may be de-rated by the specific Work Package project specifications.
- Telemetry section with the following signals from each pump starter wired to a dedicated telemetry din rail terminal strip (Blue):
 - Motor Run
 - Motor Stopped
 - Motor Tripped
 - AUTO/OFF/MANUAL Selection
 - Motor current 4-20 mA signal
 - Seal fail trip
 - Motor winding temperature trip

Other:

- Main Failure
- Intruder
- Generator Start
- Generator Stopped
- Generator on-load
- Generator Low Fuel
- Generator Tripped
- Generator Intruder
- Generator battery charger failure/alarm
- Battery inverter failure/alarm

Control philosophy:

Separate site specific application design and priced separately according to Works Package Specifications

Installation:

Separate site specific application costing according to Works Package Specifications

3.2.6.4 Two pump kiosk type control panel

Drawing reference Specification, Section 13 clauses 3.8.1 to 3.8.10 and 3.9, Standard Specifications for Electrical Works latest revision 2023.

Complete design and build specification.

Draughting and design of a kiosk type motor control centre with a single front and double rear compartment for the following sections and switchgear;

- Bus Bar Section = to 8 kA fault rating
- 63 Ampere mains incomer 3 phase circuit breaker or alternative,
- 63 Ampere mains/generator source changeover automated switchgear including side mounted Industrial Switched Socket power input
- Bottom glanding sections
- Bottom hot dipped galvanized base for entire MCC
- Rear door mounted metering section measuring all three phases
- Distribution section with miniature circuit breakers for 1 x 63 ampere three phase mains, 1 x single phase earth leakage, 1 x plug circuit, 1 x lighting circuit, 1 x three phase 32 Ampere Industrial Switches Socket Outlet circuit circuit breaker, 2 x Spare spaces
- Instrumentation section including one panel mount 5 x relay ultrasonic level control relay unit installed
- 2 x 7.5 kW Variable Speed Drive control or Soft starter control or Direct on-line control starter with AUTO/OFF/MANUAL control. Compartment ventilation system for VSD application. This may be de-rated by the specific Work Package project specifications.
- Telemetry section with the following signals from each pump starter wired to a dedicated telemetry din rail terminal strip (Blue):
 - Motor Run
 - Motor Stopped
 - Motor Tripped
 - AUTO/OFF/MANUAL Selection
 - Motor current 4-20 mA signal
 - Seal fail trip
 - Motor winding temperature trip

Other:

- Main Failure
- Intruder
- Generator Start
- Generator Stopped
- Generator on-load
- Generator Low Fuel
- Generator Tripped
- Generator Intruder
- Battery inverter failure/alarm

Control philosophy:

Separate site specific application design and priced separately according to Works Package Specifications

Installation:

Separate site specific application costing according to Works Package Specifications

3.2.6.5 Two pump wall mount type control panel

Drawing reference Specification, Section 13 clauses 3.8.1 to 3.8.10 and 3.9, Standard Specifications for Electrical Works latest revision 2023.

Complete design and build specification.

Draughting and design of a wall mount type motor control centre with a single front and double rear compartment for the following sections and switchgear;

- Bus Bar Section = to 8 kA fault rating
- 80 Ampere mains incomer 3 phase circuit breaker or alternative,
- 80 Ampere mains/generator source changeover automated switchgear including side mounted Industrial Switched Socket power input
- Bottom glanding sections
- Bottom hot dipped galvanized base for entire MCC
- Rear door mounted metering section measuring all three phases
- Distribution section with miniature circuit breakers for 1 x 63 ampere three phase mains, 1 x single phase earth leakage, 1 x plug circuit, 1 x lighting circuit, 1 x three phase 32 Ampere Industrial Switches Socket Outlet circuit circuit breaker, 2 x Spare spaces
- Instrumentation section including one panel mount 5 x relay ultrasonic level control relay unit installed
- 2 x 18.5 kW Variable Speed Drive control or Electronic Soft starter control with AUTO/OFF/MANUAL control. Compartment ventilation system for VSD application. This may be de-rated by the specific Work Package project specifications.
- Telemetry section with the following signals from each pump starter wired to a dedicated telemetry din rail terminal strip (Blue):
 - Motor Run
 - Motor Stopped
 - Motor Tripped
 - AUTO/OFF/MANUAL Selection
 - Motor current 4-20 mA signal
 - Seal fail trip
 - Motor winding temperature trip

Other:

- Main Failure
- Intruder
- Generator Start
- Generator Stopped
- Generator on-load
- Generator Low Fuel
- Generator Tripped
- Generator Intruder
- Battery inverter failure/alarm

Control philosophy:

Separate site specific application design and priced separately according to Works Package Specifications

Installation:

Separate site specific application costing according to Works Package Specifications

3.2.6.6 Two pump control panel

Drawing reference Specification, Section 13 clauses 3.8.1 to 3.8.10 and 3.9, Standard Specifications for Electrical Works latest revision 2023.

Complete design and build specification.

Draughting and design of a kiosk type motor control centre with a single front and double rear compartment for the following sections and switchgear;

- Bus Bar Section = to 8 kA fault rating
- 80 Ampere mains incomer 3 phase circuit breaker or alternative,
- 80 Ampere mains/generator source changeover automated switchgear including side mounted Industrial Switched Socket power input
- Bottom glanding sections
- Bottom hot dipped galvanized base for entire MCC
- Rear door mounted metering section measuring all three phases
- Distribution section with miniature circuit breakers for 1 x 63 ampere three phase mains, 1 x single phase earth leakage, 1 x plug circuit, 1 x lighting circuit, 1 x three phase 32 Ampere Industrial Switches Socket Outlet circuit circuit breaker, 2 x Spare spaces
- Instrumentation section including one panel mount 5 x relay ultrasonic level control relay unit installed
- 2 x 18.5 kW Variable Speed Drive control or Soft starter control with AUTO/OFF/MANUAL control. Compartment ventilation system for VSD application. This may be de-rated by the specific Work Package project specifications.
- Telemetry section with the following signals from each pump starter wired to a dedicated telemetry din rail terminal strip (Blue):
 - Motor Run
 - Motor Stopped
 - Motor Tripped
 - AUTO/OFF/MANUAL Selection
 - Motor current 4-20 mA signal
 - Seal fail trip
 - Motor winding temperature trip

Other:

- Main Failure
- Intruder
- Generator Start
- Generator Stopped
- Generator on-load
- Generator Low Fuel
- Generator Tripped
- Generator Intruder
- Battery inverter failure/alarm

Control philosophy:

Separate site specific application design and priced separately according to Works Package Specifications

Installation:

Separate site specific application costing according to Works Package Specifications

3.2.6.7 Two pump control panel

Drawing reference Specification, Section 13 clauses 3.8.1 to 3.8.10 and 3.9, Standard Specifications for Electrical Works latest revision 2023.

Complete design and build specification.

Draughting and design of a motor control centre with a single front and double rear compartment for the following sections and switchgear;

- Bus Bar Section = to 8 kA fault rating
- 80 Ampere mains incomer 3 phase circuit breaker or alternative,
- 80 Ampere mains/generator source changeover automated switchgear including side mounted Industrial Switched Socket power input
- Bottom glanding sections
- Bottom hot dipped galvanized base for entire MCC
- Rear door mounted metering section measuring all three phases
- Distribution section with miniature circuit breakers for 1 x 63 ampere three phase mains, 1 x single phase earth leakage, 1 x plug circuit, 1 x lighting circuit, 1 x three phase 32 Ampere Industrial Switches Socket Outlet circuit circuit breaker, 2 x Spare spaces
- Instrumentation section including one panel mount 5 x relay ultrasonic level control relay unit installed
- 2 x 22.0 kW Variable Speed Drive control or Soft starter control with AUTO/OFF/MANUAL control. Compartment ventilation system for VSD application. This may be de-rated by the specific Work Package project specifications.
- Telemetry section with the following signals from each pump starter wired to a dedicated telemetry din rail terminal strip (Blue):
 - Motor Run
 - Motor Stopped
 - Motor Tripped
 - AUTO/OFF/MANUAL Selection
 - Motor current 4-20 mA signal
 - Seal fail trip
 - Motor winding temperature trip

Other:

- Main Failure
- Intruder
- Generator Start
- Generator Stopped
- Generator on-load
- Generator Low Fuel
- Generator Tripped
- Generator Intruder
- Battery inverter failure/alarm

Control philosophy:

Separate site specific application design and priced separately according to Works Package Specifications

Installation:

Separate site specific application costing according to Works Package Specifications

3.2.6.8 Two pump kiosk type control panel

Drawing reference Specification, Section 13 clauses 3.8.1 to 3.8.10 and 3.9, Standard Specifications for Electrical Works latest revision 2023.

Complete design and build specification.

Draughting and design of a kiosk type motor control centre with a single front and double rear compartment for the following sections and switchgear;

- Bus Bar Section = to 8 kA fault rating
- 63 Ampere mains incomer 3 phase circuit breaker or alternative,
- 63 Ampere mains/generator source changeover automated switchgear including side mounted Industrial Switched Socket power input
- Bottom glanding sections
- Bottom hot dipped galvanized base for entire MCC
- Rear door mounted metering section measuring all three phases
- Distribution section with miniature circuit breakers for 1 x 63 ampere three phase mains, 1 x single phase earth leakage, 1 x plug circuit, 1 x lighting circuit, 1 x three phase 32 Ampere Industrial Switches Socket Outlet circuit circuit breaker, 2 x Spare spaces
- Instrumentation section including one panel mount 5 x relay ultrasonic level control relay unit installed
- 2 x 7.5 kW Variable Speed Drive control or Soft starter control or Direct on-line control starter with AUTO/OFF/MANUAL control. Compartment ventilation system for VSD application. This may be de-rated by the specific Work Package project specifications.
- Telemetry section with the following signals from each pump starter wired to a dedicated telemetry din rail terminal strip (Blue):
 - Motor Run
 - Motor Stopped
 - Motor Tripped
 - AUTO/OFF/MANUAL Selection
 - Motor current 4-20 mA signal
 - Seal fail trip
 - Motor winding temperature trip

Other:

- Main Failure
- Intruder
- Generator Start
- Generator Stopped
- Generator on-load
- Generator Low Fuel
- Generator Tripped
- Generator Intruder
- Battery inverter failure/alarm

Control philosophy:

Separate site specific application design and priced separately according to Works Package Specifications

Installation:

Separate site specific application costing according to Works Package Specifications

3.2.6.9 Two pump wall mount type control panel

Drawing reference Specification, Section 13 clauses 3.8.1 to 3.8.10 and 3.9, Standard Specifications for Electrical Works latest revision 2023.

Complete design and build specification.

Draughting and design of a wall mount type motor control centre with a single front and double rear compartment for the following sections and switchgear;

- Bus Bar Section = to 8 kA fault rating
- 63 Ampere mains incomer 3 phase circuit breaker or alternative,
- 63 Ampere mains/generator source changeover automated switchgear including side mounted Industrial Switched Socket power input
- Bottom glanding sections
- Bottom hot dipped galvanized base for entire MCC
- Rear door mounted metering section measuring all three phases
- Distribution section with miniature circuit breakers for 1 x 63 ampere three phase mains, 1 x single phase earth leakage, 1 x plug circuit, 1 x lighting circuit, 1 x three phase 32 Ampere Industrial Switches Socket Outlet circuit circuit breaker, 2 x Spare spaces
- Instrumentation section including one panel mount 5 x relay ultrasonic level control relay unit installed
- 2 x 7.5 kW Variable Speed Drive control or Soft starter control or Direct on-line control starter with AUTO/OFF/MANUAL control. Compartment ventilation system for VSD application. This may be de-rated by the specific Work Package project specifications.
- Telemetry section with the following signals from each pump starter wired to a dedicated telemetry din rail terminal strip (Blue):
 - Motor Run
 - Motor Stopped
 - Motor Tripped
 - AUTO/OFF/MANUAL Selection
 - Motor current 4-20 mA signal
 - Seal fail trip
 - Motor winding temperature trip

Other:

- Main Failure
- Intruder
- Generator Start
- Generator Stopped
- Generator on-load
- Generator Low Fuel
- Generator Tripped
- Generator Intruder
- Battery inverter failure/alarm

Control philosophy:

Separate site specific application design and priced separately according to Works Package Specifications

Installation:

Separate site specific application costing according to Works Package Specifications

	Redundant cooling pump motor seals	I	I	I	I	I	I	I	I	R
	Thermostatic valve element	I	I	R	I	I	I	I	I	I

Interval period (Years)		3.2.7.1 Type A Service (Year 12)	3.2.7.2 Type B Service (Year 13)	3.2.7.3 Type C Service (Year 14)	3.2.7.4 Type D Service (Year 15)	3.2.7.5 Type E Service (Year 16)	3.2.7.6 Type F Service (Year 17)	3.2.7.7 Type G Service (Year 18)	3.2.7.8 Type H Service (Year 19)	3.2.7.9 Type I Service (Year 20)
Maintenance and commissioning activities		S								
Power Switching Components	Power devices (SGTC's/SCR's)	R	I	I	I	I	I	I	I	I
	Snubber resistors/sharing resistors/HECS	I	I	I	I	I	I	I	I	I
	Rectifier snubber capacitors	R	I	I	I	R	I	I	I	Rv/R
	Inverter snubber capacitors	I	I	I	I	I	I	I	I	R
	Integrated Gate Driver Power Supply	I	I	I	RFB/R	I	I	I	I	RFB/R
Integral Magnetics/ Power Filters	Isolation transformer/Line reactor	I	I	I	M	I	I	I	I	M
	DC Link/Common-Mode choke	I	I	I	M	I	I	I	I	M
	Line/Motor Filter Capacitors	I	I	I	M	I	I	I	I	M
Control Cabinet Components	AC/DC and DC/DC Power supplies	I	I	I	RFB/R	I	I	I	I	RFB/R

Interval period (Years)	3.2.7.1 Type A Service (Year 12)	3.2.7.2 Type B Service (Year 13)	3.2.7.3 Type C Service (Year 14)	3.2.7.4 Type D Service (Year 15)	3.2.7.5 Type E Service (Year 16)	3.2.7.6 Type F Service (Year 17)	3.2.7.7 Type G Service (Year 18)	3.2.7.8 Type H Service (Year 19)	3.2.7.9 Type I Service (Year 20)
Control boards	I	I	I	I	I	I	I	I	I
Batteries (DCB's and CIB)	R	I	I	R	I	I	R	I	I
Batteries (UPS)	I	I	I	R	I	I	I	I	R

Interval period (Years)		Type A Service (Year 12)	Type B Service (Year 13)	Type C Service (Year 14)	Type D Service (Year 15)	Type E Service (Year 16)	Type F Service (Year 17)	Type G Service (Year 18)	Type H Service (Year 19)	Type I Service (Year 20)
Maintenance and commissioning activities		S								
Connections	Low Voltage Terminal connections/Plug-in connections	I	I	I	I	I	I	I	I	I
	Medium Voltage connections	I	I	I	I	I	I	I	I	I
	Heatsink bolted connections	I	I	I	I	I	I	I	I	I
	Medium Voltage connections (rectifier)	R				R				R
	Medium Voltage connections (inverter)			I						I
Enhancements	Firmware	Rv			Rv			Rv		
	Hardware	Rv			Rv			Rv		
Operational Conditions	Parameters	Rv	I	I	Rv	I	I	Rv	I	I
	Variables	Rv	I	I	Rv	I	I	Rv	I	I
	Application concerns	Rv	I	I	Rv	I	I	Rv	I	I
Spare parts	Inventory/needs	Rv	I	I	Rv	I	I	Rv	I	I
Legend: R = Replace I = Inspect RFB/R = Refurbish or Replace C = Clean C/R Clean or Replace M = Maintenance S = Standard										

3.2.8 Medium Voltage Variable Speed Drive maintenance specifications

Yaskawa medium voltage 3.3kV Variable Speed Drives for the High Lift pump station were delivered and installed at Voelvlei Bulk Water Treatment Plant in 2020.

The install base consist of 5 of 3.3 kV 1500kW Yaskawa model code CIMR-MV2AC5CB330EIAB and 1 of 3.3 kV 450 kW Yaskawa model code CIMR-MV2AC5CB100EIAB.

The VSD's require specific annual inspections, maintenance and where applicable replacement of parts to ensure availability and reliability.

At Firlands pump station is a Yaskawa FS Drive-MV1000 with Schneider Electric MV switchgear section.

The contractor shall factor in all cost for the works package which shall include all resources required, travel, subsistence and associated cost to perform all the maintenance activities.

In the event of unforeseen labour and transport charges, the contractor may quote the City of Cape Town which will evaluate the offer before issuing and additional Purchase Order. The standard labour and transport rates in the tender shall be used for this purpose.

Maintenance requirement and specification

The bi-annual service shall maintain and optimize the drive performance while ensuring that risks associated with the environmental operation of the medium voltage drives are minimised to ensure the prolonged lifespan of the installation and to reduce possible downtime due to unforeseen breakdowns. The services include, but not limited to the following:

a) Transformer Section

A visual inspection of the transformer section and proper cleaning of the cubicle and door air inlet filters to ensure optimal airflow. The transformer section cooling fans shall be checked for dust build up and proper operation to be verified to ensure optimal cooling. The top covers and side cover will be cleaned and the door catches and locking mechanisms will be tested and maintained to ensure proper operation. Internal connections will be checked.

b) Power Section

A visual inspection of the power cell sections shall be done and proper cleaning of the cubicle and door air inlet filters elements will be done to ensure optimal airflow. The individual power cells shall be cleaned of any dust and external components will be checked to ensure integrity and proper operation. The top covers and side cover will be cleaned and the door catches and locking mechanisms will be tested and maintained to ensure proper operation. Internal connections will be checked for correct tightness and the cooling fans will be checked for proper operation to ensure maximum cooling is achieved

c) Control Section

A visual inspection of the drive control cubicle section shall be done and proper cleaning of the cubicle and will be done. The battery life test will be conducted and all drive operating parameters and log history shall be downloaded and backup done for the City of Cape Town ENGINEERING AND ASSET MANAGEMENT (EAM) maintenance section. The top covers and side cover will be cleaned and the door catches and locking mechanisms will be verified to ensure proper operation. Internal connections shall be checked for correct tightness.

d) VSD Performance Report

The City of Cape Town ENGINEERING AND ASSET MANAGEMENT (EAM) maintenance section shall receive a comprehensive service report from Varispeed/OEM to keep for historical and informative purposes of each drive unit in electronic and printed format for record keeping.

3.2.9 Static Power Factor Correction service and maintenance plans:

Uninterrupted Power Supplies (UPS)



UPS in enclosed chassis mounted in MCC



Rack mount UPS with additional battery pack



Service only to be performed by qualified 3 phase electrician and UPS service technician

3.2.9.1 Type A Service for Uninterruptable Power Supply (UPS) service, inspection and diagnostic check:

6-Monthly Inspection/Battery Checks

1. Check the correct operation of the UPS, a power failure will have to be simulated. Switch out, trip or disconnect the mains supply, to activate the UPS into operation.
2. Check the output voltage of the battery packs while the UPS is under load. Where applicable and possible, check the output voltages, individually, of each battery pack, to see if any one battery pack is in the process of failing, or whether there are faulty cells.
3. Where fitted on certain makes of UPS use the battery test button to test the status of the batteries
4. Once the mains power has been restored check the battery pack voltages without load.
5. Check the battery charger output voltage and charging currents and observe for any cells or packs that may be overheating while charging.
6. Clean the inverter and charger cooling fans, check for proper balance and smooth operation. If any doubt exists, replace cooling fans.
7. Clean inverter; remove dust using vacuum cleaner or small blower (no compressed air).
8. Check for loose connections, moisture ingress and general damage or deterioration. Check for damage or overheating of insulation.

3.2.9.2 Type B Service for Uninterruptable Power Supply (UPS) service, inspection and diagnostic check:

5 Yearly Battery Pack/Unit Replacement

1. Do a comprehensive load test on the power packs of the UPS, by disconnecting the charging device and allowing the battery packs to discharge. Observe the discharge current and voltages, recording the time it takes to discharge. Notice whether there is any excessive heating up of individual battery cells.
2. Based on the discharge rate and effective life of the battery pack, exchange some or all of the cells in the pack. If more than 50% of the cells show weakness, replace all cells as a unit.
3. Alternatively, should the cell condition still be acceptable, extend the service/replacement interval to 4- or 5 years, as needed
4. Inspect and test the extended battery pack where this is fitted. These batteries should also be replaced at the same time when the UPS internal batteries are replaced.
5. Should any of the above tests reveal that the UPS shows signs of un-reliability for another 5-year period after original manufacturing date, replace the unit.

3.2.9.3 Uninterruptible Power Supply (UPS)

Equipment and hardware specifications for the maintenance and supply of Single Phase and Three Phase Uninterruptible Power Supplies or equivalent:

1. SUMMARY

This specification describes an, on-line, double conversion, solid state Uninterruptible Power Supply, hereafter referred to as the UPS. The UPS shall operate in conjunction with the existing building electrical system to provide high quality power conditioning, back-up power protection and distribution for electronic equipment loads. The system shall consist of a solid state inverter, power factor corrected rectifier, a 100% rated for continuous duty static switch, an internal maintenance bypass switch, battery plant, status/control panel, and synchronizing circuitry as described herein.

2. STANDARDS

The UPS shall meet the requirements of the following standards:

IEC 1000 (801) level 4

The Occupational Health and Safety Act

3. SUBMITTALS

Submittals shall contain the following documentation:

3.1 Installation Package: Complete electrical characteristics and connection requirements. Provide detailed equipment outlines with cabinet dimensions and spacing requirements entry/exit paths; available battery types/sizes; all cabinet weights; control, and external wiring.

3.2 Product Data: Provide catalog sheets and technical data sheets to indicate physical data and electrical performance, electrical characteristics, and connection requirements.

3.3 Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product. Include equipment installation outline, connection diagram for external cabling, internal wiring diagram, and written instruction for installation.

4. FINAL SUBMITTALS

Upon delivery of the UPS system, the following submittals shall be included:

An installation and user's manual showing safe and correct operation of all UPS functions.

5. QUALIFICATIONS & QUALITY ASSURANCE

5.1 Manufacturer's Certification: The manufacturer shall specialize in manufacturing of on-line, double conversion single or three phase UPS modules, and with a local party service organization. The manufacturer shall be ISO 9001 certified and shall design to internationally accepted standards.

5.2 Factory Testing: Prior to shipment the manufacturer shall complete a documented test procedure to test all functions of the UPS module and batteries (via a discharge test), when supplied by the UPS manufacturer, and guarantee compliance with the specification. The manufacturer shall provide a copy of the test report upon request.

5.3 Materials and Assemblies: All materials and parts comprising the UPS shall be new, of current manufacture, and shall not have been in prior service. All active electronic devices shall be solid state and not exceed the manufacturer's recommended tolerances for temperature or current to ensure maximum reliability. All semiconductor devices shall be sealed. All relays shall be provided with dust covers. The manufacturer shall conduct inspections on incoming parts, modular assemblies and final products.

6. STORAGE, AND HANDLING

All products shall be packaged in a manner to prevent penetration by debris and to allow safe delivery by all modes of ground transportation and air transportation where specified.

Equipment shall be protected against extreme temperature and humidity and shall be stored in a conditioned or protected environment.

Equipment containing batteries shall not be stored for a period exceeding three months without powering up the equipment for a period of eight hours to recharge the batteries.

7. ENVIRONMENTAL REQUIREMENTS

The UPS shall be manufactured to operate under the following environmental conditions:

Temperature:

UPS Module Operating: 0° to 40°C

Non-Operating: -10°C to +45°C

Relative humidity (operating and storage): 0 to 90% non-condensing

Barometric Pressure: Up to 1000 meters above sea level (up to 2000 meters with ambient temperature less than 28°C) / (up to 2,000 meters above sea level non-operating)

Audible Noise: 67 dBA at 3 feet

8. WARRANTY

8.1 UPS Module: The UPS shall be covered by a full parts and labor warranty from the manufacturer for a period of twelve (12) months from date of installation or acceptance by customer.

8.2 Battery: The battery manufacturer's warranty shall be passed through to the final customer and shall have a minimum period of one year. Internal batteries shall make use of Lithium Iron Phosphate (LiFePO4) batteries replacing the old generation lead acid batteries.

