



SUPPLY OF GOODS AND SERVICES CONTRACT

Bid for the supply of services for City Power
Johannesburg (SOC) Ltd

REQUEST FOR BID

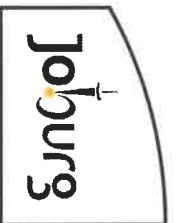
Bid no: 2480GS

**REQUEST FOR BID FOR . DESIGN, SUPPLY,
INSTALLATION & COMMISSIONING OF SOLAR
ROOFTOP PV & BATTERY STORAGE SYSTEMS FOR
CITY POWER**

COMPANY NAME: _____

Closing Date: 21 OCTOBER 2022

Time: 11h00



40 Herommere Road
Reuven
Johannesburg

P.O.Box 38766
BooySENS
2016

Tel +27(0) 11 490 7000
Fax +27(0) 11 490 7590

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 - Valid Tax Clearance Certificate or SARS Pin
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1.1 TENDER NOTICE AND INVITATION TO TENDER

YOU ARE HEREBY INVITED TO BID FOR REQUIREMENTS OF CITY POWER JOHANNESBURG SOC.					
BID NUMBER:	2480GS	CLOSING DATE:	21 OCTOBER 2022	CLOSING TIME:	11:00
DESCRIPTION	REQUEST FOR BID FOR DESIGN, SUPPLY, INSTALLATION & COMMISSIONING OF SOLAR ROOFTOP PV & BATTERY STORAGE SYSTEMS FOR CITY POWER				
THE SUCCESSFUL BIDDER WILL BE REQUIRED TO FILL IN AND SIGN A WRITTEN CONTRACT FORM (MBD7).					
BID RESPONSE DOCUMENTS MAY BE DEPOSITED IN THE BID BOX SITUATED AT (STREET ADDRESS) City Power Tender Advice Centre					
40 Heronmere Road					
Reuven					
Johannesburg					
Bidders should ensure that bids are delivered timeously to the correct address. If the bid is late, it will not be accepted for consideration. The bid box is generally open 24 hours a day, 7 days a week.					
SUPPLIER INFORMATION					
NAME OF BIDDER					
POSTAL ADDRESS					
STREET ADDRESS					
TELEPHONE NUMBER	CODE		NUMBER		
CELLPHONE NUMBER					
FACSIMILE NUMBER	CODE		NUMBER		
E-MAIL ADDRESS					
VAT NUMBER	REGISTRATION				
TAX COMPLIANCE STATUS	TCS PIN:		OR	CSD No:	
B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE [TICK APPLICABLE BOX]	<input type="checkbox"/> Yes <input type="checkbox"/> No	B-BBEE STATUS LEVEL SWORN AFFIDAVIT	<input type="checkbox"/> Yes <input type="checkbox"/> No		
[A B-BBEE STATUS LEVEL VERIFICATION CERTIFICATE/ SWORN AFFIDAVIT (FOR EMES & QSES) MUST BE SUBMITTED IN ORDER TO QUALIFY FOR PREFERENCE POINTS FOR B-BBEE]					
ARE YOU THE ACCREDITED REPRESENTATIVE IN SOUTH AFRICA FOR THE GOODS /SERVICES /WORKS OFFERED?	<input type="checkbox"/> Yes <input type="checkbox"/> No [If YES ENCLOSE PROOF]		ARE YOU A FOREIGN BASED SUPPLIER FOR THE GOODS /SERVICES /WORKS OFFERED?	<input type="checkbox"/> Yes <input type="checkbox"/> No [If YES, ANSWER PART B:3]	
TOTAL NUMBER OF ITEMS OFFERED		TOTAL BID PRICE	R		
SIGNATURE OF BIDDER		DATE		
CAPACITY UNDER WHICH THIS BID IS SIGNED					
BIDDING PROCEDURE ENQUIRIES MAY BE DIRECTED TO:			TECHNICAL INFORMATION MAY BE DIRECTED TO:		
DEPARTMENT	SCM	CONTACT PERSON			
CONTACT PERSON	Prudence Hlatshwayo	TELEPHONE NUMBER			
TELEPHONE NUMBER	011 490 7592	FACSIMILE NUMBER			
FACSIMILE NUMBER		E-MAIL ADDRESS			
E-MAIL ADDRESS	phlatshwayo@citypower.co.za				