9. SERVICE AND SPARE PARTS

The manufacturer shall, upon request, provide spare parts kits for the UPS module in a timely manner, as well as provide access to qualified trained first party service personnel to provide preventative maintenance and service on the UPS module when required.

10. MAINTENANCE, ACCESSIBILITY AND SELF DIAGNOSTICS

All UPS subassemblies, as well as the battery, shall be accessible. UPS design shall provide maximum reliability and minimum MTTR (mean time to repair). To that end, the UPS shall be equipped with a self-test function to verify correct system operation. The self-test function shall identify the subassembly requiring repair in the event of a fault. The electronic UPS control and monitoring assembly shall therefore be fully microprocessor based, thus doing away with all potentiometer settings. This shall allow:

- Auto-compensation of component drift;
- Self-adjustment of replaced subassemblies;
- Extensive acquisition of information vital for computer-aided diagnostics (local or remote);
- Socket connection to interface with computer-aided diagnostics system.

The UPS shall be repairable by replacing standard subassemblies requiring no adjustments. Communication via a modem with a remote maintenance system shall be possible.

11. PRODUCT AND SYSTEM DESCRIPTION

11.1 PRODUCT DESCRIPTION

This specification describes a single phase, double conversion, on-line, solid state Uninterruptible Power System, hereafter referred to as the UPS. The UPS shall operate in conjunction with the existing building electrical system to provide power conditioning, back-up power protection and distribution for electronic equipment loads. The system shall consist of a solid state IGBT PWM inverter, IGBT rectifier with a power factor corrected input, static switch, internal maintenance bypass switch, battery plant, status/control panel, dry contact and communications ports, and synchronizing circuitry as described herein.

11.2 SYSTEM DESCRIPTION

11.2.1 UPS Design Requirements

11.2.1.1 Output Power Continuous Rating: The continuous output power rating of the UPS shall be as per the tender schedule.

11.2.1.2 Battery Autonomy: The UPS shall be capable of operating at full load for 5 minutes at full load, 0.8 PF, output at a temperature of 25°C on battery power, without any external battery packs.

11.2.1.3 Battery Type: Lithium Iron Phosphate (LiFePO4) batteries or equivalent.

11.2.1.4 Physical protection: All internal components of the UPS, including all modules, printed circuit boards and interface components, shall be coated with two coats of a lacquer conformal coating to

protect against environmental contamination and humidity, except where such a coating may affect the correct operation of the component in question.

11.2.1.5 AC Input Characteristics

Voltage: Single phase, 2 wire plus ground

Minimum voltage supplied before battery intervention: 160V

Maximum voltage supplied before battery intervention: 300V

Maximum voltage supplied to return to mains supply 464V

Minimum voltage supplied to return to mains supply 180V

Frequency: Nominal 50Hz

Frequency range supplied before battery intervention: 40 Hz to 72Hz

Power Factor: < .98 lagging

Total Harmonic Distortion: Less than 6% at full load

Input Surge Protection: The UPS is equipped with input MOVs to withstand surges per IEEE 587-1980/ANSI C62.41

11.2.1.6 AC Output Characteristics

Voltage: 220 - 440VAC, $\pm 1.5\%$, single phase, 2 wire plus ground

Frequency: 50 Hz $\pm 1\%$

Voltage Regulation: + 1.0% for balanced load

+ 1.75 for 50% unbalanced load

+ 2.5% for 100% unbalanced load

Voltage Distortion: Maximum 3% total (THD) and 1% any single harmonic on 100% linear loads

12. MODES OF OPERATION

The UPS module shall be designed to operate as a double conversion, on-line reverse transfer system in the following modes.

12.1 Normal: The inverter shall continuously supply power to the critical load. The PFC rectifier shall derive power from the utility AC source and supply DC power to the inverter, while simultaneously float charging the battery.

12.2 Upon failure of the utility AC power source, the critical load shall be supplied by the inverter, which, without any interruption, shall obtain its power from the battery.

12.3 Recharge: Upon restoration of the utility AC power source (prior to complete battery discharge), the PFC rectifier shall power the inverter and simultaneously recharge the battery.

12.4 Bypass Mode: The static bypass transfer switch shall be used to transfer the load to the bypass without interruption to the critical power load. This shall be accomplished by turning the inverter off. Automatic retransfer or forward transfer of the load shall be accomplished by turning the inverter on.

12.5 Maintenance Bypass/Test Mode: A manual make before break internal maintenance bypass switch shall be provided to isolate the UPS inverter output and static bypass transfer switch for maintenance. This shall allow the UPS to be tested or repaired without affecting load operation.

13. COMPONENT DESCRIPTION

13.1 PFC Rectifier and Battery Charger

Incoming AC power shall be converted to a regulated DC output voltage by an IGBT (insulated gate bipolar transistor) power factor corrected (PFC) rectifier. The rectifier shall provide high quality DC power to charge the batteries and power the inverter and shall have the following characteristics:

13.2 Input Power Factor Correction (PFC): The PFC rectifier shall be power factor corrected so as to maintain an input power factor of 0.98 lagging to unity at all load levels to ensure generator compatibility and avoid reflected harmonics from disturbing loads sharing the utility power.

13.3 Input Harmonic Current Suppression: The PFC rectifier shall produce a sinusoidal input AC current with low harmonic content, limiting THD on the UPS input to below 3%. This shall eliminate the requirement for an input filter.

13.4 Modular Assembly: The PFC rectifier assembly shall be constructed of modular design to facilitate rapid maintenance.

13.5 Battery Charger Current Limiting: The UPS shall be equipped with a system designed to limit the battery recharge current

13.5 Intermittent Charging: The battery charge level shall be maintained by an intermittent charging technique between two values V_{min} and V_{max} very close to the floating voltage. This technique shall be based on a cycle made up of a short charge period (a few seconds) from V_{min} to V_{max} followed automatically by a slow discharge period (a few minutes) from V_{max} to V_{min} . This cycle shall be repeated continuously to maintain the battery charge level. In this way the battery shall actually be charging only for a small part of the time, which considerably increases its service life.

13.6 Temperature Compensated Charging: The battery charger shall be equipped with a temperature probe to enable temperature compensated charging and adjust the battery float voltage to compensate for the ambient temperature using a negative temperature coefficient of 3 mV per cell per degree Celsius at a nominal temperature of 25°C.

13.7 Battery Capacity: The battery charger shall have sufficient capacity to support a fully loaded inverter and fully recharge the battery to 95% of its full capacity within 6-8 hours.

13.8 Inverter

The UPS output shall be derived from a *Variable Frequency Pulse Width Modulated (PWM)* IGBT inverter design. The inverter shall be capable of providing the specified precise output power characteristics (specified in section 2.2.C) while operating over the battery voltage range. The inverter assembly shall be constructed as a modular assembly to facilitate rapid maintenance.

13.9 Static Bypass – 100% Rated, Continuous Duty

The static bypass transfer switch shall be solid-state, rated for 100% continuous duty operation without mechanical contactor device in parallel for higher reliability and consistent response time and shall operate under the following conditions:

13.10 Uninterrupted Transfer: The static bypass transfer switch shall automatically cause the bypass source to assume the critical load without interruption after the logic senses one of the following conditions:

- 13.10.1 Inverter overload exceeds unit's rating
- 13.10.2 Battery protection period expired and bypass current is available
- 13.10.3 Inverter failure

13.11 Interrupted Transfer: If the bypass source is beyond the conditions stated below, the UPS will make an interrupted transfer (not less than 100 msec. in duration).

- 13.11.1 Bypass voltage greater than + 5%, -5% from the UPS rated output voltage.
- 13.11.2 Bypass frequency greater than + 2 Hz from the UPS rated output frequency.

13.12 Automatic Uninterrupted Forward Transfer: The static bypass transfer switch shall automatically forward transfer power, without interruption, after the UPS inverter is turned "ON" after an instantaneous overload-induced reverse transfer has occurred and the load current returns the UPS's nominal rating or less.

13.13 Manual Transfer: A manual static transfer shall be initiated from the UPS Control Panel by turning the UPS inverter off.

13.14 Overload Ratings: The static bypass transfer switch shall have the following overload characteristics:

- 13.14.1 1000% of UPS output rating for 0.016 seconds (one cycle)
- 13.14.2 150% for 1 second

13.14.3 130% of UPS output rating for 1 minute

13.15 Output Static Switch – 100% Rated, Continuous Duty

UPS output shall be equipped with a 100% rated output static switch without mechanical contactor device in parallel for higher reliability and consistent response time of 16.66 msec.

13.16 Microprocessor Controlled Logic

The full UPS operation shall be provided through the use of microprocessor controlled logic. All operation and parameters are firmware controlled, thus eliminating the need for manual adjustments or potentiometers. The logic shall include a self-test and diagnostic circuitry such that a fault can be isolated down to the printed circuit assembly or plug-in power assembly level. Every printed circuit assembly or plug-in power assembly shall be monitored. Diagnostics shall be performed via a PC through the local diagnostics port on the UPS.

13.17 Standard Display, Control and Indicator Panel

The UPS will include a standard easy to use control and indicator panel. Included will be a backlit, color graphic animated LCD display and LED indicators. The UPS panel will include UPS "ON" and UPS "OFF" pushbuttons that will permit the user to safely command the UPS on or off without risk of load loss.

14. CONTROLS AND INDICATORS

14.1 Front Panel LCD Display: The UPS control panel shall provide a back-lit for indication of UPS status, metering, battery status, alarm/event log and operational features. The display provides access to:

- 14.1.1 Measurements, status indications and events
- 14.1.2 Event log with time stamping
- 14.1.3 Access to all measurements

14.2 System Parameters Monitored: The visual display will display the following system parameters based on true RMS metering:

14.2.1 Measurements:

- Input voltage
- Input current
- Bypass voltage
- Bypass input frequency
- UPS output voltage
- UPS output current
- UPS output frequency
- UPS output % load
- UPS output kVa
- UPS output power factor
- Battery voltage
- Battery backup time and remaining service life
- Battery temperature

14.2.2 Status Indications and Events:

- Low-battery warning
- General alarm
- Battery fault
- Remaining back-up time during operation on battery power
- Bypass source outside tolerances
- Battery temperature

14.2.3 Time-Stamped Historical Events: This function shall time-stamp and store all important status changes, anomalies and faults, and make this information available for automatic or user-requested consultation.

14.2.4 LED Status Indicators: The UPS control panel shall provide LEDs that signal the status conditions.

14.2.5 On/Off Switch: The UPS shall provide the ON and OFF buttons to start and stop the inverter. The switch shall provide a built-in time delay to eliminate the risk of inadvertent operation.

14.2.6 Audible Alarm Reset: The UPS shall provide an audible alarm that can be stopped using the user interface. If a new alarm is sensed after the original alarm has been silenced, it will reactivate the audible alarm.

14.2.7 Emergency Power Off (EPO): The UPS shall be equipped with a local emergency power off button and dry contact input that can be used to command UPS shut down remotely. Activation of this command shall lead to the following actions:

- inverter shutdown
- opening of the static bypass switch and the battery circuit breaker
- opening of input and output devices
- opening of an isolated dry contact on the programmable relay board

15 MECHANICAL DESIGN AND VENTILATION

Enclosure: The UPS shall be housed in a freestanding enclosure with dead front construction. The mechanical structure of the UPS shall be sufficiently strong and rigid to withstand handling and installation operations without risk. Access to UPS subassemblies shall be through the front or top. The sheet-metal elements in the structure shall be protected against corrosion by a suitable treatment, such as zinc electroplating, biochromating, epoxy paint or an equivalent.

16 BATTERY

The UPS module shall use a Lithium Iron Phosphate (LiFePO₄) internal battery designed for auxiliary power service in a UPS application. The primary battery shall be furnished with impact resistant plastic cases and housed in rack out containers inside the UPS module.

16.1 Protection Against Deep Discharge and Self-Discharge: The UPS shall be equipped with a device designed to protect the battery against deep discharge, depending on discharge conditions, with isolation of the battery by a circuit breaker. In particular, a monitoring device shall adjust the battery shutdown voltage as a function of a discharge coefficient to avoid excessive discharge at less than the rated output. A second device shall avoid self-discharge of the battery into the UPS control circuits during an extended shutdown of the UPS (over two hours).

16.2 Battery Self-Tests: The battery monitoring system shall be to perform the following automatic functions:

- Battery circuit checks every twelve hours
- Open-circuit battery test once a month
- Partial discharge test every three months
- This self-test system shall signal faults via LEDs on the front panel or a message to remote supervision systems.

17 FIELD QUALITY CONTROL & SERVICE ORGANIZATION FIELD SERVICE AND SUPPORT

The manufacturer must provide backup and after sales support for all supplied products for a minimum of three years.

18 SPARE PARTS

Field Engineers must have immediate access to recommended spare parts with additional parts storage located in regional depots.

19 MAINTENANCE TRAINING

The manufacturer shall make available to the customer various levels of training ranging from basic UPS operation to UPS maintenance.

20 MAINTENANCE & SERVICE CONTRACTS

The manufacturer shall offer additional preventative maintenance and service contracts covering both the UPS and the battery bank. Accredited professional service engineers employed exclusively in the field of critical power systems service shall perform all maintenance and service.

3.2.9.4 SOLAR PV AND HYBRID INVERTER BATTERY BACK UP SYSTEMS AND PARTS

SUPPLY AND DELIVERY OF SOLAR PHOTO VOLTAIC SYSTEMS

1. The contractor shall make available a specialist with a power quality (PQ) and energy data logger to log and record power consumption, maximum demand, power quality of supply (Volts, Ampere, Frequency, Harmonics, Power Factor etc.) up to increments of 1 second.
2. The data is required to determine the appropriate size of SSEG system or battery storage inverter system based on the duration of the back-up required for a specific site and installation.
3. The contractor may be required to make available a specialist with a power quality (PQ) and energy data logger to log and record power consumption, maximum demand, power quality of supply (Volts, Ampere, Frequency, Harmonics, Power Factor etc.) up to increments of 1 second. The report would be required to establish trends or fault analysis.
4. Measurements and data reports can be requested for up to two weeks of logging data.

Products, components and installation shall comply with applicable legislation and Municipal By-Laws and National Standards.

Equipment selection procurement and installation shall comply with Utility Electricity By-Laws in terms of;

1. Municipal Requirements for Small Scale Energy Supply Generation. (SSG)
2. Selection and procurement of inverters needs to be based on the latest Supply Authority approved list.
3. Electrical Installation Regulations and Wiring Code South African National Standards SANS 10142-1 Ed 3
4. As per South African National Standards SANS 10142-1 clause 7.12.7.1 - The photovoltaic installation shall comply with SANS/IEC 60364-7-712 - Low voltage electrical installations - Part 7-712: Requirements for special installations or locations - Solar photovoltaic (PV) power supply systems
5. Solar panels shall comply with SANS/IEC 61215 - Terrestrial photovoltaic (PV) modules – Design qualification and type approval – Part 1-4: Special requirements for testing of thin-film Cu(In,Ga)(S,Se)₂ based photovoltaic (PV) modules (for poly and monocrystalline) or
6. South African National Standards SANS 61646 - Thin-film terrestrial photovoltaic (PV) modules - Design qualification and type approval. (for thin-film)
7. NRS 097-2-1
8. NRS 097-2-3
9. Occupational Health and Safety Act 83 of 1993
10. The South African National Standards SANS 10400 provides for the the minimum requirements of the South African National Building Regulations in building design. Applicable to this contract would be section T – Fire protection and barriers where risk of fire exist.

Solar PV system components are subject to the follow standards for selection and installation;

1. Distribution boards – SANS 61439-2 and SANS 60670 relevant part
2. DC circuit breakers – SANS 60947-2
3. DC fuses – SANS 60269-6
4. PV Connectors – IEC 62852
5. Surge Protection Devices (AC) – SANS 61643-11
6. Surge Protection Devices (DC) – IEC 61643-31
7. Assembly insulation according to SANS 61439-1 and SANS 1973-1

System no 1:

5 kW single phase solar system supplied with Lithium-ion 9.6 kW storage with Wi-Fi inverter monitoring system, rooftop mount on tile and IBR sheet metal

- All inclusive of;
- 1 x Hybrid inverter 5kW single phase 48 VDC hybrid grid tied with Wi-Fi equivalent
- 8 x Solar panel 445W Monocrystalline
- 1 x 160 440 VDC Amp Battery fuse holder disconnecter with 125 Amp fuses
- 5 meter battery red cable and lugs 35mm square
- 5 meter battery black cables and lugs 35mm square
- 100 meter Solar DC cable 6mm square red
- 100 meter Solar DC cable 6mm black
- 2 x 4.8kW Lithium-ion (Lithium Iron Phosphate (LiFePO₄) battery with cables equivalent
- 1 x Combiner box 2 in 1 out 600 VDC with 63 Amp isolator
- Set M4 connectors IP65/IP68 mated pair male and female
- 8 x Panel mounting kit (IBR or corrugated roof)

System no 2:

8 kW single phase solar system supplied with Lithium-ion 14.4 kW storage with Wi-Fi inverter monitoring system, rooftop mount on tile and IBR sheet metal

- 1 x Hybrid inverter 8kW single phase 48 VDC hybrid grid tied with Wi-Fi or equivalent
- 18 x Solar panel 445W Monocrystalline or 12 x Solar panel 545W Monocrystalline
- 1 x 160 440 VDC Amp Battery Fuse holder disconnecter with 160 Amp fuses
- 5 meter battery red cable and lugs 35mm square
- 5 meter battery black cables and lugs 35mm square
- 100 meter Solar DC cable 6mm square red
- 100 meter Solar DC cable 6mm black
- 3 x 4.8kW Lithium-ion (Lithium Iron Phosphate (LiFePO₄) battery with cables equivalent
- 1 x Combiner box 2 in 1 out 600 VDC with 63 Amp isolator
- Set M4 connectors IP65/IP68 mated pair male and female
- 18 x Panel mounting kit (IBR or corrugated roof)

System no 3:

12 kW single phase solar system supplied with Lithium-ion 14.4 kW storage with Wi-Fi inverter monitoring system, rooftop mount on tile and IBR sheet metal

- 1 x Hybrid inverter 12kW single phase 48 VDC hybrid grid tied with Wi-Fi equivalent
- 30 x Solar panel 445W Monocrystalline
- 1 x 160 440 VDC Amp Battery Fuse holder disconnecter with 160 Amp fuses
- 5 meter battery red cable and lugs 60 mm square
- 5 meter battery black cables and lugs 60 mm square
- 100 meter Solar DC cable 10 mm square red
- 100 meter Solar DC cable 10mm black
- 3 x 4.8w Lithium-ion (Lithium Iron Phosphate (LiFePO₄) battery with cables equivalent
- 1 x Combiner box 2 in 1 out 600 VDC with 63 Amp isolator
- Set M4 connectors IP65/IP68 mated pair male and female
- 30 x panel mounting kit (IBR or corrugated roof)

System no 4:

5 kW three phase solar hybrid inverter battery back-up system supplied with new first generation Lithium Iron Phosphate (LiFePO₄) 49.6 kW or equivalent battery capacity storage with inverter monitoring GSM Wi-Fi modem dongle and software. System sized to supply maximum full load continuous discharge current for 2 hours. The system shall allow for future expansion of the battery packs in parallel where it may become necessary. This system excludes all solar array parts and equipment.

System no 5:

8 kW three phase solar hybrid inverter battery back-up system supplied with new first generation Lithium Iron Phosphate (LiFePO₄) 14.4 kW or equivalent battery capacity storage with inverter monitoring GSM Wi-Fi modem dongle and software. System sized to supply maximum full load continuous discharge current for 2 hours. The system shall allow for future expansion of the battery packs in parallel where it may become necessary. This system excludes all solar array parts and equipment.

System no 6:

12 kW three phase solar hybrid inverter battery back-up system supplied with new first generation Lithium Iron Phosphate (LiFePO₄) 14.4 kW or equivalent battery capacity storage with inverter monitoring GSM Wi-Fi modem dongle and software. System sized to supply maximum full load continuous discharge current for 2 hours. The system shall allow for future expansion of the battery packs in parallel where it may become necessary. This system excludes all solar array parts and equipment.

System components

Equipment selection procurement and installation shall comply with Utility Electricity By-Laws in terms of;

1. Municipal Requirements for Small Scale Energy Supply Generation. (SSG)
2. Electrical Installation Regulations and Wiring Code SANS 10142-1 (Ed.3)
3. NRS 097-2-1
4. NRS 097-2-3

5. Occupational Health and Safety Act 83 of 1993
6. The South African National Standards SANS 10400 provides for the minimum requirements of the South African National Building Regulations in building design. Applicable to this contract would be section T – Fire protection and barriers where risk of fire exist.

1. Hybrid Inverter specifications and features (Sunsynk, DEYE, Fusion, ATESS or equivalent)

1.1 Low Voltage Hybrid Inverter specifications and features

- Dual MPPT design
- 48 – 52V Volt low voltage battery compatible
- Support connection with mobile standalone generator
- Compatible with most Lithium Iron Phosphate (LiFePO) batteries or Lead Acid batteries
- Inverter Mobile App for monitoring system and free software. Compatible with App for remote monitoring
- Anti-islanding protection
- 5 year standard product warranty
- IP65 rating
- Automatic switching from Grid-Tied to Off-Grid mode
- Generator input to charge battery system
- Zero export function
- Up to 16 units with the same firmware can be paralleled
- Essential and Non-Essential Loads outputs
- Push-in terminal for PV connection
- Standard with the Wi-Fi logger
- Directional Current Transformer (CT)

1.2 High Voltage Hybrid Inverter specifications and features

Grid connected

- Rated AC Voltage 400 Volt
- Rated frequency 50 Hz
- THDI <3%
- PF 0.8lagging~0.8leading

Off Grid connected

- Rated AC Voltage 400 Volt
- THDU $\leq 2\%$ linear
- Rated frequency 50 Hz
- Overload capability 110%-10 mins 120%-1 min

General Information

- Protection degree: IP 20
- Noise emission: <65dB(A)@1m
- Operating temperature: -25 °C~+55 °C
- Cooling: Forced-air
- Relative humidity 0-95% non-condensing
- Build-in transformer Yes
- Transfer between on/off grid: Automatic ≤ 10 ms

2. Lithium Iron Phosphate (LiFePO) first generation battery (Sunsynk, Hubble, Freedom Won, BlueNova, or equivalent)

Selection and procurement of Lithium Iron Phosphate (LiFePO) batteries shall be made to ensure the inverter and battery combination shall be fully integrated and operational in terms of compatibility and communication protocols. Batteries selected for an installation shall be all of the same manufacturer to ensure a stable, reliable and functional installation.

2.1 2.4 kW H 48V Lithium Iron Phosphate (LiFePO), rack mount:

Battery Chemistry Lithium Iron Phosphate (LiFePO₄)

Single string quantity: 8 pcs

Nominal Voltage: 48V

Nominal Capacity: 2400Wh

Usable Capacity: 2200Wh

Discharge Voltage: 45 ~ 53.5V

Charge Voltage: 52.5 ~ 53.5V

Charge / Discharge Current: 28Amps (recommended) / 50Amps (Max)

Working Temperature: 0 ~ 50 °C

Shelf Temperature: -20 ~ 60 °C

Humidity: 5% ~ 85%

Altitude: <2000

Design Life: 10+ Years (25°C)

Cycle Life: > 6000, 25°C

Communication Port: RS485 / CAN

Authentication Level: UL / IEC62619 / CE / UN38.3

Dimension: 442 x 410 x 89mm

Weight: 24kg

2.2 3.55 kW H Lithium Iron Phosphate (LiFePO battery)

Battery Chemistry Lithium Iron Phosphate (LiFePO₄)

3.55kW H 48V Li-ion battery, rack mount

Communication Port: RS485 / CAN

Authentication Level: UL / IEC62619 / CE / UN38.3

Mechanical

Charge / Discharge Current: 37Amps (recommended) / 74Amps (Max)

Single string quantity: 8 pcs

Design Life: 10+ Years (25°C)

Dimension: 442 x 420 x 132mm

Weight: 32kg

Altitude: <2000

Electrical

Nominal Voltage: 48V

Nominal Capacity: 3552Wh

Usable Capacity: 3200Wh

Discharge Voltage: 45 ~ 53.5V

Charge Voltage: 52.5 ~ 53.5V

Humidity: 5%~ 85%

Cycle Life: > 6000, 25°C

Ambient conditions

Working Temperature: 0~50°C

2.3 5.12-5.32 kWh 48V - 51.4V Lithium Iron Phosphate (LiFePO battery)

Rated capacity 100 Ah

Nominal Voltage 51.2V DC

Discharge cut off voltage 5.12KWh

Equalized charge voltage 55.2V DC

Maximum continuous charging current 100A

Maximum continuous discharging current 100A

Parallel connection with up to 8 packs with full communication

Design life approximately 15 years

Cycle life > 6000 at 80% discharge

2.4 10.65 kWh 48V - 51.4V Lithium-ion/LiFePO4 battery

Battery Chemistry Lithium Iron Phosphate (LiFePO₄)

Capacity: 10.65 kwh / 208ah

Nominal voltage: 51.2v

Nominal charge/discharge current: 100a

Nominal charge/discharge power: 5000w

Max charge/discharge current: 200a

Max charge/discharge power: 10000w

Dimensions: 836mm x 550mm x 160mm

Cycle life: 6000 cycles @ 80% DOD

Floor or wall mounted

2.5 5 kWh total capacity/4 kWh at 80% DoD Lithium-ion/LiFePO4 battery

Battery Chemistry Lithium Iron Phosphate (LiFePO₄)

Total Energy Capacity [kWh] 5

Energy, 80% DoD [kWh] 4

Energy, 90% DoD [kWh] 4.5

Current Capacity [Ah] 100

Max & Cont. Charge Current [A] 100

Max & Cont. Charge Power [kW] 5

Max/Cont. Discharge Current [A] 200/100

Max/Cont. Discharge Power [kW] 10/6

Max Recommended Inverter Total Rated Power (cont.) [kVa] 8

Nominal Voltage [V] 52V, to suit 48V Inverters, min 47V, max 56V

Enclosure Aluminum — powder coated white front, rated for indoor use

DC Connection – Integrated Cables [no. per electrode] 3 1 x 50mm²

Control Interface RJ45 Socket x 2 – CAN Bus for Interfacing with Compatible Inverters and System Controllers, and communication for the connection of parallel batteries – note that parallel batteries must all be of the same model.

Protection Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault, manual reset. Includes overcurrent, cell under and over voltage, temperature, weak cell detection, minimum SOC control.

Human Interface State of Charge Display (0 to 100%), Error light, Error Reset Button, USB Plug for Programming, Wi-Fi remote monitoring (optional accessory)

Warranty 10 years or 4 000 cycles for average 80% DoD, and max 90% DoD Service Life 4 >16 years (>5 500 cycles) expected life at 80% DoD 1, >20 years (>7 500 cycles) at 50% DoD

2.6 10 kWh total capacity/8 kWh at 80% DoD Lithium-ion/LiFePO4 battery

Battery Chemistry Lithium Iron Phosphate (LiFePO4)

Total Energy Capacity [kWh] 10

Energy, 80% DoD [kWh] 8

Energy, 90% DoD [kWh] 9

Current Capacity [Ah] 200

Max & Cont. Charge Current [A] 200

Max & Cont. Charge Power [kW] 10

Max/Cont. Discharge Current [A] 300/200

Max/Cont. Discharge Power [kW] 15/10

Max Recommended Inverter Total Rated Power (cont.) [kVa] 10

Nominal Voltage [V] 52V, to suit 48V Inverters, min 47V, max 56V

Enclosure Aluminum — powder coated white front, rated for indoor use

DC Connection – Integrated Cables [no. per electrode] 3 1 x 50mm²

Control Interface RJ45 Socket x 2 – CAN Bus for Interfacing with Compatible Inverters and System Controllers, and communication for the connection of parallel batteries – note that parallel batteries must all be of the same model.

Protection Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault, manual reset. Includes overcurrent, cell under and over voltage, temperature, weak cell detection, minimum SOC control.

Human Interface State of Charge Display (0 to 100%), Error light, Error Reset Button, USB Plug for Programming, Wi-Fi remote monitoring (optional accessory).

Warranty 4 10 years or 4 000 cycles for average 80% DoD, and max 90% DoD Service Life 4 >16 years (>5 500 cycles) expected life at 80% DoD 1, >20 years (>7 500 cycles) at 50% DoD

2.7 15 kWh total capacity/12 kWh at 80% DoD Lithium-ion/LiFePO4 battery

Battery Chemistry Lithium Iron Phosphate (LiFePO4)

Total Energy Capacity [kWh] 10

Energy, 80% DoD [kWh] 8

Energy, 90% DoD [kWh] 9

Current Capacity [Ah] 200

Max & Cont. Charge Current [A] 200

Max & Cont. Charge Power [kW] 10

Max/Cont. Discharge Current [A] 300/200

Max/Cont. Discharge Power [kW] 15/10

Max Recommended Inverter Total Rated Power (cont.) [kVa] 10

Nominal Voltage [V] 52V, to suit 48V Inverters, min 47V, max 56V Weight [kg] 130

Enclosure Aluminum — powder coated white front, rated for indoor use

DC Connection – Integrated Cables [no. per electrode] 3 1 x 50mm²

Control Interface RJ45 Socket x 2 – CAN Bus for Interfacing with Compatible Inverters and System Controllers, and communication for the connection of parallel batteries – note that parallel batteries must all be of the same model.

Protection Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault, manual reset. Includes overcurrent, cell under and over voltage, temperature, weak cell detection, minimum SOC control.

Human Interface State of Charge Display (0 to 100%), Error light, Error Reset Button, USB Plug for Programming, Wi-Fi remote monitoring (optional accessory).

Warranty 4 0 years or 4 000 cycles for average 80% DOD, and max 90% DOD Service Life 4 >16 years (>5 500 cycles) expected life at 80% DoD 1, >20 years (>7 500 cycles) at 50% DOD

2.8 20 kWh total capacity/16 kWh at 80% DoD Lithium-ion/LiFePO4 battery

Battery Chemistry Lithium Iron Phosphate (LiFePO4)

Total Energy Capacity [kWh] 20

Energy, 80% DoD [kWh] 16

Energy, 90% DoD [kWh] 18

Current Capacity [Ah] 400

Max & Cont. Charge Current [A] 400

Max & Cont. Charge Power [kW] 20

Max/Cont. Discharge Current [A] 480/400

Max/Cont. Discharge Power [kW] 24/20

Max Recommended Inverter Total Rated Power (cont.) [kVa] 15

Nominal Voltage [V] 52V, to suit 48V Inverters, min 47V, max 56V

Enclosure Aluminum — powder coated white front, rated for indoor use

DC Connection – Integrated Cables [no. per electrode] 3 2 x 50mm²

Control Interface RJ45 Socket x 2 – CAN Bus for Interfacing with Compatible Inverters and System Controllers, and communication for the connection of parallel batteries – note that parallel batteries must all be of the same model.

Protection Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault, manual reset. Includes overcurrent, cell under and over voltage, temperature, weak cell detection, minimum SOC control.

Human Interface State of Charge Display (0 to 100%), Error light, Error Reset Button, USB Plug for Programming, Wi-Fi remote monitoring (optional accessory).

Warranty 4 10 years or 4 000 cycles for average 80% DoD, and max 90% DoD Service Life 4 >16 years (>5 500 cycles) expected life at 80% DoD 1, >20 years (>7 500 cycles) at 50% DoD

2.10 30 kWh total capacity/24 kWh at 80% DoD Lithium-ion/LiFePO4 battery

Battery Chemistry Lithium Iron Phosphate (LiFePO4)

Total Energy Capacity [kWh] 30

Energy, 80% DoD [kWh] 24

Energy, 90% DoD [kWh] 27

Current Capacity [Ah] 600

Max & Cont. Charge Current [A] 600

Max & Cont. Charge Power [kW] 30

Max/Cont. Discharge Current [A] 750/600

Max/Cont. Discharge Power [kW] 38/30

Max Recommended Inverter Total Rated Power (cont.) [kVa] 25

Nominal Voltage [V] 52V, to suit 48V Inverters, min 47V, max 56V

Enclosure Aluminum — powder coated white front, rated for indoor use

DC Connection – Integrated Cables [no. per electrode] 3 2 x 95mm²

Control Interface RJ45 Socket x 2 – CAN Bus for Interfacing with Compatible Inverters and System Controllers, and communication for the connection of parallel batteries – note that parallel batteries must all be of the same model.

Protection Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault, manual reset. Includes overcurrent, cell under and over voltage, temperature, weak cell detection, minimum SOC control.

Human Interface State of Charge Display (0 to 100%), Error light, Error Reset Button, USB Plug for Programming, Wi-Fi remote monitoring (optional accessory).

Warranty 4 10 years or 4 000 cycles for average 80% DoD, and max 90% DoD Service Life 4 >16 years (>5 500 cycles) expected life at 80% DoD 1 , >20 years (>7 500 cycles) at 50% DoD

2.11 40 kWh total capacity/32 kWh at 80% DoD Lithium-ion/LiFePO4 battery

Battery Chemistry Lithium Iron Phosphate (LiFePO4)

Total Energy Capacity [kWh] 40

Energy, 80% DoD [kWh] 32

Energy, 90% DoD [kWh] 36

Current Capacity [Ah] 800

Max & Cont. Charge Current [A] 600

Max & Cont. Charge Power [kW] 30

Max/Cont. Discharge Current [A] 750/600

Max/Cont. Discharge Power [kW] 38/30

Max Recommended Inverter Total Rated Power (cont.) [kVa] 25

Nominal Voltage [V] 52V, to suit 48V Inverters, min 47V, max 56V

Protection Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault, manual reset. Includes overcurrent, cell under and over voltage, temperature, weak cell detection, minimum SOC control.

Human Interface State of Charge Display (0 to 100%), Error light, Error Reset Button, USB Plug for Programming, Wi-Fi remote monitoring (optional accessory).

Warranty 10 years or 4 000 cycles for average 80% DoD, and max 90% DoD

Service Life 4 >16 years (>5 500 cycles) expected life at 80% DoD 1 , >20 years (>7 500 cycles) at 50% DoD

2.12 60 kWh total capacity/48 kWh at 80% DoD Lithium-ion/LiFePO4 battery

Battery Chemistry Lithium Iron Phosphate (LiFePO4)

Total Energy Capacity [kWh] 60

Energy, 80% DoD [kWh] 48

Energy, 90% DoD [kWh] 54

Current Capacity [Ah] 1200

Max & Cont. Charge Current [A] 800

Max & Cont. Charge Power [kW] 40

Max/Cont. Discharge Current [A] 1000/800

Max/Cont. Discharge Power [kW] 50/40

Max Recommended Inverter Total Rated Power (cont.) [kVa] 35

Nominal Voltage [V] 52V, to suit 48V Inverters, min 47V, max 56V

Protection Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault, manual reset. Includes overcurrent, cell under and over voltage, temperature, weak cell detection, minimum SOC control.

Human Interface State of Charge Display (0 to 100%), Error light, Error Reset Button, USB Plug for Programming, Wi-Fi remote monitoring (optional accessory).

Warranty 10 years or 4 000 cycles for average 80% DoD, and max 90% DoD

Service Life 4 >16 years (>5 500 cycles) expected life at 80% DoD 1 , >20 years (>7 500 cycles) at 50% DoD

2.13 80 kWh total capacity/64 kWh at 80% DoD Lithium-ion/LiFePO4 battery

Battery Chemistry Lithium Iron Phosphate (LiFePO4)

Total Energy Capacity [kWh] 80

Energy, 80% DoD [kWh] 64

Energy, 90% DoD [kWh] 72

Current Capacity [Ah] 1600

Max & Cont. Charge Current [A] 800

Max & Cont. Charge Power [kW] 40

Max/Cont. Discharge Current [A] 1000/800

Max/Cont. Discharge Power [kW] 50/40

Max Recommended Inverter Total Rated Power (cont.) [kVa] 35

Nominal Voltage [V] 52V, to suit 48V Inverters, min 47V, max 56V .

Protection Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault, manual reset. Includes overcurrent, cell under and over voltage, temperature, weak cell detection, minimum SOC control.

Human Interface State of Charge Display (0 to 100%), Error light, Error Reset Button, USB Plug for Programming, Wi-Fi remote monitoring (optional accessory).

Warranty 10 years or 4 000 cycles for average 80% DoD, and max 90% DoD

Service Life 4 >16 years (>5 500 cycles) expected life at 80% DoD 1 , >20 years (>7 500 cycles) at 50% DoD

2.14 80 kWh total capacity/64 kWh at 80% DoD HV Lithium-ion/LiFePO4 battery

Battery Chemistry Lithium Iron Phosphate (LiFePO4)

Max Energy [kWh] 80

Energy, 90% DoD [kWh] 72

Energy, 80% DoD [kWh] 64 Nominal Voltage [V] 410

Max/Min Operating Voltage [V] 454/365

Max/Cont. Discharge Current [A] 250/200

Max/Cont. Discharge Power [kW] 102/80

Max and Cont. Charge Current [A] 200

Enclosure Aluminum – powder coated white, IP54 enclosure rating, Home – wall or floor mount, Business – floor mount Protection Shunt Trip Circuit Breaker sized to suit max current, can be tripped by BMS if critical fault incl.

overcurrent, cell under and over voltage, temperature, weak cell detection, minimum SOC control, manual reset Human Interface State of Charge Display (0 to 100%), Error light, Error Reset Button, USB Plug for Programming

Service Life 4 10 year (or 4000 cycles) warranty for 80% average DoD, 13-15 yrs (>5 500 cycles) expected life at 70% DoD, 15-20 years at 50% DoD (>7 000 cycles)

3. Solar panel

3.1 375 Watt panel:

Electrical data:

Nominal max. power: 375 W

Opt. Operating Voltage: 34.3 V

Opt. operating current: 10.94 A

Open circuit voltage: 41.0 V

Short circuit current: 11.61 A

Module efficiency: 20.3%

Operating temperature: -40°C ~ +85°C

Max. system voltage: 1500V (IEC/UL) or 1000V (IEC/UL)

Module fire performance: TYPE 1 (UL 61730 1500V) or TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730)

Max. Series fuse rating: 20 A

Application classification: Class A

Power tolerance: 0 ~ + 10 W

Connection type: EVO2

3.2 445 Watt panel:

Electrical data:

Nominal Max. Power (Pmax): 445 W
Opt. Operating Voltage (Vmp): 40.9V
Opt. Operating Current (Imp): 10.89A
Open Circuit Voltage (Voc): 48.9V
Short Circuit Current (Isc): 1.54A
Module Efficiency: 20.1%
Operating Temperature: -40°C ~ +85°C
Max. System Voltage: 1500V (IEC/UL) or 1000V (IEC/UL)
Max. Series Fuse Rating: 20A
Application Classification Class A
Power Tolerance 0 ~ + 10 W

3.3 545 Watt panel:

Electrical data:

Nominal max. power: 545 W
Opt. Operating Voltage: 41.5 V
Opt. operating current: 13.14 A
Open circuit voltage: 49.2 V
Short circuit current: 13.95 A
Module efficiency: 21.3%
Operating temperature: -40°C ~ +85°C
Max. system voltage: 1500V (IEC/UL) or 1000V (IEC/UL)
Module fire performance: TYPE 1 (UL 61730 1500V) or TYPE 2 (UL 61730 1000V) or CLASS C (IEC 61730)
Max. Series fuse rating: 25 A
Application classification: Class A
Power tolerance: 0 ~ + 10 W
Connection type: EVO2

4. Single phase and Three Phase String Inverter

The inverter must be able accommodate PV arrays or combinations of wind turbine and solar arrays. It must have the ability of a scalable product for it to be placed in parallel in a circuit increasing the system to 100kW, 3 phase or larger.

Main Features and functions:

Maximum efficiency of 98% or more
Multiple MPPT design with precise MPPT algorithm
Natural ambient cooling - IP65
Compact and light design for easy installation
Transformer-less GT technology
RS485 Wi-Fi interface

On board protection functions.

Remote monitoring application

25 years lifespan or more

Power output single phase 3 kW and 5 kW

Power output three phase 10kW and 55 kW

5. The City of Cape Town intends to **open a section of this tender and contract for work in the entire City of Cape Town Metropolitan geographical area to the awarded contractor/s.** This Goods and Services works packages may comprise of **Uninterruptable Power Supplies (UPS) Grid Tied hybrid inverter battery back-up power solutions and Solar PV Grid Tied hybrid inverter battery back-up systems, components, power supply systems and associated electrical protection and distribution equipment.** The City of Cape Town intends to implement hybrid inverter and battery back-up systems where it is impractical or preferred over the use of diesel drive standby generators sets. The contractor shall assign a specialist resource to scope the work and implement the systems proposed with the City of Cape Town Engineering Section. The inverter battery back-up systems shall be designed and approved by an ECSA registered Technician or Engineer. The contractor shall be responsible to administer the application and registration the systems where required on behalf on the City of Cape Town with the Electrical Supply Authority. The proposed plants where hybrid inverter and battery back-up systems are provisionally planned are listed below. The City of Cape Town reserves the right to implement more and other systems during this contract period.

Without creating expectations or commitments to any person, organisation, company, vendor or contractor, the City of Cape Town will be exploring to install these systems through this tender contract to approximately 200 installations in and around the Metropole.

3.2.9.5 THE SUPPLY, DELIVERY AND INSTALLATION OF NEW 3X3 METER AND 6X3 METER STEEL MARITIME SHIPPING CONTAINERS

This tender covers the supply, delivery, installation, moving and repair of used 3m and 6m steel shipping containers.

1. DESCRIPTION:

New steel standard and mini 3mx3m and 3mx6m containers shall be supplied and shall be of the marine shipping container type. Used containers shall be rejected. The containers must be free of any major dents or distortions and rust.

2. FEATURES:

Locks: All shipping containers must be fitted with a concealed lock box and a 75 mm "SABS Approved" security lock and three (3) keys must be provided.

Roofing: Additional painting shall be applied upon delivery and the painting shall be done as per included specification below.

Roof and ventilation: There shall be a solar powered ventilator fan fitted protected and enclosed on the outside and additionally on the inside with a vandal proof galvanised 20 mm round bar screwed by flat bottom bolts on the outside which is impossible to loosen from the outside with a normal tool such a wrench or socket. The roof mounted solar ventilating fan shall be of equivalent to 1 x RM1200 for a 3mx3m containers and 2 x RM1200 for a 3mx6m containers including all fittings, flashings, waterproofing, parts and installation costs, equivalent or same as Skylite concepts Solatube variant.

An air-filtration replaceable filter and filter slider holder must be fitting into the floor of the container to allow for the air circulation. The Works Package Manager in consultation with the contractor instruct the exact position of the filter assembly.

200mm x 200mm x 45mm

Interior: The units shall have a double insulated with cold storage sandwich type Square wave panel. The interior cladding shall be painted white. There is no particular preference on the type of paint for the interior cladding panels. The interior cladding shall be of a minimum thickness of 50 mm.

Floor: All containers must be fitted with a wooden floor with PU coating

Interior preparation and painting: This must include surface preparation and the application of one coat of a suitable rust inhibiting undercoat and one coat of suitable white topcoat to the walls and roof. The new container shall be supplied in standard form with marine grade corrosion protective coatings.

Exterior preparation and painting: This must include surface preparation, the application of a suitable rust inhibiting undercoat and two coats of suitable topcoat. The new container shall be supplied in standard form with marine grade corrosion protective coatings. Additional painting may be requested and the painting shall be done as per included specification below.

Electrical installation:

Each container once fitted with interior cladding shall be supplied with fitted and installed electrical installation comprising of the following parts and components.

All parts, components and wire ways such as ega trunking shall be fitted surface mount.

1 x Main incoming electrical supply connection enclosure, IP 65 mounted internally for 60 ampere three phase electrical supply.

1 x surface mount polyester IP 55 RAL7035, 3 x 18 way, DIN rail

63 amp On - Off - On, 4 pole centre off changeover switch (with centre off) - 3 way (I - O - II) (mains and inverter electrical change over)

3 x single phase surge protection module with indicator

1 x main voltage output digital indicator 48 mm x 48 mm (Red)

1 x inverter voltage output digital indicator 48 mm x 48 mm (Green)

1 x 22 mm Red pilot light (Mains supply on)

1 x 22 mm White pilot light (Mains supply on)

1 x 22 mm Blue pilot light (Mains supply on)

1 x 60 amp, 6kA, three pole main C/B
1 x 60 amp, 30 mA single phase earth leakage
1 x 60 amp, 30 mA three phase earth leakage
1 x 25 amp, 6kA, and double pole slow curve (air-conditioned 1)
1 x 25 amp, 6kA, double pole slow curve (air-conditioned 2)
1 x 20 amp, 6kA, single pole circuit breaker (single phase socket outlet)
1 x 10 amp, 6kA, amp single pole circuit breaker (lights)
1 x 5 ft LED vapour proof surface mount light fitted in the centre of the roof/ceiling (3 x 3 meter container)
2 x 5 ft LED vapour proof surface mount light fitted in the centre of the roof/ceiling (3 x 6 meter container)
1 x single lever light switch
3 x single phase double socket outlet points (2 x general use, 1 x Pepper Spray System and Alarm system control panel)

Issue an Electrical Certificate of Compliance for the electrical installation.

Wi-Fi Modem:

Each container shall be fitted with a Wi-Fi modem with an external antenna mounted at the top leading edge of the container.

Modem specifications and features:

The unit shall offer Cellular 3G/4G/LTE CAT4 router, including Band 28 support. The unit shall be able to do a fall back from 4G to lower rated networks like 3G. The unit shall be in an industrial compact metal enclosure and be able to fit on din rail for cabinet mounting. The unit shall be able to support at least single or preferable dual sim card. The unit shall have at least 2 Ethernet ports, however 4 is preferable. Furthermore the unit shall also offer at least one serial port for RS 232 and one for RS 485. The unit shall also allow for digital input and output functionality. The unit shall support Modbus RTU, TCP, and MQTT. The unit shall be powered by supplied via 24vdc. The unit shall offer both cyber and data security during transmission. The unit shall offer IPsec & OpenVPN Client & Server, L2TP and PPTP. The LAN ports must at least be rated at 100M. The unit shall offer Wi-Fi connection. The unit shall also offer an internal serial server and sms services to read or control input/output and alarm statuses. The unit can be of the Eplro 641M series or equivalent.

2.4 LABELING OF CONTAINERS:

All containers must be marked with the unique metal plate plaque allocated to the side of container at initial manufacturing stage of the container. The plant name shall be engraved and painted black inside the engraving and must be fitted to the outside of the enclosure. The plaque must be placed on the outside side panel in the top corner. The plaque must be 200 mm in height. The number of letters of the name of the site will determine the length.

2.5 Fire precaution:

Supply and install on wall bracket 1 x 6 litre LITH – EX Battery Fire Extinguisher inside the container with label outside and inside indicating the location of the extinguisher. Refer to specification.

Aqueous Vermiculite Dispersion (AVD) fire extinguishing agent uses fixed and portable delivery techniques to effectively combat lithium-ion battery fires.

AVD is an aqueous dispersion of chemically exfoliated vermiculite. It is applied to lithium battery fires as a mist, extinguishing them and preventing the propagation of the fire.

Vermiculite is the name given to a group of hydrated laminar aluminium-iron-magnesium silicates. It consists of thin, flat flakes containing microscopic layers of water. The chemical exfoliation of vermiculite produces microscopic, individual platelets that are freely suspended in water. This yields a stable aqueous dispersion of vermiculite to be used as a lithium battery fire extinguishing agent.

3. INSTALLATION:

Installation must take place as specified by with the relevant City of Cape Town Representative and Work Project Manager. All containers must be installed on concrete slabs placed at each corner of the container.

The dimensions of the slabs must be 900 mm X 900 mm X 450mm (thickness) and concrete plinth spanning the entire Width x Length of the container and concrete must be 30 MPa strength.

4. SECURING OF SHIPPING CONTAINERS:

In certain instances, (as indicated by Council's Representative), shipping containers need to be secured to the surface to prevent theft or the moving of the shipping containers. Depending on the type of surface where the containers are placed and the level of risk in an area, it must be secured by one of the following ways: Hard Surface e.g. tar, paved etc. Securing the container to the surface with a 1.5 m long reinforced steel rod (diameter of 30 mm) through the floor at each corner bolted at each corner footing. The container can also be secured by trenching and concrete plinth spanning the entire Width x Length of the container, (400mm x 400mm x 300 depth) with concrete (30MPa strength) and then securing it with a 1.5 m long reinforced steel rod (diameter of 30 mm) at each corner where the top of the rod is bolted to the side of the container corner footing.