Note: technical questions received after the 07 October 2022 after 17:00 will not be answered

PART B TERMS AND CONDITIONS FOR BIDDING

1. BID SUBMISSION:

- 6.1. BIDS MUST BE DELIVERED BY THE STIPULATED TIME TO THE CORRECT ADDRESS. LATE BIDS WILL NOT BE ACCEPTED FOR CONSIDERATION.
- 6.2. **ALL BIDS MUST BE SUBMITTED ON THE OFFICIAL FORMS PROVIDED-(NOT TO BE RE-TYPED) OR ONLINE**
- 6.3. THIS BID IS SUBJECT TO THE PREFERENTIAL PROCUREMENT POLICY FRAMEWORK ACT AND THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017, THE GENERAL CONDITIONS OF CONTRACT (GCC) AND, IF APPLICABLE, ANY OTHER SPECIAL CONDITIONS OF CONTRACT.

2. TAX COMPLIANCE REQUIREMENTS

- 2.1 BIDDERS MUST ENSURE COMPLIANCE WITH THEIR TAX OBLIGATIONS.
- 2.2 BIDDERS ARE REQUIRED TO SUBMIT THEIR UNIQUE PERSONAL IDENTIFICATION NUMBER (PIN) ISSUED BY SARS TO ENABLE THE ORGAN OF STATE TO VIEW THE TAXPAYER'S PROFILE AND TAX STATUS.
- 2.3 APPLICATION FOR THE TAX COMPLIANCE STATUS (TCS) CERTIFICATE OR PIN MAY ALSO BE MADE VIA E-FILING. IN ORDER TO USE THIS PROVISION, TAXPAYERS WILL NEED TO REGISTER WITH SARS AS E-FILERS THROUGH THE WEBSITE WWW.SARS.GOV.ZA.
- 2.4 FOREIGN SUPPLIERS MUST COMPLETE THE PRE-AWARD QUESTIONNAIRE IN PART B: 3.
- 2.5 BIDDERS MAY ALSO SUBMIT A PRINTED TCS CERTIFICATE TOGETHER WITH THE BID.
- 2.6 IN BIDS WHERE CONSORTIA / JOINT VENTURES / SUB-CONTRACTORS ARE INVOLVED, EACH PARTY MUST SUBMIT A SEPARATE TCS CERTIFICATE / PIN / CSD NUMBER.
- 2.7 WHERE NO TCS IS AVAILABLE BUT THE BIDDER IS REGISTERED ON THE CENTRAL SUPPLIER DATABASE (CSD), A CSD NUMBER MUST BE PROVIDED.

3. QUESTIONNAIRE TO BIDDING FOREIGN SUPPLIERS

- 3.1. IS THE ENTITY A RESIDENT OF THE REPUBLIC OF SOUTH AFRICA (RSA)? ☐
YES ☐ NO
- 3.2. DOES THE ENTITY HAVE A BRANCH IN THE RSA? ☐ YES ☐ NO
- 3.3. DOES THE ENTITY HAVE A PERMANENT ESTABLISHMENT IN THE RSA? ☐
YES ☐ NO
- 3.4. DOES THE ENTITY HAVE ANY SOURCE OF INCOME IN THE RSA? ☐
YES ☐ NO
- 3.5. IS THE ENTITY LIABLE IN THE RSA FOR ANY FORM OF TAXATION? ☐
YES ☐ NO

IF THE ANSWER IS "NO" TO ALL OF THE ABOVE, THEN IT IS NOT A REQUIREMENT TO REGISTER FOR A TAX COMPLIANCE STATUS SYSTEM PIN CODE FROM THE SOUTH AFRICAN REVENUE SERVICE (SARS) AND IF NOT REGISTER AS PER 2.3 ABOVE.