5. PAINTING:

New ISO maritime shipping containers shall be supplied by the manufacturer pre-painted with marine grade corrosion protective paint coatings. The contractor may request that the container is supplied by the three preferred RAL paint colour codes specified. The contractor shall make provision in case a specific container and site requires a different RAL paint colour from the three preferred specified colours.

Over and above the pre-painted corrosion protection the contractor need to make an allowance and price to spray paint a container either supplied new by the original manufacturer or sales agent or when an older container require refurbishment and a re-application of a corrosion protective paint.

RAL5017 Traffic Blue
RAL 7001 Silver Grey
RAL 6003 Olive Green

The container shall be painted as per the following specification;

Surface preparation for ISO maritime shipping container and spray painting:

When applicable and once all cutting and welding work is fully completed, the Contractor shall shot blast the entire container or the areas requiring preparation before painting. The Contractor shall notify the Engineer to inspect the shot blasting results, prior to starting any of the following applications:

Stripe coat all edges, welds, edges and crevices with Opti Mastic AL Red Toned.
Coatings need to be washed down between coats with clean potable running water, allow drying and then painting.

5.1 Optima Industrial Coating Specification (or equal approved) for external steel sections:

Coat	Product Name	Generic Type	V/S %	DFT Min	DFT Max
Primer	Opti Mastic AL	High Build Epoxy Mastic	92	125	175
Finish	Opti Thane 421	Gloss Polyurethane	50	50	

Coatings need to be washed down between coats with clean potable running water, allow drying and then painting.

5.2 Optima Industrial Coating Specification (or equal approved) for internal steel sections:

Coat	Product Name	Generic Type	V/S %	DFT Min	DFT Max
Primer	Opti Mastic AL	High Build Epoxy Mastic	92	125	175
Finish	Opti Thane 421	Gloss Polyurethane	50	50	75

Stripe coat all edges, welds, edges and crevices with Opti Mastic AL Red Toned. Coatings need to be washed down between coats with clean potable running water, allow drying and then painting.

5.3 Optima Industrial Coating Specification (or equal approved) for galvanised steel sections:

All surface preparation and application shall be in accordance with the relevant product data bulletin, this specification, and the general painting specification of Optima Coatings and SANS 1200:2014. If a conflict exists between the above items, the most restrictive shall be considered the control.

Ensure surfaces are not left overnight to prevent contamination from resettling on the surface and all bare exposed metal surfaces to be coated within the 4 hour window period.

Only Optima thinners and reducers as identified in the appropriate product data sheet shall be used.

5.4 Optima Industrial Coating Specification for galvanised sections:

Remove all traces of protective storage oil by scrubbing with Optima Opti-Degreaser followed by thorough rinsing with potable running water (use hose pipe) to obtain a water break-free surface. If necessary, repeat above until water break-free. Follow this by scrubbing with Optima Galvanize iron cleaner and rinsing with potable running water. Allow to dry before priming

Coat	Product Name	Generic Type	V/S %	DFT Min	DFT Max
Primer	Opti Mastic AL	High Build Epoxy Mastic	92	125	175
Finish	Opti Thane 421	Gloss Polyurethane	50	50	75

Stripe coat all edges, welds, edges and crevices with Opti Mastic AL Red Toned.

All surface preparation and application shall be in accordance with the relevant product data bulletin, this specification, and the general painting specification of Optima Coatings and SANS 1200:2014. If a conflict exists between the above items, the most restrictive shall be considered the control. Only Optima thinners and reducers as identified in the appropriate product data sheet shall be used.

5.5 Optima Industrial Coating Specification for rooftop and underside corrosion protection:

Once the final top coats have been applied the Contractor shall apply the following.

Exposure conditions: Severe Coastal and Industrial (ISO=M4/I4) - Conditions of very high humidity; UV radiation and salt spray. This environment is characterised by a salt content of >12mg per litre in rain water and sulphur content >10µg per m³ air.

Typically within 5 km inland from the coast line.

SURFACE PREPARATION:

Remove all oil, grease and soluble salts by washing with a water emulsifiable solvent degreaser (Opti-Degreaser) and rinsing with potable water. Abrasive blast clean with potable water injection to white metal in accordance with Sa2½ of the International Standard ISO 8501-1:1988 to obtain a blast profile of 25 to 40 microns. The abrasive blast clean surfaces may not left overnight and is coated within 4 hours.

Wet Blasting is used to control the dust into the environment.

Blast media natural mineral slag B60 or B 90 or Micro blast.

Coat	Product Name	Generic Type	V/S %	DFT Min	DFT Max
Coat	Product Name	GENERIC TYPE	V/S %	DFT Min	DFT Max
Primer	OptiGuard Universal EP	GENERIC TYPE	60	75	125
Intermediate	Opti PU TAR	Polyamide Cured Epoxy	88	500	500
Finish	Opti PU TAR	High Performance Polyurethane Waterproofing	88	500	500

Ensure the sides of the container is taped off from the OPTI PU TAR Black to prevent contamination onto the coated or uncoated steel.

Coatings need to be washed down between coats with clean potable running water, allow to dry and paint.

5.6 FINISHING AND PAINTING OF MATERIALS AND EQUIPMENT

All equipment and materials supplied under this Contract, irrespective of whether it is for the electrical subcontract or not, shall comply with this Council's specifications.

The painting and finishing specifications are detailed in the General Mechanical Specification, and the onus is on the Electrical Contractor to familiarise with these specifications.

All work done to Containers shall have a 6 (six) month warranty. Latent defects within a period of 6 (six) months and are directly attributed to inferior workmanship will be reported to the Contractor by the City's representative. The Contractor will be required to effect the necessary repairs at no additional cost to the City of Cape Town.

5.7 DELIVERY AND MOVING:

The successful tenderer will be required to deliver and install as and when required. At the time on the tender there are not guaranteed amount of containers to be procured. It is at least estimated to be 20 within the period of the contract.

3.2.9.6 General technical specification for the excavation and cast of concrete base for 3 x 3 meter and 3 x 6 meter container

The contractor shall be responsible to apply in advance for wayleaves and permit to work in areas identified where an inverter batter back up container shall be installed. The administrative cost shall be part of the concrete base.

The contractor shall excavate and cast as per the following instructions;

3 x 3 meter container concrete base plinth:

Inclusive of excavating trenches (900mm x 900mm x 450 depth) at each corner and to fill the trenches with concrete (30MPa strength) and then securing it with a 1.5m long reinforced steel rod (diameter of 30 mm) through the floor at each corner where the top of the rod is bolted to the side of the container.

Contractor is responsible for checking that reinforcement is fixed and maintained in the correct position before and after casting of concrete.

No concrete may be cast without approval and inspection by the Works Package Manager.

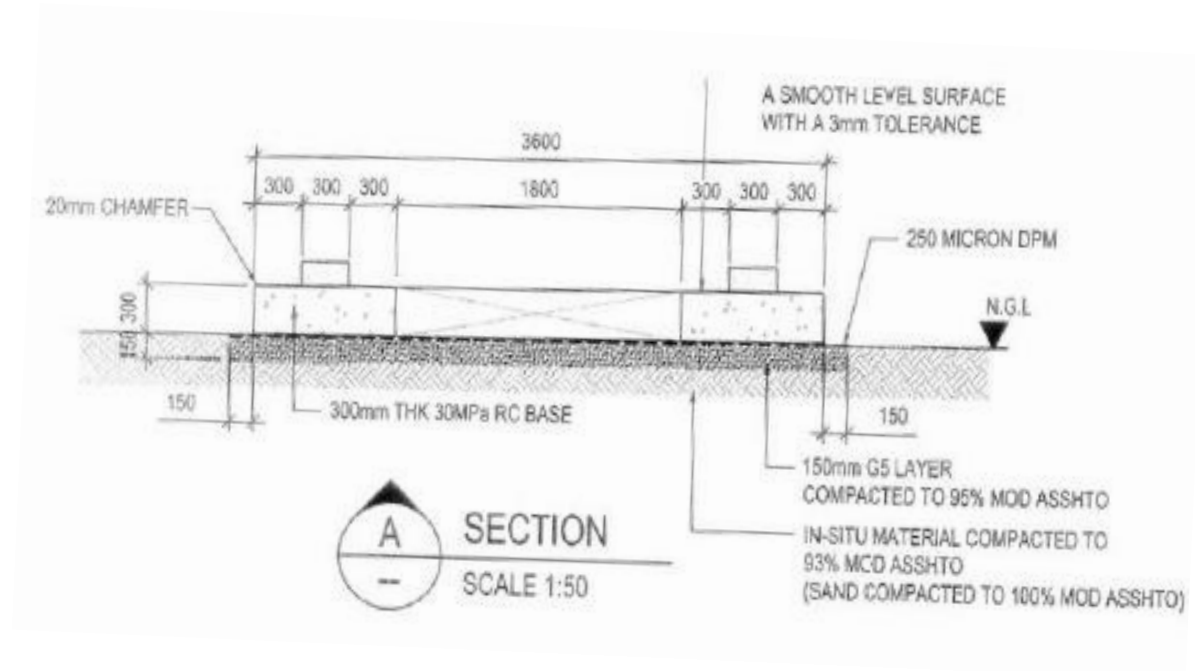
No alterations may be made to the structure without the approval by the Works Package Manager.

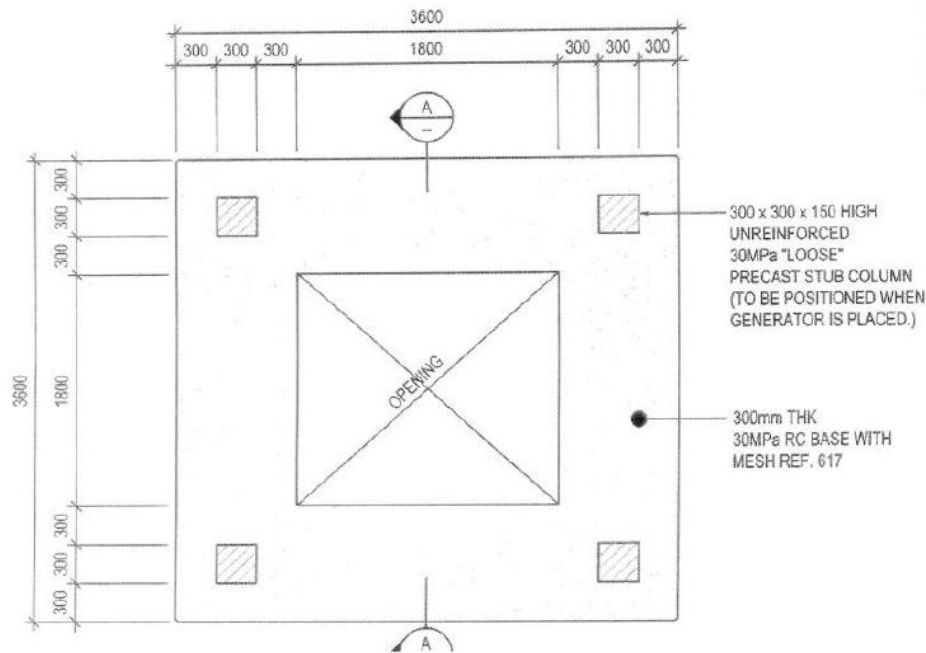
20 mm x 20 mm chamfer to all exposed concrete edges.

Bottom of foundation to be compacted to 95% MOD AASHTO after excavation.

Concrete to be cured for 7 days with approved curing method.

All existing serviced to be checked and surveyed by the contractor such as underground cable and services location on site prior to excavation.





6 x 6 meter container concrete base plinth

Inclusive of excavating trenches (000mm x 900mm x 450 depth) at each corner and to fill the trenches with concrete (30MPa strength) and then securing it with a 1.5m long reinforced steel rod (diameter of 30 mm) through the floor at each corner where the top of the rod is bolted to the side of the container.

Contractor is responsible for checking that reinforcement is fixed and maintained in the correct position before and after casting of concrete.

No concrete may be cast without approval and inspection by the Works Package Manager.

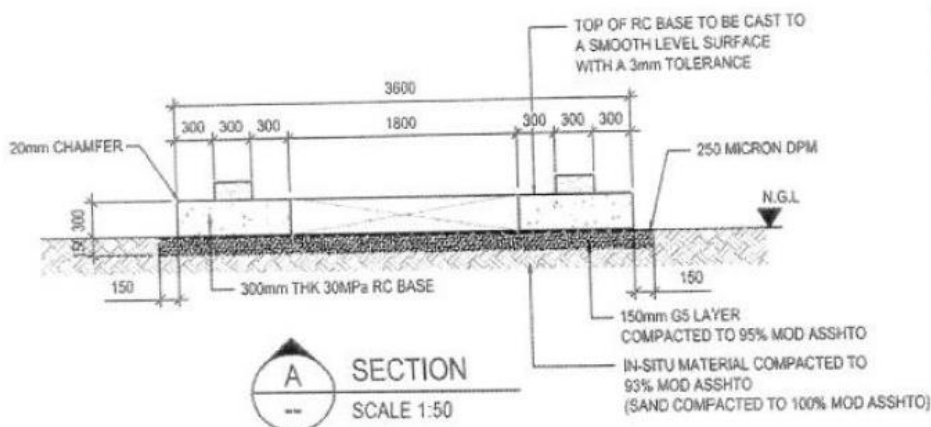
No alterations may be made to the structure without the approval by the Works Package Manager.

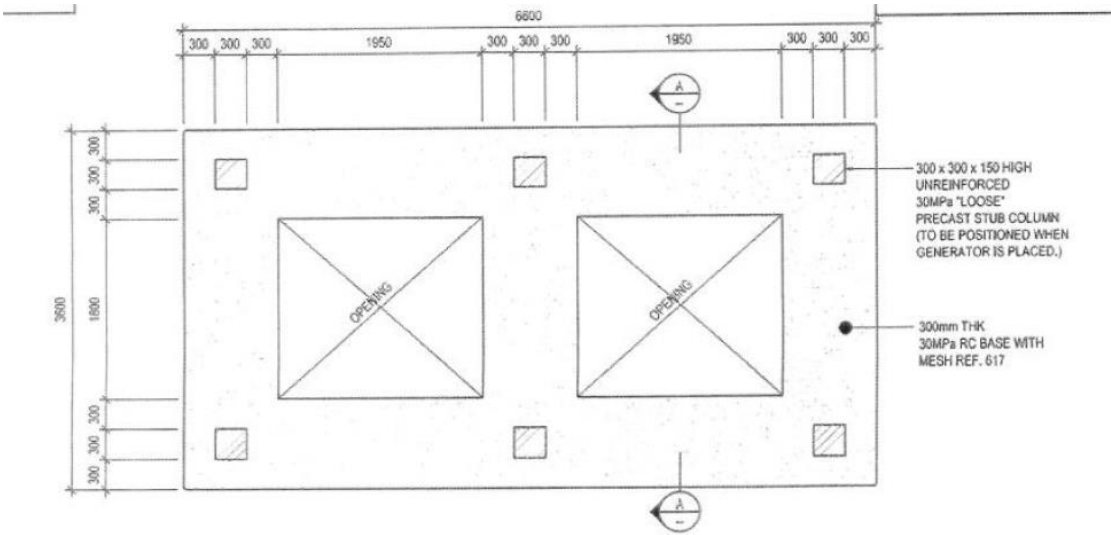
20 mm x 20 mm chamfer to all exposed concrete edges.

Bottom of foundation to be compacted to 95% MOD AASHTO after excavation.

Concrete to be cured for 7 days with approved curing method.

All existing serviced to be checked and surveyed by the contractor such as underground cable and services location on site prior to excavation.





3.2.9.6 GENERAL TECHNICAL SPECIFICATIONS OF ELECTRICAL ACTUATORS

General

The actuators shall be suitable for use on a nominal 380 Volt AC, 3 phase, 50 Hz power supply and are to incorporate motor, integral reversing starter, local control facilities and terminals for remote control and indication connections housed within a self-contained, sealed enclosure.

As a minimum, the actuators should meet the requirements set out in EN15714-2 and ISA SP96.02

In order to maintain the integrity of the enclosure, setting of the torque levels, position limits and configuration of the indication contacts etc. must be carried out without the removal of any actuator covers and without mains power over an Infrared or Bluetooth wireless interface. Sufficient commissioning tools must be provided with the actuators and must meet the enclosure protection and certification levels of the actuators. Commissioning tools must not form an integral part of the actuator and must be removable for secure storage / authorized release. In addition, provision shall be made for the protection of configured actuator settings by a means independent of access to the commissioning tool. Provision shall be made to disable Bluetooth® communications or only allow a Bluetooth connection initiated by an Infrared command for maximum security.

The actuator shall include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel irrespective of the connection sequence of the power supply.

Actuator sizing

The actuator must be sized to guarantee valve closure at the specified differential pressure and temperature. The safety margin of motor power available for seating and unseating the valve must be sufficient to ensure torque switch trip at maximum valve torque with the supply voltage 10% below nominal. For linear operating valves, the operating speed shall be such as to give valve closing and opening at approximately 10-12 inches per minute unless otherwise stated in the data sheet. For 90° valve types the operating time will be specified.

Environmental

Actuators must be suitable for indoor and outdoor use with a standard corrosivity category, C4 medium durability as per ISO 12944. The actuator must be capable of functioning in an ambient temperature ranging from -30°C (-22°F) to +70°C (+158°F), up to 100% relative humidity. Actuators for hazardous area applications must meet the area classification, gas group and surface temperature requirements specified in the data sheet.

Enclosure

Actuators shall be O-ring sealed, watertight to IP66/IP68 20m for 10 days, NEMA 4, 6. The motor and all other internal electrical elements of the actuator must be protected from ingress of moisture and dust when the terminal cover is removed for site cabling. The terminal compartment must maintain the same ingress protection rating with the terminal cover removed. The actuator enclosure must allow for temporary site storage without the need for electrical supply connection. All external fasteners shall be suitable for the actuator corrosivity category and installation environment indicated on the datasheet.

Motor

The motor must be an integral part of the actuator, designed specifically for valve actuator applications. The motor shall be a low inertia, high torque design and class F insulated. Resulting in class B temperature rise with a time rating of 15 minutes at 40°C (104°F) at an average load of at least 33% of maximum valve torque. Temperature shall be limited by thermostat device embedded in the motor end windings and integrated into the actuator control. Electrical and mechanical disconnection of the motor shall be possible without draining the lubricant from the actuator gear case. The actuator shall include a device to ensure that the motor runs with the correct rotation for the required direction of valve travel irrespective of the connection sequence of the power supply.

Motor Protection

Protection must be provided for the motor as follows:

- Stall - the motor must be de-energised within 8 seconds in the event of a stall when attempting to unseat a jammed valve.
- Over temperature - thermostat will cause tripping of the motor. Auto-reset on cooling
- Single phasing - lost phase protection.
- Direction – phase rotation correction.

Gearing

The actuator gearing must be totally enclosed in an oil-filled gear case suitable for operation at any angle. Grease lubrication is not permissible. All drive gearing and components must be of metal construction and incorporate a lost-motion hammer blow feature. For rising spindle valves the output shaft shall be hollow to accept a rising stem, and incorporate thrust bearings of the ball or roller type at the base of the actuator. The design should be such as to permit the opening of the gear case for inspection or disassembled without releasing the stem thrust or taking the valve out of service. For 90° operating type valves, drive gearing shall be self-locking to prevent the valve back-driving the actuator.

Hand Operation

A hand wheel must be provided for emergency operation, engaged when the motor is declutched by a lever or similar means, the drive being restored to electrical operation automatically by starting the motor. The hand wheel or selection lever must not move on restoration of motor drive. Provision shall be made for the hand/auto selection lever to be locked in both hand and auto positions. It should be possible to select hand operation while the actuator is running or start the actuator motor while the hand/auto selection lever is locked in hand without damage to the drive train.

Clock Wise operation of the hand wheel must give closing movement of the valve unless otherwise stated in the data sheet. For linear valve types, the actuator hand wheel drive must be mechanically independent of the motor drive and should be such as to permit valve operation in a reasonable time with a manual force not exceeding 400N through stroke and 800N for seating/unseating of the valve. The hand wheel does not mean an external gearbox not part of the electrical actuator. This shall be an integral part of the electrical actuator and one component.

Drive Interface

The actuator shall be furnished with a drive bushing easily detachable for machining to suit the valve stem or gearbox input shaft. The drive bush shall be positioned in the base of the actuator. Thrust bearings shall be sealed for life and the base shall be capable of withstanding five times the rated thrust of the actuator.

Local Controls

The actuator must incorporate local controls for Open, Close and Stop operation and a Local/Stop/Remote mode selector switch. Mode selection must be lockable in any one of the following three positions: local control plus local stop only, stop (no electrical operation), remote control plus local stop only. It must be possible to select maintained or non-maintained local control.

The local controls shall be arranged so that the direction of valve travel can be reversed without the necessity of stopping the actuator.

The local controls and display shall be rotatable through increments of 90 degrees to suit valve and actuator orientation.

Torque and Limits

Torque and turns limitation to be adjustable as follows:

- Position setting range – multi-turn: 2.5 to 8,000 turns, with resolution to 7.5° of actuator output.
- Position setting range – direct drive part turn actuators: 90° +/-10°, with resolution to 0.1° of actuator output.
- Torque setting: 40% to 100% rated torque.

Position measurement – Absolute position measurement should be incorporated within the actuator. The technology must be capable of reliably measuring position even in the case of a single fault. The design must be simple with the minimum amount of moving parts. Technologies such as LEDs or potentiometers for position measurement are considered unreliable and therefore not preferred.

Measurement of torque for multi-turn actuators must be from direct measurement of force at the output of the actuator. Methods of determining torque-using data derived from the motor such as motor speed, current, flux etc. are only acceptable for part-turn actuators.

A means for automatic “torque switch bypass” to inhibit torque off during valve unseating and “latching” to prevent torque switch hammer under maintained or repeated control signals shall be provided.

The electrical circuit diagram of the actuator should not vary with valve type remaining identical regardless of whether the valve is to open or close on torque or position limit.

Remote Valve Position and Status Indication

Four contacts must be provided which can be selected to indicate any position of the valve; Provision must be made for the selection of a normally closed or open contact form. Contacts shall maintain and update position indication during hand wheel operation when all external power to the actuator is isolated.

The contacts must be rated for 5mA to 5A, 120V AC, 30V DC.

As an alternative to providing valve position indication, any of the four contacts shall be selectable to signal one of the following:

- Valve opening, closing or moving
- Thermostat tripped, lost phase
- Motor tripped on torque in mid travel, motor stalled
- Remote selected, Local selected, Stop selected
- Actuator being operated by hand wheel
- Actuator fault

Provision shall be made in the design to support an additional eight contacts with the same configurable functionality.

A configurable monitor relay must be provided as standard, which can be used to indicate either Availability or Fault. The relay should be a spring return type with a Normally Open / Normally Closed contact pre-wired to the terminal block.

The Monitor (availability or fault) relay, being energized from the control transformer will de-energise under any one or more the following conditions:

Available Mode Fault Mode

- | | |
|---|---|
| <ul style="list-style-type: none"> • • • Motor thermostat tripped • | <p>Loss of main or customer 24V DC power supply</p> <p>Actuator control selected to local or stop</p> <p>Motor thermostat tripped</p> |
|---|---|

•

Actuator internal fault

Provision shall be made in the design for the addition of a contactless transmitter to give a 4-20mA analogue signal corresponding to valve travel and / or torque for remote indication when required. The transmitter will auto range to the set limits

Local Position Indication

The actuator display must include a dedicated numeric/symbol digital position indicator displaying valve position from fully open to fully close in 0.1% increments. Valve closed and open positions shall be indicated by symbols showing valve position in relation to the pipework to ensure that valve status is clearly interpreted. With mains power connected, the display must be backlit to enhance contrast at all ambient light levels and must be legible from a distance of at least 5m (16ft). A power save mode shall be available to switch off the display backlight during long periods of inactivity.