**NB: FAILURE TO PROVIDE ANY OF THE ABOVE PARTICULARS MAY RENDER THE BID INVALID.
NO BIDS WILL BE CONSIDERED FROM PERSONS IN THE SERVICE OF THE STATE.**

SIGNATURE OF BIDDER:

.....

CAPACITY UNDER WHICH THIS BID IS SIGNED:

.....

DATE:

.....

**ANY ENQUIRIES REGARDING THE BIDDING PROCEDURE MAY BE DIRECTED TO:
Municipality / Municipal Entity: City Power**

Department: Supply Chain Management

Contact Person: Prudence Hlatshwayo

Tel: 011 490 7592

Fax: 011 870 3856

E-mail: Phlatshwayo@citypower.co.za

**BIDDERS MAY SUBMIT WRITTEN REQUESTS FOR CLARIFICATIONS REGARDING TECHNICAL
INFORMATION TO:**

Prudence Hlatshwayo

Tel: 011 490 7592

Fax: 011 870 3856

E-mail: phlatshwayo@citypower.co.za

*Enquiries will close at 17h00 on Friday, 07 October 2022; City Power will not be obliged to respond to any queries
received after this date*

REPORT FRAUD AND CORRUPTION TO EITHER OF THE FOLLOWING SERVICES;

TOLL FREE – 0800 002 587

FAX – 0800 007 788

E-mail: anticorruption@tip-offs.com

1.2 TENDER DATA

The conditions of tender are the Standard Conditions of Tender as contained in Annex F of the CIDB Standard for Uniformity in Construction Procurement (July 2015). ([See \[www.cidb.org.za\]\(http://www.cidb.org.za\)](http://www.cidb.org.za))

The Standard Conditions of Tender make several references to the Tender Data for details that apply specifically to this tender. The Tender Data shall have precedence in the interpretation of any ambiguity or inconsistency between it and the standard conditions of tender. Each item data given below is cross-referenced to the clause in the Standard Conditions of Tender to which it mainly applies.

The CIDB Standard Condition of Tender, as contained in Annex F of the Standard for Uniformity published in July 2015 are included in this document.

F1.1 The employer is City Power Johannesburg (SOC) Ltd

F1.2 The employer's agent is:

Name: Prudence Hlatshwayo

Address: 40 Heronmere Road, Booysens, Johannesburg

Tel: 011 490 7592

Fax: 011 870 3856

E-mail: phlatshwayo@citypower.co.za

F2.1 Only those bidders who satisfy the eligibility criteria are eligible to submit tenders and the tenderer, or his principals, is not under any restriction to do business with employer

F2.2 The arrangements for a NON-COMPLSORY clarification meeting are: **NOT APPLICABLE**
F2.3 Parts of each tender offer communicated shall be submitted as an original, plus two copies and a Memory Stick of the whole tender submission

City Power Johannesburg reserves the right to award the bid to a **maximum of one (1) Bidder**; these bidders must comply with the Pre-qualification criteria and achieve the minimum threshold for the functionality.

F2.12 If a tenderer wishes to submit an alternative offer, the only criteria permitted for such alternative offer is that it demonstrably satisfies the Employer's standards and requirements, the details of which may be obtained from the Employer's agent.

Acceptance of an alternative offer will mean acceptance in principle of the offer. It will be an obligation of the contract for the tenderer, in the event that the alternative is accepted, to accept full responsibility and liability that the alternative offer complies in all respects with the Employer's standards and requirements.

F2.13.2 Return all returnable documents after completing and signing them in their entirety

F2.13.5 The employer's address for delivery of tender offer and identification details to be shown on each tender offer package are:

Location of tender box: City Power Head Office Tender Advice Centre

Physical address: 40 Heronmere Road, Reuven

Identification details: Tender no: 2480GS

Postal address: P.O. Box 38766, Booysens, 2016

F2.13.6 A two envelope system will not be followed

F2.15 The closing time for submission of tender offers is as stated in the Notice and Invitation to Tender. Telephonic, telegraphic, telex, facsimile or e-mailed tender offers will not be accepted.