Red, green, and yellow LEDs corresponding to open, closed and intermediate valve positions must be included on the actuator display when power is switched on. The yellow LED should also be fully programmable for on/off, blinker and fault indication. The digital display must be maintained and updated during hand wheel operation when mains power to the actuator is isolated.

The actuator display shall include a fully configurable dot-matrix display element with a minimum pixel resolution of 168 x 132 to display operational, alarm, configuration and graphical data logger information. The text display shall be selectable between English and other languages such as: Spanish, German, French, and Italian. Provision shall be made to upload a different language without removal of any covers or using specialized tools not provided as standard with the actuator.

Data logger graphical displays and trend graphs must be available on the local LCD for the following functions:

- Torque versus Position
- Number of Starts versus Position
- Number of starts per hour
- Dwell Time
- Average temperature

The main display must include configurable a minimum of four different home-screens that include the following information:

- Position and status
- Position and torque (analogue)
- Position and torque (digital)
- Position and demand (positioning)

An optional environmental cover to protect the display from high levels of UV radiation or abrasive materials must be available and shall be fitted without the need for any special tooling.

The local controls and display must be rotatable through increments of 90 degrees to suit valve and actuator installation orientation.

Integral Starter and Transformer

The reversing starter, control transformer and local controls must be integral to the valve actuator and suitably housed to prevent breathing and condensation. The starter shall be suitable for 60 starts per hour during normal service or 1,200 starts per hour under reduced load conditions and of rating appropriate to motor size. The controls supply transformer shall be fed from two of the incoming three phases and incorporate overload protection. It must have the necessary voltage tapping and be adequately rated to provide power for the following functions

:

Energizing of the contactor coils

- 24V DC or 110V AC output for remote controls (maximum 5W/VA)
- Supply for all the internal electrical circuits

An alternative solid state motor starter is permissible for applications requiring up to 1,200 starts per hour. 24VDC remote controls should be used in combination with a solid state starter to maximise response time. The solid state starter must facilitate configurable electrical braking functionality.

Speed adjustable actuators must have an integral motor controller to manage starting, speed and operation.

Remote Control Facilities

The necessary control, wiring and terminals must be contained within the actuator enclosure. Open and close external interlocks must be made available to inhibit local and remote valve opening / closing control. It must be possible to configure the interlocks to be active in remote control only.

Remote control signals fed from an internal 24VDC (or 110VAC) supply and/or from an external supply between 20V and 60VDC or 40V and 120VAC, must be suitable for any one or more of the following methods of control:

- Open, Close and Stop control
- Open and Close maintained or "push to run" (inching) control
- Overriding Emergency Shut-Down; to close (or open) valve from a normally closed or open contact
- Two-wire control; energise to close (or open), de-energise to open (or close)

Additionally, provision shall be made for a separate 'drive enable' permissive input to prevent any unwanted electrical operation.

It must be possible to reverse valve travel without the necessity of stopping the actuator or moving through an intermediate stop control position. The motor starter must be protected from excessive current surges during rapid travel reversal. The internal circuits associated with the remote control and monitoring functions are to be designed to withstand simulated lightning impulses up to 2kV.

Operation by distributed control system must be possible utilising one or more of the following network systems:

- Profibus
- Modbus
- Foundation Fieldbus
- Device Net
- Pakscan
- HART

Monitoring Facilities

Facilities to indicate actuator availability and monitor operation must be included as standard.

Actuator text display indication of the following status/alarms:

- Closed Limit, open limit, moving open, moving closed, stopped
- Torque trip closing, torque trip opening, motor stalled
- ESD active, interlock active
- Thermostat trip, phase lost, 24V supply lost, local control failure
- Configuration error, position sensor failure, torque sensor failure
- Battery low, battery discharged, power loss inhibit

Integral data logger to record and store the following operational data:

- Opening last / average torque against position
- Closing last / average torque against position
- Opening motor starts against position
- Closing motor starts against position
- Total open / closed operations
- Maximum recorded opening and closing torque values
- Event recorder logging operational conditions (valve, control and actuator)

The event log must include time and date information for each stored event.

Logged data must be accessible via non-intrusive *Bluetooth*® communication and also visible on the actuator display. An intrinsically safe portable tool must be provided to extract data logger and actuator configuration files from the actuator. The portable tool must permit *Bluetooth*® connection with a PC to perform file transfer. The actuator manufacturer must supply PC software to enable extracted actuator files to be viewed and analysed.

Wiring and Termination

Internal wiring shall be tropical grade PVC insulated stranded cable of appropriate size for the control and power. Each wire shall be clearly identified at both ends. The terminals shall be embedded in a terminal block of high tracking resistance compound.

The terminal compartment must be separated from the inner electrical components of the actuator by means of a watertight seal. A minimum of four threaded cable entries with provision for an additional four extra conduit entries must be available to accommodate wiring connections.

All wiring supplied as part of the actuator must be contained within the main enclosure for physical and environmental protection. External conduit connections between components are not acceptable. A durable terminal identification card showing a plan of terminals must be attached to the inside of the terminal box cover indicating:

- Serial number
- External voltage values
- Wiring diagram number
- Terminal layout

Commissioning Kit

Each actuator must be supplied with a start-up kit comprising installation instruction manual, electrical wiring diagram and cover seals to make good any site losses during the commissioning period. In addition, sufficient actuator commissioning tools shall be supplied to enable actuator set up and adjustment during valve/actuator testing and site installation commissioning.

Performance and Test Certificate

Each actuator must be performance tested by the manufacturer and individual test certificates are to be supplied free of charge. Test certificates must be retained by the manufacturer for the serviceable life of the product. The test certificate must include details of the equipment specification such as:

- Serial number
- Test date
- Manufacturing site address
- Customer
- Customer order number (where applicable)
- Actuator size
- Mounting flange
- Enclosure type
- Lubricant

- Paint coating
- Power supply
- Operating speed/time
- Drive close direction
- Gear ratio for second stage gearbox (where applicable)
- Electrical optional extras
- Catalogue performance

The test equipment should simulate a typical valve load. The following parameters must be recorded and clearly stated on the certificate:

- Torque at maximum torque setting in both directions
- Current at maximum torque setting in both directions
- Flash test statement
- Test power supply voltage

3.3 Manufacturers' specifications, codes of practice and installation instructions

All equipment and materials shall be installed, serviced and repaired strictly in accordance with the manufacturers' specifications, instructions and codes of practice.

3.4 Definition of repair requirements

This entails repair, replacement and/or refurbishment of defective equipment, units or parts of an installation to restore installations to their normal functional condition.

3.5 Supply of Labour, Equipment and Materials

The contractor shall make available, appoint and provide all labour and necessary resources required which is clearly indicated in the Pricing Schedule.

Only competent personnel that have been adequately trained by the Contractor shall execute all of the required work.

All tools, equipment and consumables that are required for undertaking work shall be provided by the Contractor at his cost.

All material, spare parts, components, equipment and accessories necessary for the repairs of each installation shall be supplied and installed by the Contractor.

All workmanship, materials and components shall have a warranty valid for twelve (12) months after the goods and/or services have been delivered. Some products procured will be supplied with the OEM guarantee and warrantee conditions applicable to the specific product which may exceed twelve (12) months from date of purchase. The OEM guarantee and warranty conditions shall take preference for the products supplied.

3.6 Communication

The Contractor shall ensure that he is reachable by telephone, email and a cellular telephone connection to ensure that he can be contacted at any time.

Upon request, City of Cape Town shall furnish the Contractor with a list of contact details of all the Engineering and Asset Management maintainers also referred to as Works Package Managers (WPM) in the respective Regions.

Should the ENGINEERING AND ASSET MANAGEMENT (EAM) WPM personnel determine or suspect that preventative, corrective or breakdown maintenance is required, the Contractor shall be contacted.

3.7 Work scheduling and approval

When the ENGINEERING AND ASSET MANAGEMENT (EAM) Works Package Manager requests, the Contractor shall visit the site and submit a detailed works programme to CCT seven (7) days prior to work commencing on site. The programme shall indicate the detail and nature of work to be completed, which section of the works will be effected, a detailed schedule clearly indicating the duration of work (kick off date to date of commissioning). Where applicable, the CCT internal wayleave procedure and timeline has to be factored into the works programme.

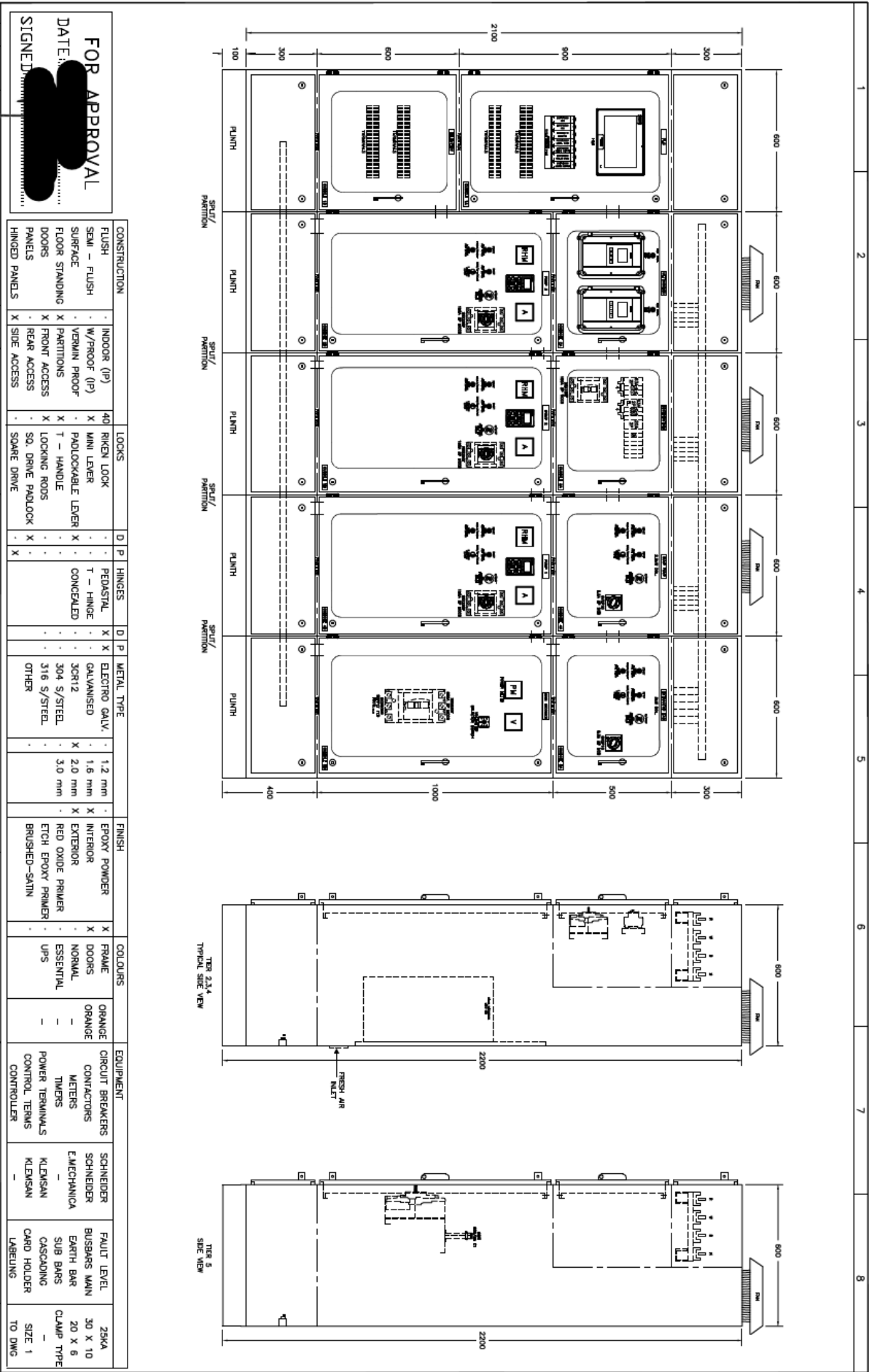
Only once the works programme has been approved by the City of Cape Town, will the Contractor be allowed to proceed with the Works.

3.8 Drawings

The contractor shall on instruction of the Project Manager or Works Package Manager, provide CAD electrical engineering drawings for new installations or modified installations. In the case of existing modified installations, the changes to the original electrical schematic drawings shall be referred to in the OEM manuals and the original layout and format shall be used to update all versions and editions of the ENGINEERING AND ASSET MANAGEMENT (EAM) manuals.

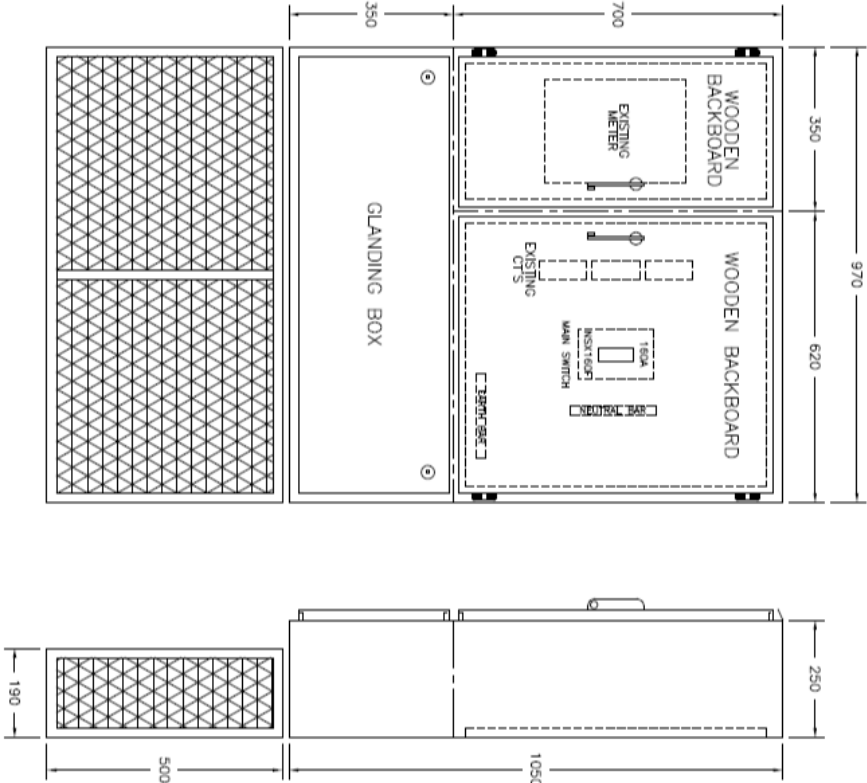
Copies of drawings in sections 3.8.1. – 3.8.9, will be made available, upon request from the Contract Manager via e-mail. (AndreJ.Visser@capetown.gov.za)

3.8.1 Three pump Motor Control Centre floor standing

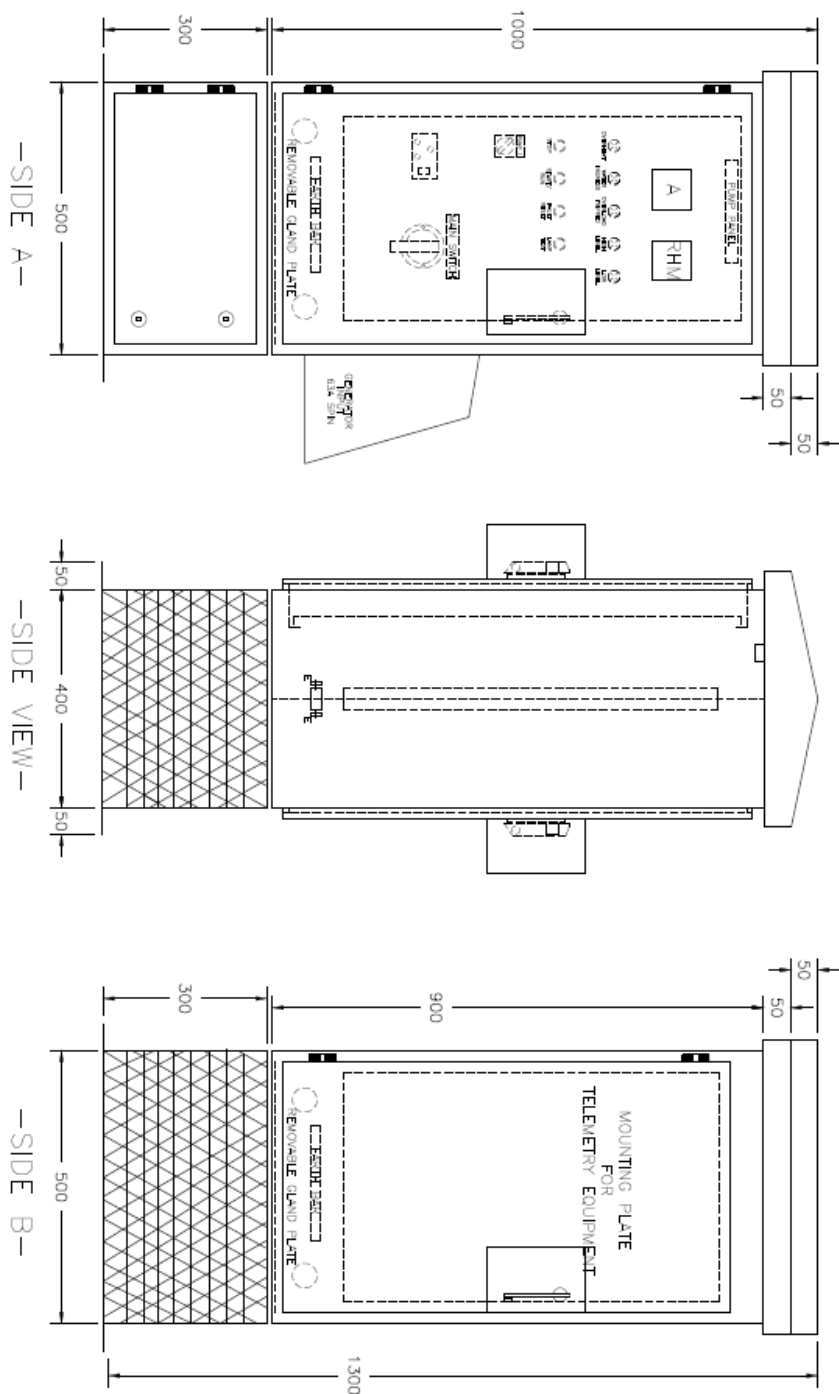


3.8.2 Metering panel floor standing

FOR APPROVAL		CONSTRUCTION		LOOKS		HINGES		METAL TYPE		FINISH		COLOURS		EQUIPMENT		FAULT LEVEL	
FLUSH	-	INDOOR (IP)	40	RIMED LOCK	-	PEDESTAL	X	ELECTRO GALV.	X	EPOXY POWDER	X	FRAME	ORANGE	CIRCUIT BREAKERS	HAGER	BUSBARS MAIN	BKA
SEMI - FLUSH	-	W/PROOF (IP)	-	MINI LEVER	-	T - HINGE	-	GALVANISED	-	INTERIOR	X	PANELS	ORANGE	CONTACTORS	-	EARTH BAR	CLAMP TYPE
SURFACE	X	VERMIN PROOF	-	PADLOCKABLE LEVER	X	CONCEALED	-	30CR12	-	EXTERIOR	X	NORMAL	-	METERS	-	SUB BARS	BRASS
FLOOR STANDING	-	PARTITIONS	X	T - HANDLE	-	-	-	304 S/STEEL	-	RED OXIDE PRIMER	-	ESSENTIAL	-	TINERS	-	CASCADING	CLAMP TYPE
DOORS	X	FRONT ACCESS	X	LOOKING RODS	-	-	-	316 S/STEEL	-	ETCH EPOXY PRIMER	-	UPS	-	POWER TERMINALS	-	CARD HOLDER	-
PANELS	X	REAR ACCESS	-	SO. DRIVE PADLOCK	-	-	-	OTHER	-	BRUSHED-SATIN	-	-	-	CONTROL TERMS	-	-	SIZE 1
HINGED PANELS	-	SIDE ACCESS	-	CON SLOT	-	-	-	-	-	-	-	-	-	OTHER	-	-	TO DWS



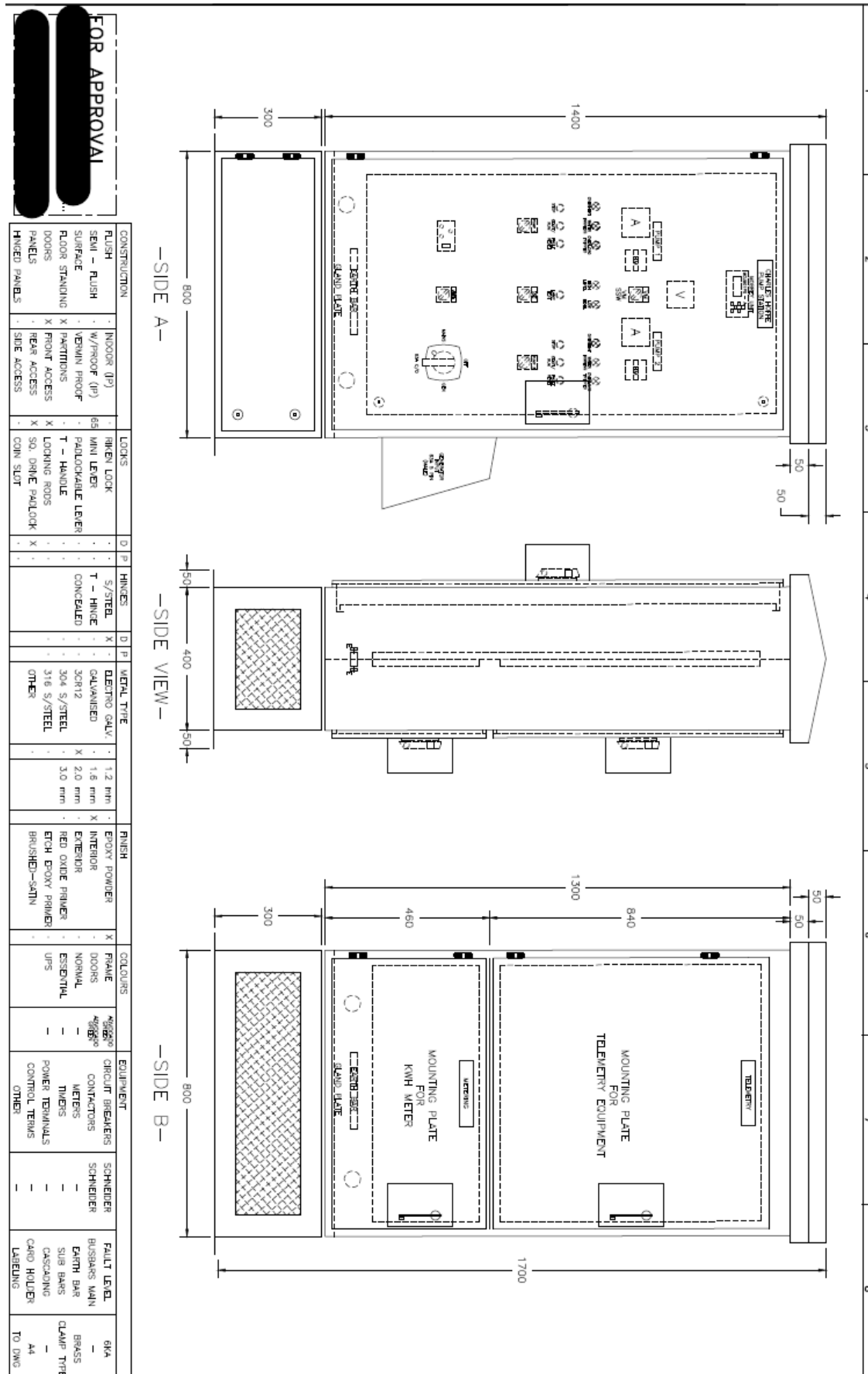
3.8.3 One pump kiosk control panel floor standing