SUB-CONTRACTING

a) This contract will have a requirement of no less than 30% subcontracting, which is limited to either EME or QSE as a pre-qualifying criteria as set out in the PPPFA section 4.(1)(b) and will thus be allowed to advance to the next phase of the evaluation.

b) The main contractor must ensure that the following documents for the intended subcontractor is supplied as part of the bid, failure will result in disqualification:

c) TAX Pin

d) CSD number

e) Municipal account not in arrears for more than 90 days

f) Sworn affidavit or applicable certificate

g) MBD 4, 5 & 8

h) Financials last three years

In terms of the PPPFA section 9(a) no tender may be awarded to bidders that is not market related.

F2.16 The tender offer is validity period is 150 days. CONTRACTUAL PERIOD OF TWO (2) YEARS

F2.16.2 The tender must consider extending the validity period if requested by the Purchaser.

F3.4 Tender offers/quotes will be opened by City Power SCM unit, in accordance with City Power procurement policy, in the presence of City Power Legal Representative.

F3.11.3 Method 2 will be used to evaluate the offers

The minimum threshold for functionality is 80% (Only bidders who obtain 80% and above will be evaluated further on Price and B-BBEE)

THE 80/20 PREFERENCE POINT SYSTEMS

A maximum of 80 points is allocated for price on the following basis:

80/20

$$P_s = 80 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$$

Where

P_s = Points scored for comparative price of tender or offer under consideration;

P_t = Comparative price of tender or offer under consideration; and

P_{min} = Comparative price of lowest acceptable tender or offer.

Points awarded for B-BBEE Status Level of Contribution

In terms of Regulation 5 (2) and 6 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (80/20 system)
1	20
2	18
3	16
4	12
5	8
6	6
7	4
8	2
Non-compliant contributor	0

F.3.13.1 Tenders will only be accepted if:

- a) The tenderer has in his or her possession an original valid tax clearance certificate or pin issued by the South African Revenue Services or a pin
- b) The tenderer is registered with Central System Database (CSD)
- c) The tenderer is not in arrears for more than 3 months with municipal rates and taxes and municipal service charges
- d) The tenderer or any of its directors is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector
- e) The tenderer has not:
 - i) Abused the Employer's Supply Chain Management System; or
 - ii) Failed to perform on any previous contract and has been given a written notice to this effect
- f) Has completed the declaration of Interest Form and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interest of the employer or potentially compromise the tender process.

1.4

CIDB STANDARD CONDITIONS OF TENDER

Annex F (normative)

Standard Conditions of Tender

F.1 General

F.1.1 Actions

F.1.1.1 The employer 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 F.2 and F.3, timeously and with integrity, and behave equitably, honestly and transparently, comply with all legal obligations and not engage in anticompetitive practices.

F.1.1.2 The employer and the tenderer and all 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 employer shall declare any conflict of interest to whoever is responsible for overseeing the procurement process 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.

Note: 1) *A conflict of interest may arise due to a conflict of roles which might provide an incentive for improper acts in some circumstances. A conflict of interest can create an appearance of impropriety that can undermine confidence in the ability of that person to act properly in his or her position even if no improper acts result.*

2) *Conflicts of interest in respect of those engaged in the procurement process include direct, indirect or family interests in the tender or outcome of the procurement process and any personal bias, inclination, obligation, allegiance or loyalty which would in any way affect any decisions taken.*

F.1.1.3 The employer shall not seek and a tenderer shall not submit a tender without having a firm intention and the capacity to proceed with the contract.

F.1.2 Tender Documents

The documents issued by the employer for the purpose of a tender offer are listed in the tender data.

F.1.3 Interpretation

F.1.3.1 The tender data and additional requirements contained in the tender schedules that are included in the returnable documents are deemed to be part of these conditions of tender.

F.1.3.2 These conditions of tender, the tender data and tender schedules which are only required for tender evaluation purposes, shall not form part of any contract arising from the invitation to tender.