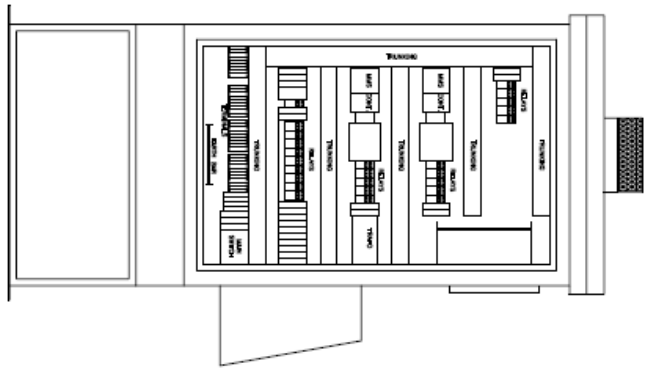


- NOTES:
- DOOR STAYS
 - 3CR12 = 1.6MM
 - LOCKING RODS
 - COLOUR: AVOCADO GREEN
 - LED LIGHT INSIDE CONTROL PANEL

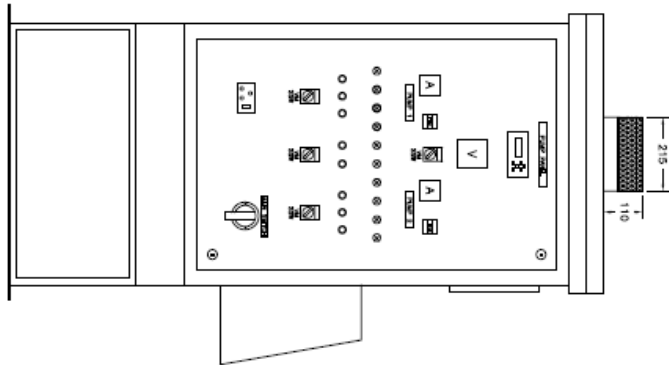
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3.8.4 Two pump kiosk control panel floor standing

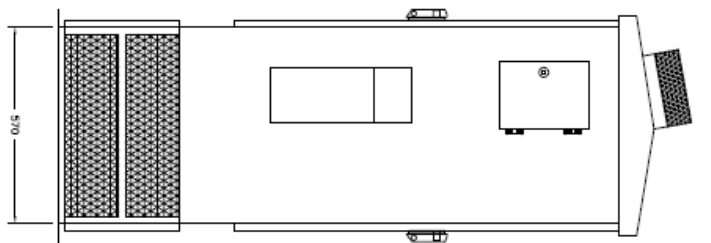




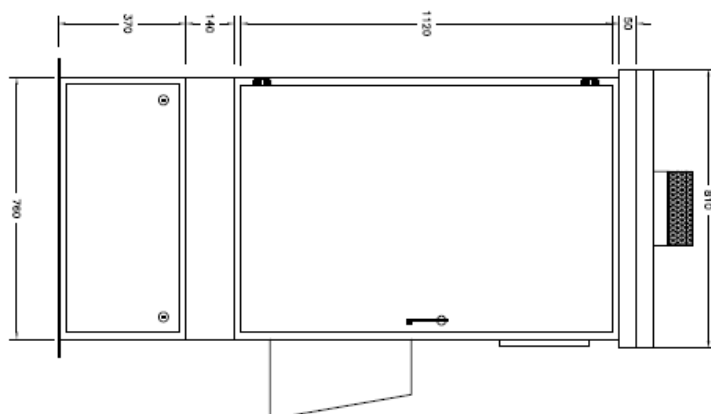
—SIDE A—
EQUIPMENT LAYOUT
(DOOR REMOVED)



—SIDE A—
PANEL LAYOUT

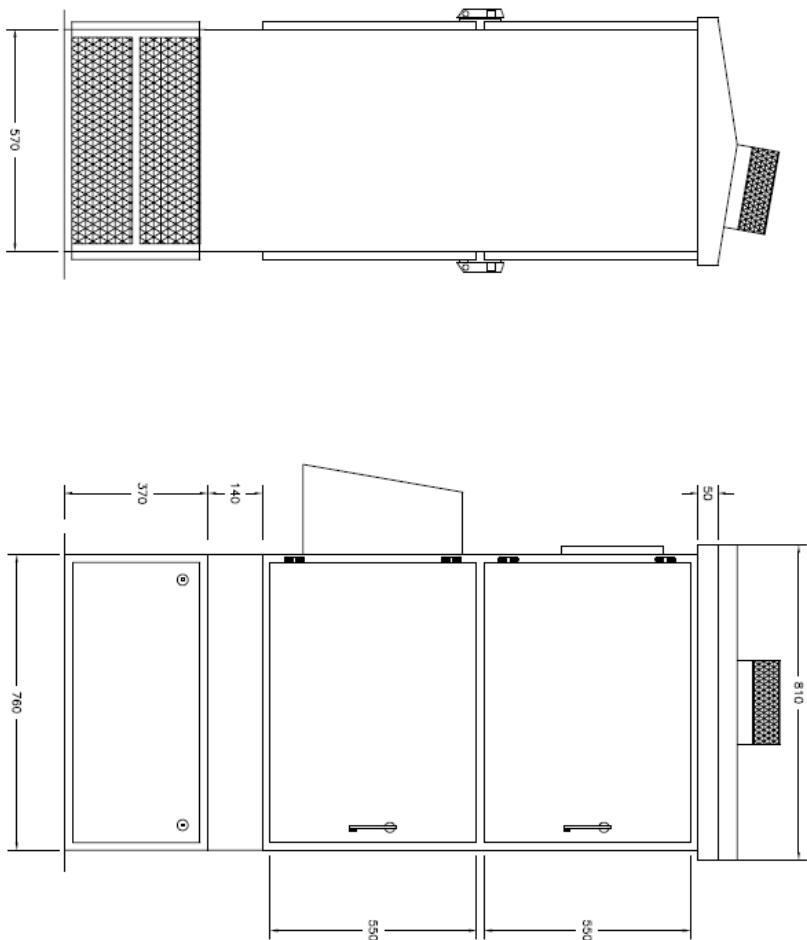


SIDE VIEW



—SIDE A—
FRONT VIEW
(WITH DOOR)

[illegible]



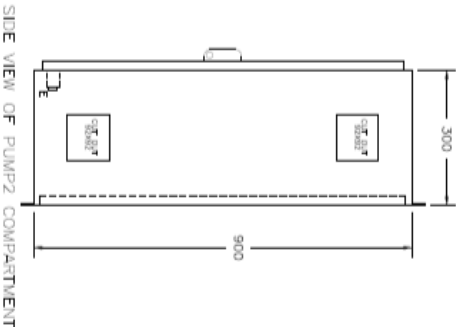
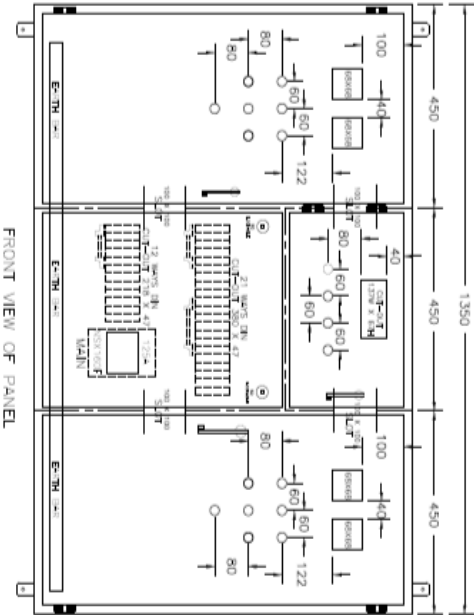
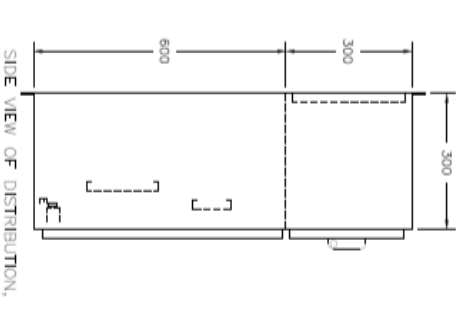
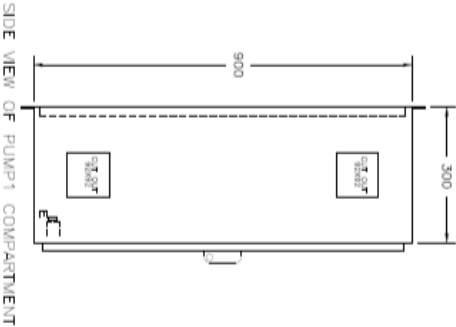
SIDE VIEW

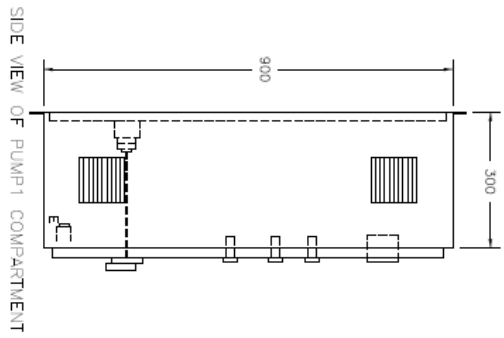
—SIDE B—
FRONT VIEW
(WITH DOOR)

AS BUILT	CONSTRUCTION	INDOOR (IP)	LOCK	HINGES	METAL TYPE	FINISH	COLORS	EQUIPMENT	CONVENT
	FLUSH	MINI LOCK	PEDESTAL	ELECTRO GALV.	1.2 mm	EPoxy POWDER	FRAME	AVOCADO	FAULT LEVEL
	SEMI - FLUSH	W/PROOF (IP)	T - HINGE	GALVANIZED	1.6 mm	INTERIOR	GREEN	CIRCUIT BREAKERS	CLAMP TYPE
	SURFACE	HERMIN PROOF	PADLOCKABLE LEVER	30R12	2.0 mm	EXTERIOR	PAVEMENT	CONTRACTORS	BRASS
	FLOOR STANDING	T - HANDLE	CONCEALED	304 S/STEEL	3.0 mm	RED OXIDE PRIMER	NORMAL	TIMERS	CLAMP TYPE
	DOORS	X FRONT ACCESS	X LOCKING RODS	316 S/STEEL	ETCH EPOXY PRIMER	ESSENTIAL	POWEE TERMINALS	CONTROL ITEMS	CASCADING
	X REAR ACCESS	X SQ. DRIVE PADLOCK	X	OTHER	BUSHED-SATIN	UPS	OTHER	CARD HOLDER	-
	X SIDE ACCESS	X COIN SLOT	X						TO DWG
	PANELS								
	HINGED PANELS								
SIGNED: WESLEY DAVIDS									

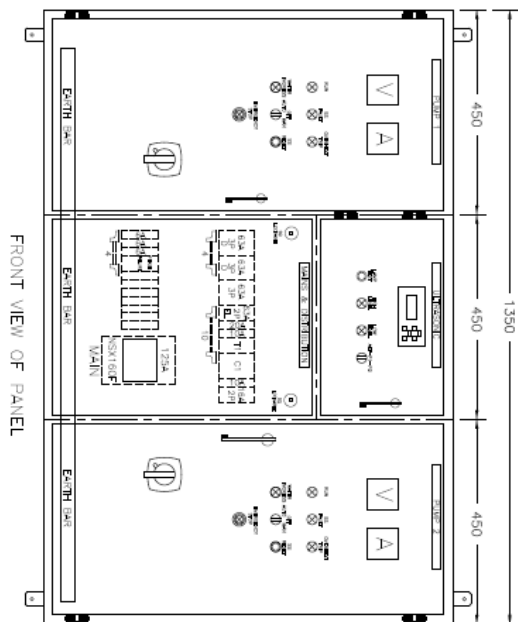
3.8.5 Two pump control panel_Wall mount

AS BUILT		CONSTRUCTION		LOCKS		HINGES		METH. TYPE		FINISH		COLORS		EQUIPMENT		SCHEDULED		FAULT LABEL		GMA	
RUSH		INDOOR (IP)		HARDEN LOCK		HORIZONTAL		ALUMINUM GALV.		EXTERIOR POWDER		PAVING		CIRCUIT BREAKERS		SCHEDULED		FAULT LABEL		GMA	
SEMI - RUSH		W/PROOF (IP)		MINI LEVER		T - HINGE		QUALIFIED		INTERIOR		PAVING		CONTACTORS		-		EARTH BAR		-	
SURFACE		REAR PROOF		PULL/SHOULDER LEVER		CONCEALED		30812		EXTERIOR		NORMAL		METERS		-		SUB BASE		-	
FLOOR STANDING		PARTING		T - HANDLE		-		304 S/STEL.		RED OXIDE PRIMER		ESSENTIAL		THERMS		-		CASCADING		-	
DOORS		FRONT ACCESS		LOCKING HOODS		-		316 S/STEL.		ETCH EXTERIOR PRIMER		-		POWER TERMINALS		-		CARD HOLDER		-	
PANELS		REAR ACCESS		SO. DOME PADLOCK		-		-		BRUSHED - SATIN		UPS		CONTROL THERMS		-		-		-	
HINGED PANELS		SITE ACCESS		COIN SLOT		-		OTHER		-		-		OTHER		-		LABELING		TO DWG	





Side view of the mechanical assembly. The total length is 600 units, divided into a 300-unit section on the left and a 300-unit section on the right. The total height is 300 units. The left section contains a large rectangular block with a smaller rectangular feature on its top surface. The right section contains a smaller rectangular block with a smaller rectangular feature on its top surface. Dashed lines indicate hidden internal features.



A side-view technical drawing of the Pump2 compartment. The drawing shows a rectangular structure with a width of 900 and a height of 300. On the left side, there is a vertical section with horizontal hatching, representing a pump or motor. On the right side, there is a vertical section with vertical hatching, representing a tank or storage unit. The top of the structure features several small rectangular components, likely sensors or valves. The drawing includes dimension lines indicating the 900 width and 300 height.

[illegible]

FRONT VIEW WITH OUTER DOORS REMOVED

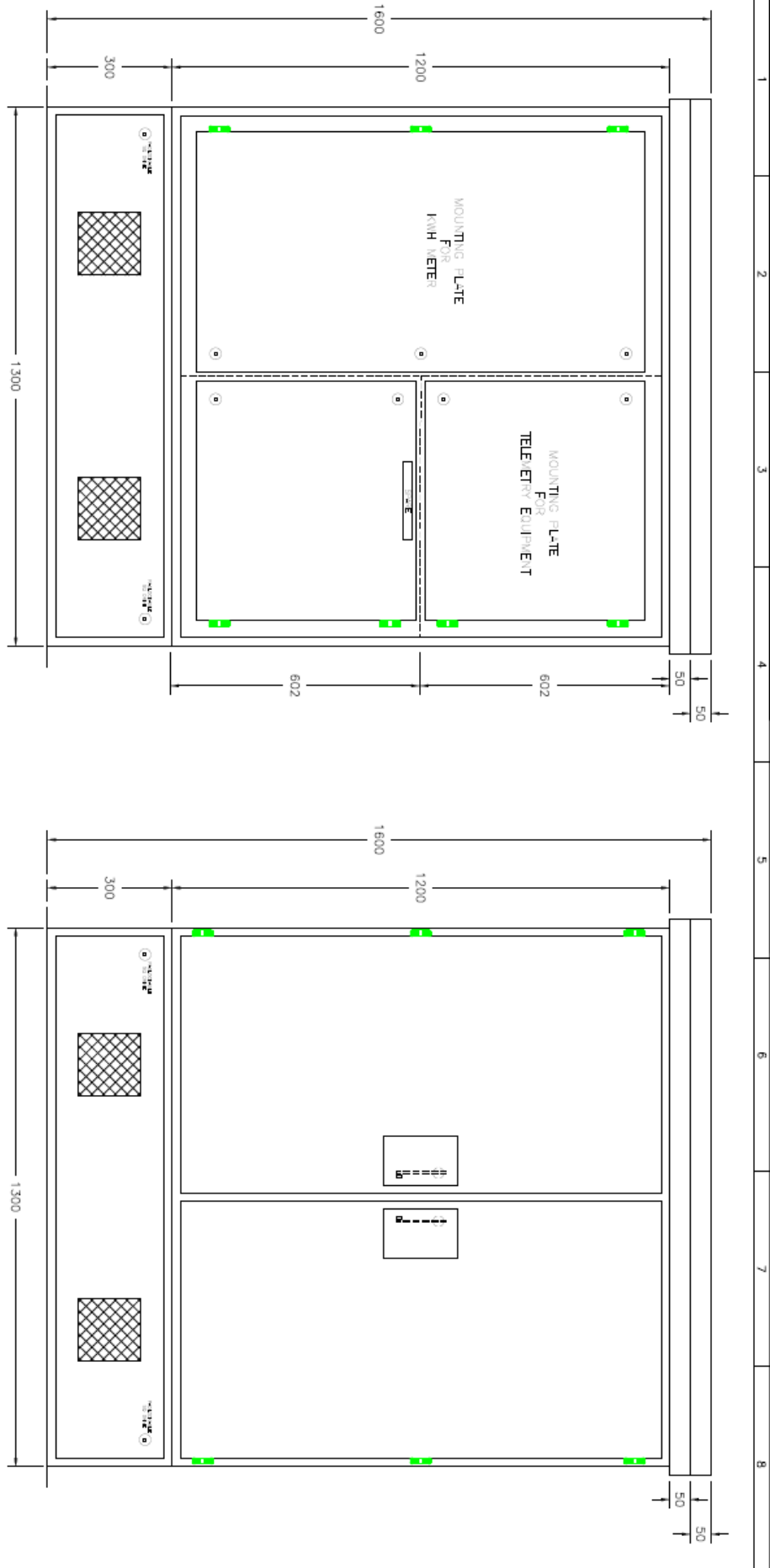
FRONT VIEW WITH OUTER DOORS ATTACHED

SIDE VIEW

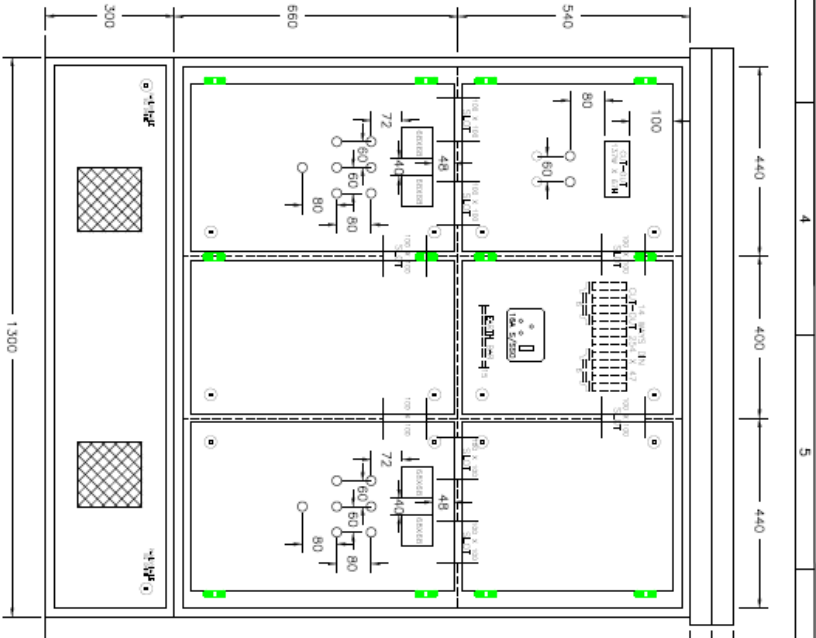
AS BUILT

CONSTRUCTION	LOCKS	HINGES	METAL TYPE	FINISH	COLORS	EQUIPMENT
FLUSH SEMI - FLUSH SURFACE FLOOR STANDING DOORS PANELS MINCED PANELS	INDOOR (P) W/PROOF (P) WEARIN PROOF PARTITIONS FRONT ACCESS REAR ACCESS SIDE ACCESS	MINER LOCK MINI LEVER PATLOCKABLE LEVER T - HANDLE LOCKING RODS SO. DRINE PALLOCK CON. SLOT	S/STEEL T - HINGE CONCEALED ELECTRO GALV. GALVANIZED 304 S/STEEL 316 S/STEEL OTHER	EPOXY POWDER INTERIOR EXTERIOR MED OXIDE PRIMER ETC EPOXY PRIMER BRUSHED-SATIN	FRAME DOORS NORMAL ESSENTIAL UPS	AND GRN CIRCUIT BREAKERS CONTROLS METERS THERMALS POWER TERMINALS CONTROL THERM OTHER

[illegible]



AS BUILT									
CONSTRUCTION	LOCKS	HINGES	D.P.	METAL THIEF	FINISH	COLOURS	EQUIPMENT	FAULT LABEL	Q/A
FLUSH	INDOOR (IP)	MINI LOCK	-	5/3/STEEL	1.2 mm	FRAME	CIRCUIT BREAKERS	SCHEMELER	6 X 6
SEMI - FLUSH	W/PROOF (IP)	MINI LEVER	-	T - HINGE	1.6 mm	DOORS	CONTRACTORS	BUSBAR MAIN	6 X 6
SURFACE	VERMIN PROOF	PALCOUDED LEVER	-	CONCEALED	3.012	NORMAL	METERS	EARTH BAR	6 X 6
FLOOR STANDING	PARTITIONS	T - HANDLE	-	304 S/STEEL	2.0 mm	ESSENTIAL	THIEVES	SUB BARS	CLAMP TYPE
DOORS	X FRONT ACCESS	X LOCKING ROBS	-	316 S/STEEL	3.0 mm	UPS	POWER TERMINALS	CASING	-
PANELS	X REAR ACCESS	X 50 DRILE PALLOCK	-	OTHER	-	BRUSHED-SATIN	CONTROL TENDS	CARD HOLDER	44
HINGED PANELS	X SLIDE ACCESS	COIN SLIT	-	-	-	-	OTHER	LABELLING	TO DWG