F.1.3.3 For the purposes of these conditions of tender, the following definitions apply:

- a) **conflict of interest** means any situation in which:
 - i) someone in a position of trust has competing professional or personal interests which make it difficult to fulfill his or her duties impartially;
 - ii) an individual or organisation is in a position to exploit a professional or official capacity in some way for their personal or corporate benefit; or
 - iii) incompatibility or contradictory interests exist between an employee and the organisation which employs that employee.
- b) **comparative offer** means the price after the factors of a non-firm price and all unconditional discounts it can be utilised to have been taken into consideration;
- c) **corrupt practice** means the offering, giving, receiving or soliciting of anything of value to influence the action of the employer or his staff or agents in the tender process;
- d) **fraudulent practice** means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the employer, including collusive practices intended to establish prices at artificial levels;
- e) **organization** means a company, firm, enterprise, association or other legal entity, whether incorporated or not, or a public body;
- f) **functionality** means the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.

F.1.4 Communication and employer's agent

Each communication between the employer and a tenderer shall be to or from the employer's agent only, and in a form that can be readily read, copied and recorded. Communications shall be in the English language. The employer shall not take any responsibility for non-receipt of communications from or by a tenderer. The name and contact details of the employer's agent are stated in the tender data.

F.1.5 Cancellation and Re-Invitation of Tenders

F1.5.1 An organ of state 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.

F1.5.2 The decision to cancel a tender must be published in the cidb website and in the government Tender Bulletin for the media in which the original tender invitation was advertised.

F.1.6 Procurement procedures

F.1.6.1 General

Unless otherwise stated in the tender data, a contract will, subject to F.3.13, be concluded with the tenderer who in terms of F.3.11 is the highest ranked or the tenderer scoring the highest number of tender evaluation points, as relevant, based on the tender submissions that are received at the closing time for tenders.

F.1.6.2 Competitive negotiation procedure

F.1.6.2.1 Where the tender data require that the competitive negotiation procedure is to be followed, tenderers shall submit tender offers in response to the proposed contract in the first round of submissions. Notwithstanding the requirements of F.3.4, the employer shall announce only the names of the tenderers who make a submission. The requirements of F.3.8 relating to the material deviations or qualifications which affect the competitive position of tenderers shall not apply.

F.1.6.2.2 All responsive tenderers, or not less than three responsive tenderers that are highest ranked in terms of the evaluation method and evaluation criteria stated in the tender data, shall be invited in each round to enter into competitive negotiations, based on the principle of equal treatment and keeping confidential the proposed solutions and associated information. Notwithstanding the provisions of F.2.17, the employer may request that tenders be clarified, specified and fine-tuned in order to improve a tenderer's competitive position provided that such clarification, specification, fine-tuning or additional information does not alter any fundamental aspects of the offers or impose substantial new requirements which restrict or distort competition or have a discriminatory effect.

F.1.6.2.3 At the conclusion of each round of negotiations, tenderers shall be invited by the employer to make a fresh tender offer, based on the same evaluation criteria, with or without adjusted weightings. Tenderers shall be advised when they are to submit their best and final offer.

F.1.6.2.4 The contract shall be awarded in accordance with the provisions of F.3.11 and F.3.13 after tenderers have been requested to submit their best and final offer.

F.1.6.3 Proposal procedure using the two stage-system

F.1.6.3.1 Option 1

Tenderers shall in the first stage submit technical proposals and, if required, cost parameters around which a contract may be negotiated. The employer shall evaluate each responsive submission in terms of the method of evaluation stated in the tender data, and in the second stage negotiate a contract with the tenderer scoring the highest number of evaluation points and award the contract in terms of these conditions of tender.

F.1.6.3.2 Option 2

F.1.6.3.2.1 Tenderers shall submit in the first stage only technical proposals. The employer shall invite all responsive tenderers to submit tender offers in the second stage, following the issuing of procurement documents.

F.1.6.3.2.2 The employer shall evaluate tenders received during the second stage in terms of the method of evaluation stated in the tender data, and award the contract in terms of these conditions of tender.