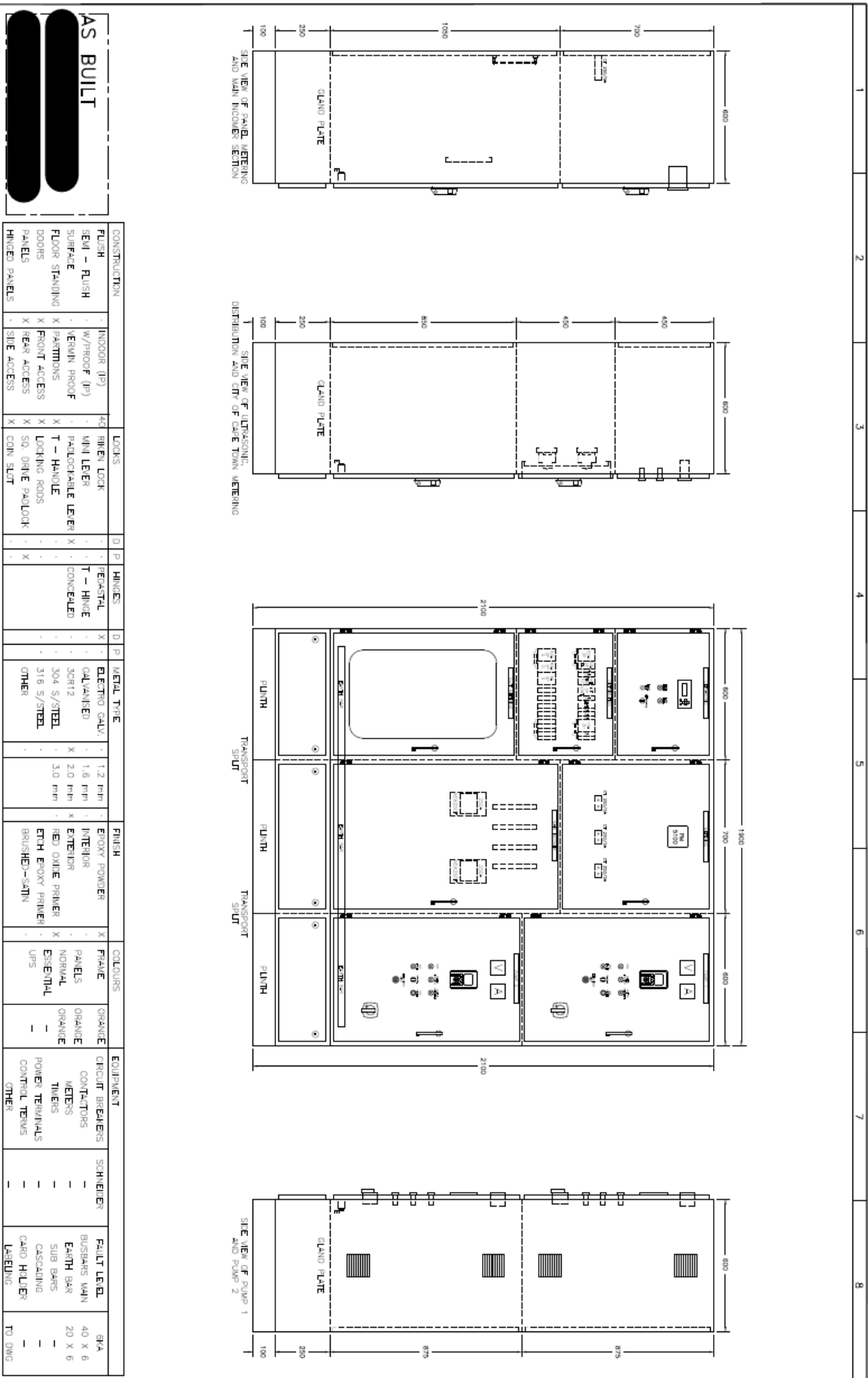


-FRONT VIEW WITH
OUTER DOORS REMOVED-

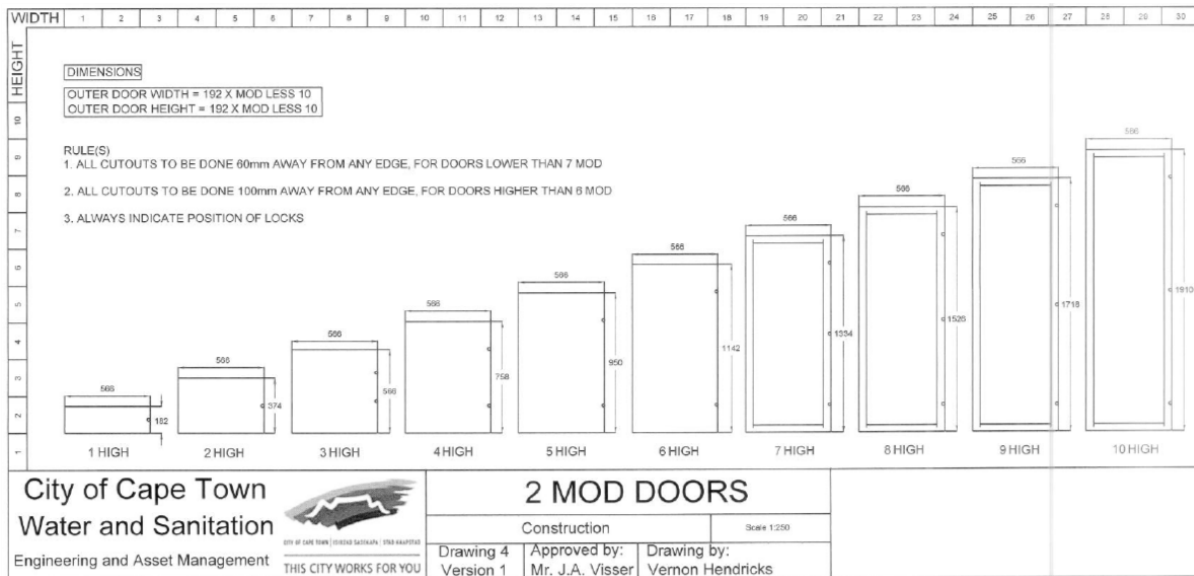
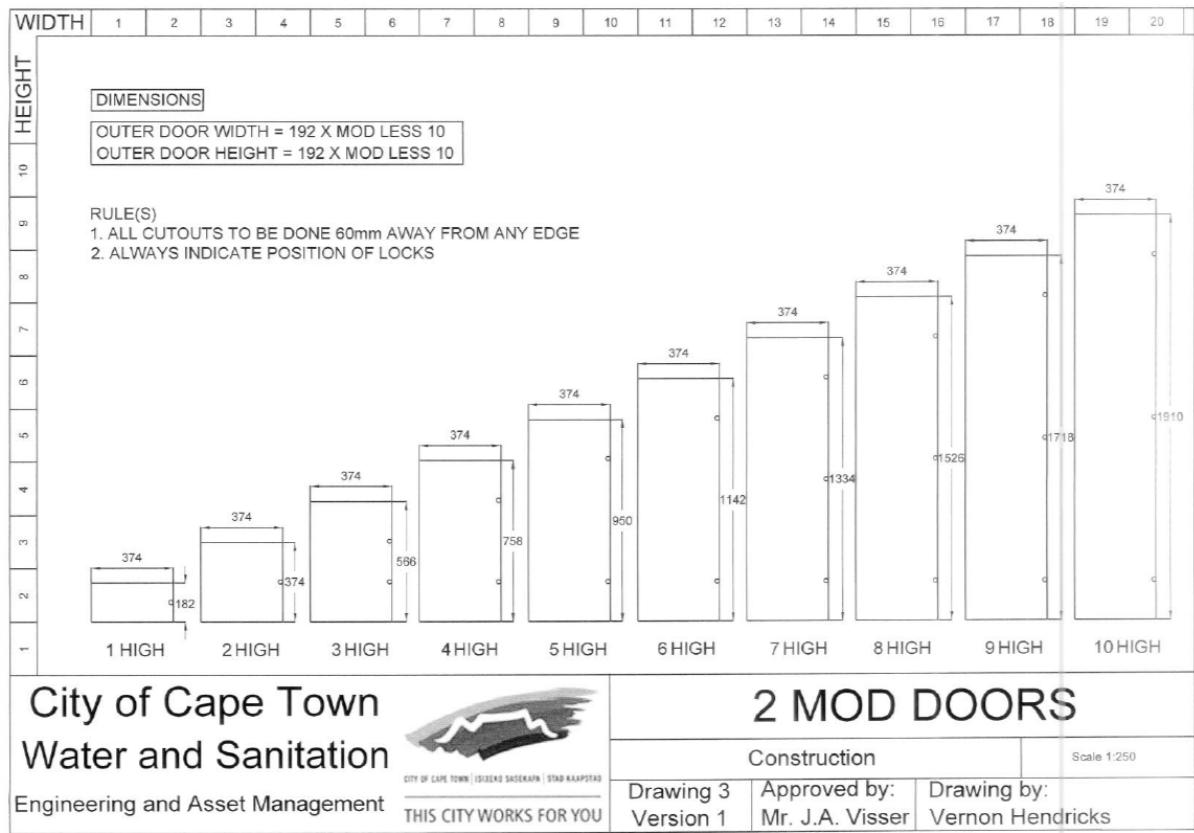
- NOTE: - STAINLESS STEEL HINGES
- STAINLESS STEEL LOCKS & HANDLES (HEAVY DUTY)
- PRIMER & PAINTED
- SIDE VENTILATION FOR PUMP COMPARTMENTS

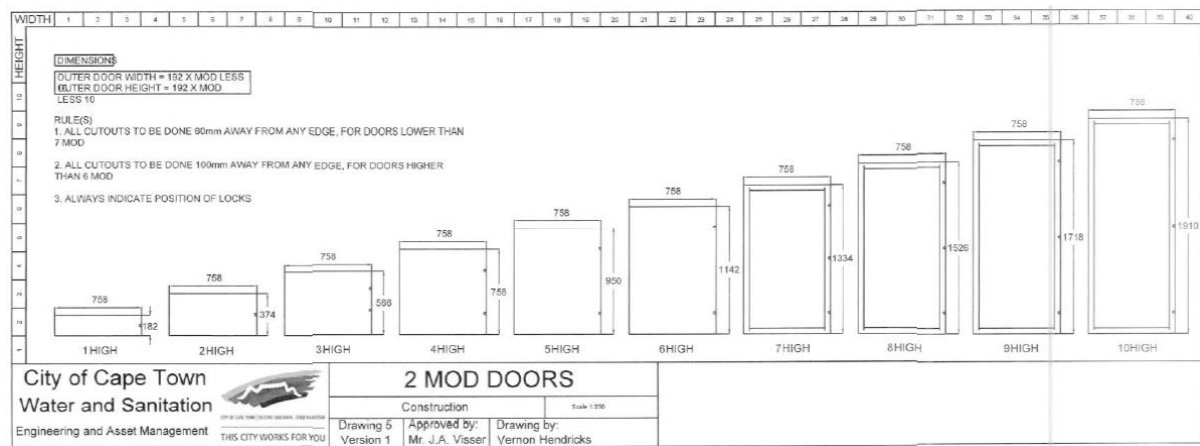
CONSTRUCTION	LOOKS	HINGES	METAL TYPE	FINISH	COLORS	EQUIPMENT	FAULT LEVEL	8K4
PUSH SEMI - PUSH SURFACE FLOOR STANDING DOORS PANELS HINGED PANELS	INDOOR (P) W/PROOF (P) VENIAN PROOF PARADISE LEVER T - HANDLE SO. DRIVE PADLOCK CON. SLUT	RIVEN LOCK MINI LEVER PADLOCKABLE LEVER T - HANDLE SO. DRIVE PADLOCK CON. SLUT	S/STEEL T - HINGE CONCEALED ELECTRO GALV. GALVANIZED 304 S/STEEL 316 S/STEEL OTHER	1.2 mm 1.6 mm 2.0 mm 3.0 mm EXTENSOR RED OXIDE PRIMER ETCH EPOXY PRIMER BRUSHED-SATIN	FRAME DOORS NORMAL ESSENTIAL UPS	AVO GRN CIRCUIT BREAKERS CONTACTORS METERS TIMERS POWER TERMINALS CONTROL TEAMS OTHER	SCHNEIDER BUSBARS MAIN EARTH BAR SUB BARS CASCADING CARD HOLDER LABELING	CLAMP TYPE 44 TO DWG

3.8.7 Two pump control panel floor standing

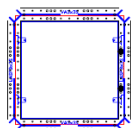


3.8.9 Modular construction MCC panels as per existing specification and equipment installed at Water and Sanitation facilities

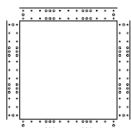




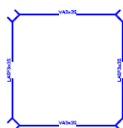
COMPLETE 3X3 CUBICLE



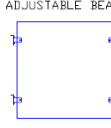
FRAMEWORK



HORIZONTAL & VERTICAL SCREENING
 OR
 FLAT PLATES (DEPENDENT ON LOCATION
 OF CUBICLE IN PANEL)



CHASSIS PLATE WITH BRACKETS
 & ADJUSTABLE BEARERS



DOOR WITH LOCKS,
 HINGES & LOCK CATCHES



ALL PARTS COME COMPLETE WITH THEIR RELEVANT BRACKETS & SCREWS

3.9 Standard Specifications for Electrical Work

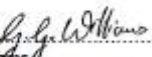
Contractor shall obtain the Standard Specification for Electrical Works from the Contract Manager after contract award. This document outlines all the applicable engineering standards and specifications for all electrical engineering works including maintenance activities. The contractor shall familiarise himself with the content and be in compliance for all electrical engineering works.

A copy of the Standard Specifications for Electrical Works will be made available, upon request from the Contract Manager via e-mail. (AndreJ.Visser@capetown.gov.za)



STANDARD SPECIFICATIONS FOR ELECTRICAL WORKS

DIRECTORATE: UTILITY SERVICES
DEPARTMENT: WATER AND SANITATION
CITY OF CAPE TOWN

Recent Input	Approved by	Date Approved
Mbulelo Madiolo Andre Visser Craig Muller Bonginkosi Malawu Babalwa Ndlovu Lungile Mangqamba Mulumeodenwa Binwa	 G.G. Williams Design and Contracts – Electrical Chief Engineer Gregory.Williams@capetown.gov.za ENGINEERING AND ASSET MANAGEMENT	Gregory Williams Digitally signed by Gregory Williams Date: 2023.02.01 15:08:25 +02'00'

VERSION: 2022

3.10 Maintenance, Service and Inspection reports

Various reports are required from the Contractor or Specialist Sub-Contractors. This would include on-site inspection reports, site service reports for electrical infrastructure services and service reports from specialist repair agents of OEM equipment.

3.11 Commissioning

When all tests have been completed to the satisfaction of the Employers Agent (WPM) the works shall be commissioned. The completed work including all control functions and control systems shall be commissioned as a unit and the process performance requirements shall be achieved during normal Operation.

Once the Works has been commissioned to the satisfaction of the Employers Agent, (WPM) the operational acceptance period shall start and shall consist of a continuous period of operation free from trouble. Unless otherwise stated, this period shall be four calendar weeks. During the operational acceptance period, the Contractor shall carry out all necessary servicing and any adjustments required. The plant operational staff will assist the Contractor in operating the Works during this period.

3.12 Commissioning Report

A comprehensive commissioning test report shall be submitted by the Contractor prior to Issue of the Certificate of Completion and shall be inserted in the Manual where required by the Works Package Manager.

The contractor shall provide performance reports upon commissioning and testing where required by the Works Package Manager.

4. MEASUREMENT AND PAYMENT

4.1 Plant and equipment charges

Unit: hour (hr)

The unit of measurement shall be an hourly rate to establish and operate plant and equipment.

The rates for plant shall, in addition, cover the cost of insurance, transport, hiring where required, consumable stores, fuel and maintenance.

4.2 Large plant establish and removal

Unit: kilometre (km)

The unit of measurement shall be a kilometre rate to supply a large and mobile plant.

The rate shall include charges for overheads, fuel, maintenance, charges and profit for the supply delivery, offloading, loading and removal etc. of a large plant including the delivery of all woven slings, steel rope steel chains, shackles etc. as required for rigging and lifting. The requirements for rigging and lifting equipment shall be the responsibility of the Contractor. The rates shall include full compensation for all costs related to traveling, inspecting and assessing the site.

4.3 Large plant operate and maintain

Unit: hour (hr)

The unit of measurement shall be an hourly rate to operate a large plant.

The rate shall include charges for overheads, fuel, maintenance, charges and profit including woven slings, steel rope, steel chains, shackles etc. as required for rigging and lifting. The requirements for rigging and lifting equipment shall be the responsibility of the Contractor.

4.4 Transport charges

Unit: kilometre (km)

The unit of measurement shall be a kilometre rate for the transport and delivery of materials, equipment or labour into storage or on the site (excluding large or mobile plant measured elsewhere). The rate shall include all charges including overheads such as fuel, maintenance charges, hire and rental cost, insurances, licensing and registration and profit etc. The tenderer may use and base the transport rate per unit on the **Automobile Association (AA) transport rates calculator**.

4.5 Labour charges

Unit: hour (hr)

The unit of measurement shall be an hourly rate to supply the required labour.

Rates include all incidental costs such as equipment, hand tools, power tools, PPE, safety equipment, medicals and all trade related training to comply with Occupational Health and Safety Act 85 of 1993 etc.

The tenderer may use and base the labour rate per unit on the **Building Industry Bargaining Council's wage schedules** or **SEIFSA indices tables** in determining the minimum labour rates.

The unit rates for labour and plant, or the percentage allowance for addition to the net cost of labour and materials shall cover overhead charges and profit, site supervision and site staff, Personal Protective Equipment (PPE), Inoculations (Hep A, Tetanus etc.), medical health evaluations, insurances, holidays with pay, and use and maintenance of tools and equipment. The rates or allowances shall also cover traveling allowances or traveling costs lodging allowances and any other emoluments and allowances payable to the workmen.

4.6 Detailed works programme and method statement

Unit: hour (hr)

The unit of measurement per works programmes and method statement.

4.7 Inspection reports

Unit: hour (hr)

The unit of measurement shall be the number of reports required by the City of Cape Town as per Clause 3.7 of this specification.

The rates shall include all costs associated with the site survey, submission of Contractor's documents, including submission of drawings, inspection and repair reports.

4.8 As Built information

Unit: hour (hr)

The unit of measurement shall be the number of sets of "as built" drawings required by the City of Cape Town for installations where no drawings are available:

Rates shall include all survey and drafting work required to produce a set of as built-drawings as per the requirements of the Standard Specifications for Electrical Work.

4.9 Installation, Operation and Maintenance Manual drafts

Unit: hour (hr)

The unit measurement shall be the number of sets (three documents per set) of draft copies of an Installation, Operation and Maintenance Manual prior to commissioning required by the City of Cape Town and for installations where no installation, Operation and Maintenance Manuals are available.

Rates shall include all work required to produce an installation, operation and maintenance manual as per the requirements of Standard Specifications for Electrical Work.

4.10 Installation, Operation and Maintenance Manual

Unit: hour (hr)

The unit of measurement shall be the number of sets (six copies per set) copies of an installation, Operation and Maintenance Manual prior to the issue of the Taking-Over Certificate required by the City of Cape Town and for installations where no Installation, Operation and Maintenance Manuals are available.

Rates shall include all work required to produce an installation, operation and maintenance manual for Standard Specifications for Electrical Work.

4.11 Operational and Maintenance Training

Unit: hour (hr)

The unit of measurement shall be per number officials for Operational and Maintenance Training

4.12 Remove existing equipment and materials

Unit: hour (hr)

The unit of measurement shall be the time worked on equipment and materials removed.

The rates shall include the complete dismantling, removal, re-instatement and installation of electrical components and parts.

4.13 Installation, testing and commissioning of works

Unit: hour (hr)

The unit of measurement shall be the time worked on equipment on City of Cape Town sites.

The tendered rates shall include full compensation for the installation, testing commissioning and making good all the damaged civil structures, including patching, plastering and painting where required.

Separate items will be listed in the Schedule of Rates for different types and sizes of equipment.

4.14 Alternative or equivalent offers to the specified brand, model and make

The contractor shall bear all costs when supplying an item of goods, part of goods and/or material when offering an alternative equivalent to the specified brand, model and make when such goods, parts of goods and/or material is found to be non-compatible with any existing electrical infrastructure. Any alternative equivalent supplied item shall be 100% compatible requiring zero modification to existing install base of plant and infrastructure. The contractor shall be solely and financially responsible to ensure the alternatively equivalent supplied item of goods, part of goods and/or material is installed to ensure 100% compatibility within 7 calendar days of when the Works Package Manager becomes aware of a non-compatibility issue. The installation of a modification will include all wiring and installation costs, updating of OEM manuals (6x copies at the cost of the contractor).

Engineering and Asset Management may not list or name brand names of electrical parts and components in the specification or pricing schedule, due to MFMA regulations, therefore it must be noted the contractor will make an allowance to supply any of the following listed brands for a particular electrical part or component, since this is the installed base in Water and Sanitation; Schneider Electric, Lovato, Siemens, ABB, Electro Mechanical supplied goods, ACDC supplied goods, Deep Sea Electric, Yaskawa, WEG, DELTA, AUMA, Greytork, ROTORK. Electrical parts and integrated components are designed and engineered to operate often in a cascading system. Such systems have been designed and factory tested to ensure its correct operation, integration, compatibility and the level of machine and human safety levels of protection.

Modifying electrical systems and designs with incompatible, untested combinations, untested and unverified combinations of parts may have a negative impact on performance and , Original Manufacturer Warranties, machine and human machine operator safety, which may lead to equipment undesired or non-performance, equipment damage, injury or loss of human life.

No alterations, additions, extensions and modifications to Works, general arrangement and design of electrical control systems will be allowed under this Contract, unless specifically instructed so by the Employer.

This implies that all equipment, parts and components offered, supplied, installed and fitted shall be 100% compatible with existing parts and components to ensure that absolutely no unauthorised modification is required when equivalent goods and parts supplied installed and fitted requires a modification which will result in a change or modification impacting on the design and integrity of the electrical design and installation.

Supplied parts and components which form part of an existing electrical control system and installation shall comply with;

Occupational Health and Safety Act 83 of 1993

Electrical Installation Regulations of 2009

SANS 10142-1 (Ed3)

SANS 61439 - Low-voltage switchgear and control gear assemblies - Part 3: Distribution boards intended to be operated by ordinary persons.

SANS 1973-1:2017 - Low-voltage switchgear and control gear ASSEMBLIES Part 1: Type-tested ASSEMBLIES with stated deviations and a rated short-circuit withstand strength above 10 kA.

4.15 Tender prices includes

All prices tendered shall factor in minor expenses, disbursements and costs per unit associated with sourcing and supplying parts or goods which include general internal administrative processes. It is generally accepted that transport to deliver the goods or parts to the City of Cape Town, excludes transport cost to deliver a product/s, which forms part of the scope of work developed by the respective Engineering and Asset Management maintenance section representative.

4.16 Provisional Sums and Prime Cost or Sub-Contract Allowances

This provision shall be subject to Supply Chain Management clauses 181 to 183 where the following clauses is expected to be used during the contract period due to the highly specialised nature and complex automation systems installed in Water and Sanitation;

SCM policy clause 181, Provision for monetary allowances shall as far as possible be avoided. Where these are unavoidable, the total value of such allowances shall not exceed 20% of the total estimated value of the tender unless otherwise approved by the Director: Supply Chain Management.

SCM policy clause 183. When monetary allowances of less than R300 000 have been included in the bid documents, and where the work or items to which the sums relate are to be executed/supplied by sub-contractors/suppliers, the supplier must be required to request a minimum of three written quotations for approval by the Responsible Agent.

SCM policy clause 1.82 "Responsible Agent" means either an internal project manager (being an employee of the City) or an external consultant (appointed by the City), as the case may be, who is responsible for the implementation of a project or part thereof.

CITY OF CAPE TOWN

HEALTH AND SAFETY SPECIFICATION AND PLAN FOR WORKS PACKAGE PROJECTS

6. PURPOSE:

In terms of the Construction Regulations 2003 of the Occupational Health and Safety Act, Act No. 85 of 1993 as amended, the Client must provide the Contractor with a Health and Safety Specification to which the Contractor must respond with a Health and Safety Plan for approval by the Client.

This document is intended to cater for the contracts up to one million rand in value by providing the Health and Safety Specification in table form to which the Contractor must respond by completing the last column, which is then deemed to constitute the Health and Safety Plan for this contract.

7. SCOPE:

This contract comprises: PROVISION OF MAINTENANCE AND PARTS FOR MOTOR CONTROL CENTRES AND ASSOCIATED ELECTRICAL CONTROL GEAR AT VARIOUS ENGINEERING AND ASSET MANAGEMENT (EAM) REGION 3 WATER AND SANITATION CITY OF CAPE TOWN SITES

8. GENERAL:

This specification covers health and safety matters applicable during construction.

The Contractor shall comply with the Occupational Health and Safety Act and Regulations, Act No. 85 of 1993 as amended (OHSA) and in particular with the Construction Regulations, 2003. In this regard refer also the Health and Safety Agreement and Conditions in terms of OHSA Section 37(2), attached to these contract documents.

All the work included in this Contract shall, for the purpose of complying with OHSA and the Construction Regulations, be deemed to be "construction work".

It should be noted that, with a few exceptions, the Standard Specifications and the Project Specifications are "end product specifications" and not "method specifications". As the methods of construction to be used are generally determined by the Contractor, detailed safety requirements applicable to all the operations to be carried out on Site are not provided in the project documentation. The Contractor shall apply all the relevant and/or amended regulations and requirements to the work methods and materials used.

CITY OF CAPE TOWN
HEALTH AND SAFETY SPECIFICATION AND PLAN FOR MINOR CONTRACTS
WITH AN ESTIMATED VALUE UP TO R1 000 000

Note: An * denotes items applicable to both construction sites and contractors plant/storage yards

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CITY OF CAPE TOWN
HEALTH AND SAFETY SPECIFICATION AND PLAN FOR MINOR CONTRACTS
WITH AN ESTIMATED VALUE UP TO R1 000 000

Note: An * denotes items applicable to both construction sites and contractors plant/storage yards

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- ◆ ERW9: MHIR6: *Emergency Drill & Evacuation
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- ◆ GSR2: *Head Protection
- ◆ GSR2: *Foot Protection
- ◆ GSR2: *Eye and Face Protection
- ◆ GSR2: *Hearing Protection
- ◆ GSR2: *Hand Protection
- ◆ GSR2: *Respiratory Protection
- ◆ GSR2: *Fall Prevention Equipment
- ◆ GSR2: *Protective Clothing
- ◆ GSR2: *PPE Issue & Control

CITY OF CAPE TOWN
HEALTH AND SAFETY SPECIFICATION AND PLAN FOR MINOR CONTRACTS
WITH AN ESTIMATED VALUE UP TO R1 000 000

Note: An * denotes items applicable to both construction sites and contractors plant/storage yards

ABBREVIATIONS AND DEFINITIONS:

COID	-	Compensation for Occupational Injuries and Diseases
CR	-	Construction Regulations
DMR	-	Driven Machinery Regulations
EMR	-	Electrical Machinery Regulations
GAR	-	General Administrative Regulations
GSR	-	General Safety Regulations
H&S	-	Health and Safety
HCS	-	Hazardous Chemical Substance
MHIR	-	Major Hazard Installation Regulations
OHSA	-	Occupational Health and Safety Act and Regulations, Act No. 85 of 1993 as amended
RA	-	Risk assessment
RHCS	-	Regulations for Hazardous Chemical Substances
Sect	-	Section of the Occupational Health and Safety Act
Site	-	Means the demarcated construction site
VUP	-	Vessels under Pressure
VUPR	-	Vessels under Pressure Regulations
WCL1 Form	-	Form to be completed for every work related disease requiring medical treatment that may lead to COID claims.
WCL2 Form	-	Form to be completed for every work related injury requiring medical treatment that may lead to COID claims.

1. ADMINISTRATIVE & LEGAL REQUIREMENTS

OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
CR 3(1): Notice of carrying out Construction work	The Department of Labour must be notified, if applicable. A copy of notice must be available on site.			
CR 4: Appointment of Contractors and H&S Specification by Client	The Client shall appoint each principal Contractor in writing and prepare a H&S Specification for each construction project and inform the contractors of any specific risks to the health and safety of the construction workers on Site.			
CR 4: *Registration with Compensation Insurer	Each Contractor must be registered with an approved compensation insurer and the Client must verify that proof of registration/letter of good-standing is available on Site	Yes		
CR 5: Contractor and Sub-contractor's H&S Plans	H&S Specifications received from the Client must be provided to sub-Contractors. H&S Plans must be completed by Contractor and sub-contractors and submitted for approval by the Client.	Yes		
CR 6(1): Designation of person responsible for the construction site	A competent employee shall be appointed in writing as Construction Supervisor.			
CR 6(2): Designation of Assistant for above	A competent employee shall be appointed in writing as Assistant Construction Supervisor.			
OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN

CITY OF CAPE TOWN
HEALTH AND SAFETY SPECIFICATION AND PLAN FOR MINOR CONTRACTS
WITH AN ESTIMATED VALUE UP TO R1 000 000

Note: An * denotes items applicable to both construction sites and contractors plant/storage yards

CR7: *Risk Assessment	A competent person must be appointed to manage the Risk Assessment and Plan. Risk Assessment Plan must be available on Site. Employees / Sub-Contractors must be informed and trained.	Yes		
CR 8: Fall prevention and protection	A competent person shall be appointed to draw-up and supervise the Fall Protection Plan. Risk Assessment must be carried out for work at heights. The Fall Protection Plan must be available on Site with the Construction Supervisor.	Yes		
CR 8(5): Roof work	In the case of roof work the Fall Protection Plan must include the Risk Assessment for the roof work. The roof work structures and safety equipment must be inspected before each shift. Employees must be medically examined for physical and psychological fitness and trained for the tasks.	Yes		
CR 9: Structures	The following information must be available on Site: Drawings of the structure being erected received from the Designer including: • Geo-science technical report where appropriate. • The design loading of the structure. • The methods and sequence of construction. • Anticipated dangers /hazards			

CITY OF CAPE TOWN
HEALTH AND SAFETY SPECIFICATION AND PLAN FOR MINOR CONTRACTS
WITH AN ESTIMATED VALUE UP TO R1 000 000

Note: An * denotes items applicable to both construction sites and contractors plant/storage yards

OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
CR 9: Structures Continued	Risk Assessment must be carried out and a Methods Statement drawn-up. Structures must be inspected before each shift. Inspections register must be kept.	Yes		
CR 10: Formwork & Support Work	Competent person must be appointed in writing to supervise the erection, maintenance, use and dismantling of Support & Formwork. Design drawings must be available on site. Risk Assessment must be carried out. Support & formwork must be inspected: • Before use for suitability. • Before and after pouring of concrete. • Daily whilst in place. • Before stripping/dismantling. An Inspection register must be kept for the above.			
CR 11: Excavations	Competent person/s must be appointed in writing to supervise and inspect excavation work. Risk Assessment must be carried out. Excavations must be inspected: • Before every shift and after rain. • After any blasting. • After an unexpected fall of ground. • After any substantial damage to the shoring.	Yes		

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	A Method Statement must be developed where explosives will be used.			
CR 12: Demolition Work	Competent person/s must be appointed in writing to supervise and control Demolition work.			
OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
CR 12: Demolition Work Continued.	Engineering survey and Method Statement must be available on site. Inspections to prevent premature collapse must be carried out by the competent person before each shift and an inspection register kept.			
CR 13: Tunnelling Mine H&S Act	Tunnelling shall comply with Mines Health & Safety Act (29 of 1996).			
CR 14: Scaffolding	Competent persons must be appointed in writing to supervise: - Erection of scaffolding. - Act as Scaffold Engineering and Asset Management (EAM) Leaders. - Inspect Scaffolding weekly and after inclement weather. Copy of SABS 085 must be available on Site. The scaffolding must be Inspected weekly and after bad weather. Inspection register/s must be kept.	Yes		

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CR 15: Suspended Platforms	Certificate of system design must be issued by a registered professional engineer available on site; A copy must be forwarded to the Provincial Director. Employees working on Suspended Platform must be medically examined for physical & psychological fitness and be trained for the task. Written proof must be available on Site.			
OHS REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
CR 15: Suspended Platforms, continued	The following performance and safety test of the whole installation must be carried out by an appointed competent persons: • After erection and before use. • Daily prior to use. • Load test of whole installation and working parts every 12 months. • Hoisting ropes / hooks / load attaching devices quarterly Test log book and register must be kept and be available on Site.			
CR 16: Boatswain's Chair	The Contractor shall ensure that each boatswain's chair: ◆ Is inspected and tested prior to use the first time ◆ Is securely suspended ◆ Constructed to prevent persons from falling out ◆ Is inspected daily before use			

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	An inspection record must be kept.			
CR 17: Material Hoists	Competent person must be appointed in writing to inspect Material Hoists. The competent person must inspect the Material Hoists weekly. Inspection registers must be kept.			
CR 18: Batch Plants	A Competent person must be appointed to supervise the operation, maintenance and safety of Batch Plants and execute the requirements stipulated in CR18(2) through to CR18(11)			
OHS REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
CR 19: Explosive Powered Tools	Competent person must be appointed to control the issue and the service, maintenance and cleaning of the explosive powered tools & cartridges. Registers must be kept of above. Empty cartridge cases/nails/fixing bolts returned must be recorded. The tools must be cleaned daily after use.			
CR 20: Cranes DMR 18: Lifting Equipment and Tackle	The Contractor must ensure compliance regarding the placement and operation of tower cranes. All Cranes, Lifting Equipment and Tackle must be identified, numbered and registers kept. A Log Book must be kept for each individual Crane	Yes		

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	and inspected as follows: • All cranes - Daily by operator • Tower Cranes - after erection and 6 monthly • Other cranes – after erection and annually • Lifting tackle - 3 monthly (i.e. slings / ropes / chain slings etc.)			
CR 21: Construction Vehicles & Earth Moving Equipment	Only competent Operators/Drivers must be appointed. Vehicles must be used in accordance with the vehicles designed capabilities. Routes and road signs on Site must be appropriate and safe. Vehicles must be inspected daily by an appointed competent person and maintained fit for service. Registers must be kept for inspections carried out and maintenance work done. Warning signs must be clear and visible for vehicles parked at night near public roads.			
OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
CR 22: Electrical Installations and Machinery on Construction Sites	A competent person must be appointed in writing to inspect/test the temporary electrical installations and machinery. Inspections: • Electrical Installation & equipment inspected after installation, after alterations and weekly. • Machinery – daily before use An inspection register must be kept.	Yes		

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	Portable electric tools, lights and extension leads must be identified / numbered. Monthly visual inspections must be done by User / Issuer / Store man and registers kept.			
CR 23: *Use and temporary storage of flammable liquids on construction sites	The construction supervisor must ensure the safe usage and storage of flammable liquids, adequate ventilation for storage and smoking / open flames prohibited in the vicinity of flammable liquids and vapours.			
CR 24: Water Environments	A contractor shall ensure that where construction is done over or in close proximity to water, provision is made for: a) Preventing workers from falling into water; and b) The rescuing of workers in danger of drowning. A life jacket is provided if there is a risk of falling into water and drowning.	Yes		
OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
CR 25: Housekeeping on Construction Sites	A contractor shall ensure: • Proper storage • Scrap removal • No unnecessary obstructions by loose materials • Site is fenced off • Catch platforms or nets erected where necessary	Yes		

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CR 26: *Stacking & Storage on Construction Sites	Competent Person/s with specific knowledge and experience designated to supervise all Stacking & Storage. Written Proof of Competence of above appointee available on Site.			
CR27: Fire precautions on Construction Sites	Person/s with specific knowledge and experience must be designated to co-ordinate emergency contingency planning and fire prevention measures. A Fire Risk Assessment must be carried out and the appropriate precautions taken to prevent fires and pollution of the environment. All Fire extinguishing equipment must be identified and listed on registers. Inspection of fire extinguishing equipment must be carried out monthly. Inspection registers must be kept. Fire extinguishers must be serviced annually.	Yes		
CR 28(1): Construction Welfare Facilities	The Contractor shall provide the necessary ablution, toilet and sheltered eating facilities on Site. Where necessary living accommodation shall also be provided.			
OHS REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
AR 11: Control of exposure to Asbestos	The Provincial Director shall be advised of any asbestos work to be undertaken. A risk assessment shall be done Employees shall be trained Air shall be monitored as required			

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	Each asbestos worker shall be monitored medically Written Work Procedures shall be available prior to the commencement of asbestos work			
DR 7: Control of Diving Operations	Diving Supervisor must be appointed in writing to Supervise Diving Operations. Proof of registration of all divers present on site must be available. Risk Assessment must be carried out. The Diving Operations Manual must be available on Site. A record of Voice Communications must be kept. Each Diver must keep a personal logbook. The Diving Supervisor must countersign entries. Decompression tables must be available on Site. A certificate of Manufacture for Compression Chambers or Diving Bells in use must be available on Site.			
(GAR)(2) (9): * Recording and of Investigation Incidents	All injuries, which resulted in the person receiving medical treatment other than first aid, shall be recorded and investigated within 7 days by an investigator designated in writing. Copies of Reports (Annexure 1) must be available on Site. All incidents must be tabled at the H&S Committee meeting. The Site Construction Supervisor and Management must take the necessary actions recommended by the H&S Committee.	Yes		

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OHS REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
GSR 2: Personal Safety Equipment (PSE)	A Risk Assessment shall be carried out to determine the requirement for personal safety equipment. The wearing or use of identified PSE shall be enforced. Records of PSE issued must be kept. A written undertaking by each employee to use/wear PSE must be kept on Site.	Yes		
GSR 3: *First Aid	Every workplace must be provided with a sufficient number of First Aid boxes. (Required where 5 persons or more are employed). A minimum of First Aid equipment must be provided as per the list in the OHS Act, GSR 3 (annexure). One qualified First Aider must be appointed for every 50 employees. (Required where more than 10 persons are employed). A list of First Aiders and Certificates must be kept on Site. Location of First Aid boxes and person responsible must be clearly indicated. Signs instructing employees to report all injuries and illness, including first aid injuries, must be displayed.	Yes		
GSR9:	Only trained competent employees with specific knowledge and experience may be	Yes		

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*Welding, flame cutting, soldering and similar operations	appointed to do Electric Arc, Gas Welding and Flame Cutting operations. No welding or flame cutting operations may be allowed in confined spaces before all the necessary precautions have been taken for the safety of the welding operators.			
OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
GSR 13A: *Inspection of Ladders	Ladders must be inspected at arrival on site and monthly thereafter. Inspection registers must be kept.	Yes		
GSR 13B: Ramps	The Contractor must ensure that Ramps are constructed as per the requirements of GSR 13B. Design calculations and inspection certificate of compliance must be available on site.			
HCSR 10: Control of exposure to HCS	Exposure to HCS shall be prevented, or adequately controlled, or limited by introducing appropriate work procedures. The emission of an HCS shall be limited in accordance with the Atmospheric Pollution Prevention Act, 1965	Yes		
Sect 16(2): *Assigned duties (Managers)	CEO must assign the responsibility of complying with the OHSA to sub-ordinates on the Construction Site. Appointment letters must be available on Site.			
Sect 17 & 18: GAR 6 & 7:		Yes		

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*Designation of Occupational Health & Safety Representatives	H&S Representatives (Reps) must be appointed as follows: More than 20 employees – One H&S Rep plus one additional H&S Rep for every 50 employees or part thereof. Designations must be in writing and the period and area of responsibility specified. H&S Reps must report to the H&S Committees. Reports must receive management's attention and necessary action.			
OHS REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
Sect 19 & 20: GAR(2) 5: *Occupational Health and Safety Committee/s	OH&S Committee/s must be established. Members must be elected and appointed in writing. Meetings must be held monthly (Minimum 3-monthly). Minutes must be kept – Management must take appropriate action regarding non-compliances reported.			
Sect 24: GAR 8: COID Act Sect 38, 39 & 41: *Reporting of incidents	Incident Reporting Procedure must be displayed. All incidents in terms of Sect 24 must be reported to the Provincial Director, Department of Labour, within 3 days re Annexure 1 and WCL1/ 2 forms. Cases of Occupational Disease must be reported. Copies of Reports must be kept available on Site.	Yes		

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	Register of First Aid Injuries must be available on Site.			
Section 37(2): *H&S Agreement with Employer and Mandataries	Written H&S Agreements must be concluded with the Employer and each Sub-Contractor prior to moving onto Site. Proof of registration with a Compensation Insurer and a letter of good standing must be provided when the H&S Agreements are submitted for signature.	Yes		
VUPR 13: Vessels under Pressure (VUP)	All pressure vessels installed on Site during construction must be listed and comply with the inspection and pressure tests specified in OHS Regulation VUPR13.			

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2. EDUCATION & TRAINING

OHS REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
Sect 7 (1) *Company H&S Policy	The Contractors H&S Policy, signed by the CEO, must be circulated to the employees and displayed on the employee notice boards. Re-assurance must be given that safety receives the same priority as reaching the construction goals, budget control and cost saving.	Yes		
Sect 13 (a): *Company/Site H&S Rules	The H&S rules must be published and displayed on the employee notice boards. The rules must be issued and explained to the employees during the induction courses and a register kept. Monthly audits must be done to ensure the employees understand and adhere to the rules.	Yes		
Sect 13(a) *Induction & Task Safety Training	All new employees must receive H&S induction training. Training must include "Task Safety Instructions". Employees must acknowledge receipt of training. An Induction Training register must be kept on Site.	Yes		

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Sect 8: * General H&S Training	All employees must receive basic H&S training. Written proof must be kept on a register. Operators of Plant & Equipment must receive specialised training.	Yes		
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3. PUBLIC SAFETY, SECURITY MEASURES & EMERGENCY PREPAREDNESS

OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
ERW9: MHIR 6: *Emergency Preparedness	Contractor shall liaise with Client and compile an Emergency Response Plan based on risks identified for the project. The Emergency Response Plan shall be made available to all on Site. Emergency contact numbers shall be displayed near telephones. Emergency evacuation instructions shall be posted up on all notice boards	Yes		
ERW9: MHIR 6: *Emergency Drill & Evacuation	An adequate number of employees shall be trained to use Fire equipment. The Emergency Response Plan must be available, displayed and practised at regular intervals (depending on the duration or the Contract).	Yes		

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GSR2C: Admittance of persons	“No Unauthorised Entry” notice & signs shall be placed at entrances and along perimeters. Notice & signs shall be placed at the entrance instructing visitors and non-employees to report to the Site Manager’s office e.g. “Visitors to report to Manager’s Office” Notices & Signs shall be posted to warn of overhead work and other hazardous activities i.e. general warning signs.			
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OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
GSR2C: Admittance of persons, continued	Access control measures: • Register kept of all visitors. • Security patrols after hours/weekdays. • Sufficient lighting after dark. • Guard has access to telephone/other means of emergency communication.			
GSR2: Personal equipment facilities safety and	The Contractor shall provide the following if applicable: Nets, Canopies, Stalls, Fans etc. to protect employees and members of the public passing or entering the Site.	Yes		

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4. PERSONAL PROTECTIVE EQUIPMENT

OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
GSR 2: *PPE needs analysis	The Contractor shall determine the PPE required for each task of the project and prescribe the use of PPE in writing.	Yes		
GSR 2: *Head Protection	All persons on Site shall wear Safety Helmets including Sub-Contractors and Visitors (where prescribed).	Yes		
GSR2 *Foot Protection	All persons on Site shall wear Safety Footwear including Gumboots for concrete/wet work and non-slip shoes for roof work (where prescribed).	Yes		
GSR2: *Eye and Face Protection	Eye and Face Protection (Goggles, Face Shields, Welding Helmets etc.) shall be used when operating the following: • Jack / Kango Hammers • Angle / Bench Grinders • Electric Drills. • Explosive Powered tools. • Concrete Vibrators / Pokers. • Hammers & Chisels • Skill / Bench Saws. • Lathes.	Yes		
OHSA REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN

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GSR 2: *Hearing Protection	Hearing Protectors (Muffs, Plugs etc.) shall be used when operating the following: • Jack / Kango Hammers. • Explosive Powered Tools. • Wood / Aluminium Working Machines e.g. saws, planers, routers.	Yes		
GSR2: *Hand Protection	Protective Gloves shall be worn by employees handling / using: • Cement / Brick / Steel / Chemicals • Welding Equipment. • Hammers & Chisels. • Jack / Kango Hammers etc. ...	Yes		
GSR2: * Respiratory Protection	Suitable/efficient respiratory protection shall be worn by employees handling / using: • Dry cement. • Dusty areas • Hazardous chemicals • Angle Grinders • Spray Painting etc. ...	Yes		

OHS REF & TOPIC	REQUIREMENTS	APPLICABLE YES // NO	PROJECT SPECIFIC H&S SPECIFICATION	CONTRACTOR H&S PLAN
GSR 2: *Fall Prevention Equipment	Suitable Safety Belts / Fall Arrest Equipment shall be used by persons working on / in unguarded, elevated positioning e.g. : • Scaffolding • Riggers • Lift shafts. • Edge work. • Ring engineering and Asset Management (EAM) edges etc... Other methods of fall prevention shall be applied, e.g. catch nets, if necessary.	Yes		
GSR 2: *Protective Clothing	All jobs requiring protective clothing (overalls, rain wear, welding aprons etc.) shall be identified and the clothing worn.	Yes		
GSR 2: *PPE Issue & Control	Identified Equipment shall be issued free of charge by the Contractor/s All PPE shall be maintained in good condition. (Regular checks). Workers shall be instructed in the proper use & maintenance of PPE. Commitment shall be obtained from each employee, accepting the conditions and to wear the PPE as required. Record of PPE issued shall be kept on file.	Yes		

NAME OF CONTRACTOR: _____ SIGNATURE OF CONTRACTOR: _____ DATE: _____

a) Monthly Project Labour Report (**Annexed**).

Not applicable to this tender.

The Monthly Project Labour Report must include details of all labour (including that of sub-contractors) that are South African citizens earning less than R350.00 per day, as adjusted from time to time (excluding any benefits), who are employed on a temporary or contract basis on this contract in the month in question.

In addition to the Monthly Project Labour Report the Supplier shall simultaneously furnish the CCT's Agent with copies of the employment contracts entered into with such labour, together with certified copies of identification documents, proof of attendance in the form of attendance register or timesheets as well as evidence of payments to such labour in the form of copies of payslips or payroll runs. If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it and proof of such acknowledgement shall be furnished to the CCT's Agent.

(14) MONTHLY PROJECT LABOUR REPORT (EXAMPLE)

Not applicable to this tender

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ANNEX 1

CITY OF CAPE TOWN
MONTHLY PROJECT LABOUR REPORT



CITY OF CAPE TOWN
 ISIXEKO SASEKAPA
 STAD KAAPSTAD

Instructions for completing and submitting forms

General

- 1 The Monthly Project Labour Reports must be completed in full, using typed, proper case characters; alternatively, should a computer not be available, handwritten in black ink.
- 2 Incomplete / incorrect / illegible forms will not be accepted.
- 3 Any conditions relating to targeted labour stipulated in the Contract (in the case of contracted out services or works) shall apply to the completion and submission of these forms.
- 4 This document is available in Microsoft Excel format upon request from the City's EPWP office, tel 021 400 9406, email EPWPLR@capetown.gov.za.

Project Details

- 5 If a field is not applicable insert the letters: NA
- 6 Only the Project Number supplied by the Corporate EPWP Office must be inserted. The Project Number can be obtained from the Coordinator or Project Manager or from the e-mail address in point 4 above.
- 7 On completion of the contract or works project the anticipated end date must be updated to reflect the actual end date.

Beneficiary Details and Work Information

- 8 Care must be taken to ensure that beneficiary details correspond accurately with the beneficiary's ID document.

- 9 A new beneficiary is one in respect of which a new employment contract is signed in the current month. A certified ID copy must accompany this labour report on submission.
- 10 Was the beneficiary sourced from the City's job seeker database?
- 11 The contract end date as stated in the beneficiary's employment contract.
- 12 Where a beneficiary has not worked in a particular month, the beneficiary's name shall not be reflected on this form at all for the month in question.
- 13 Training will be recorded separately from normal working days and together shall not exceed the maximum of 23 days per month
- 14 Workers earning more than the maximum daily rate (currently R450 excluding any benefits) shall not be reflected on this form at all.

Submission of Forms

- 15 Signed hardcopy forms must be scanned and submitted to the City's project manager in electronic (.pdf) format, together with the completed form in Microsoft Excel format.
- 16 Scanned copies of all applicable supporting documentation must be submitted along with each monthly project labour report. Copies of employment contracts and ID documents are only required in respect of new beneficiaries.
- 17 If a computer is not available hardcopy forms and supporting documentation will be accepted.

PROJECT DETAILS

Numbers in cells below e.g (6) refer to the relevant instruction above for completing and submitting forms

CONTRACT OR WORKS PROJECT NAME: (6)		EPWP SUPPLIED PROJECT NUMBER: (6)	
DIRECTORATE:		DEPARTMENT:	
CONTRACTOR OR VENDOR NAME:		CONTRACTOR OR VENDOR E-MAIL ADDRESS:	
CONTRACTOR OR VENDOR CONTACT PERSON:		CONTRACTOR OR VENDOR TEL. NUMBER:	CELL WORK
PROJECT LABOUR REPORT CURRENT MONTH (mark with "X")			
JAN	FEB	MAR	APR
MAY	JUN	JUL	AUG
SEP	OCT	NOV	DEC
YEAR			
ACTUAL START DATE (yyyy/mm/dd)		ANTICIPATED / ACTUAL END DATE (yyyy/mm/dd) (7)	
TOTAL PROJECT EXPENDITURE / VALUE OF WORK DONE TO-DATE (INCLUDING ALL COSTS, BUT EXCLUDING VAT)			
R			

CITY OF CAPE TOWN
HEALTH AND SAFETY SPECIFICATION AND PLAN FOR MINOR CONTRACTS
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ANNEX 1 (continued)

MONTHLY PROJECT LABOUR REPORT

BENEFICIARY DETAILS AND WORK INFORMATION



CONTRACT OR WORKS				Year		Month		Sheet				
PROJECT NUMBER:								1 of				

No.	(8) First name	(8) Surname	(8) ID number	(9) New Beneficiary (Y/N)	Gender (M/F)	Disabled (Y/N)	(10) Job seeker database (Y/N)	Contract start date (DDMMYY)	(11) Contract end date (DDMMYY)	(12) No. days worked this month (excl. training)	(13) Training days	(14) Rate of pay per day (R – c)
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
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Declared by Contractor or Vendor to be true and correct:	Name		Signature	
	Date			

Received by Employer's Agent / Representative:	Name		Signature	
	Date			