F.2 Tenderer's obligations

F.2.1 Eligibility

F.2.1.1 Submit a tender offer only if the tenderer satisfies the criteria stated in the tender data and the tenderer, or any of his principals, is not under any restriction to do business with employer

F.2.1.2 Notify the employer of any proposed material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used by the employer as the basis in a prior process to invite the tenderer to submit a tender offer and obtain the employer's written approval to do so prior to the closing time for tenders.

F.2.2 Cost of tendering

F2.2.1 Accept that, unless otherwise stated in the tender data, the employer will not compensate the tenderer 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.

F2.2.2 The cost of the tender documents charged by the employer shall be limited to the actual cost incurred by the employer for printing the documents. Employers must attempt to make available the tender documents on its website so as not to incur any costs pertaining to the printing of the tender documents.

F.2.3 Check documents

Check the tender documents on receipt for completeness and notify the employer of any discrepancy or omission.

F.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 employer only for the purpose of preparing and submitting a tender offer in response to the invitation.

F.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.

F.2.6 Acknowledge addenda

Acknowledge receipt of addenda to the tender documents, which the employer may issue, and if necessary apply for an extension to the closing time stated in the tender data, in order to take the addenda into account.

F.2.7 Clarification meeting

Attend, where required, a clarification meeting at which tenderers may familiarize themselves with aspects of the proposed work, services or supply and raise questions. Details of the meeting(s) are stated in the tender data.

F.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the employer at least five working days before the closing time stated in the tender data.

F.2.9 Insurance

Be aware that the extent of insurance to be provided by the employer (if any) might not be for the full cover required in terms of the conditions of contract identified in the contract data. The tenderer is advised to seek qualified advice regarding insurance.

F.2.10 Pricing the tender offer

F.2.10.1 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 tender data.

F.2.10.2 Show VAT payable by the employer separately as an addition to the tendered total of the prices.

F.2.10.3 Provide rates and prices that are fixed for the duration of the contract and not subject to adjustment except as provided for in the conditions of contract identified in the contract data.

F.2.10.4 State the rates and prices in Rand unless instructed otherwise in the tender data. The conditions of contract identified in the contract data may provide for part payment in other currencies.

F.2.11 Alterations to documents

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

F.2.12 Alternative tender offers

F.2.12.1 Unless otherwise stated in the tender data, submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted as well as a schedule that compares the requirements of the tender documents with the alternative requirements that are proposed.

F.2.12.2 Accept that an alternative tender offer may be based only on the criteria stated in the tender data or criteria otherwise acceptable to the employer.

F.2.12.3 An alternative tender offer may only be considered in the event that the main tender offer is the winning tender.

F.2.13 Submitting a tender offer

F.2.13.1 Submit one tender offer only, 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 data and described in the scope of works, unless stated otherwise in the tender data.

F.2.13.2 Return all returnable documents to the employer after completing them in their entirety, either electronically (if they were issued in electronic format) or by writing legibly in non-erasable ink.

F.2.13.3 Submit the parts of the tender offer communicated on paper as an original plus the number of copies stated in the tender data, with an English translation of any documentation in a language other than English, and the parts communicated electronically in the same format as they were issued by the employer.

F.2.13.4 Sign the original and all copies of the tender offer where required in terms of the tender data. The employer will hold all authorized signatories liable on behalf of the tenderer. Signatories for tenderers proposing to contract as joint ventures shall state which of the signatories is the lead partner whom the employer shall hold liable for the purpose of the tender offer.

F.2.13.5 Seal the original and each copy of the tender offer as separate packages marking the packages as "ORIGINAL" and "COPY". Each package shall state on the outside the employer's address and identification details stated in the tender data, as well as the tenderer's name and contact address.

F.2.13.6 Where a two-envelope system is required in terms of the tender data, place and seal the returnable documents listed in the tender data 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 employer's address and identification details stated in the tender data, as well as the tenderer's name and contact address.

F.2.13.7 Seal the original tender offer and copy packages together in an outer package that states on the outside only the employer's address and identification details as stated in the tender data.

F.2.13.8 Accept that the employer will 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.

F.2.13.9 Accept that tender offers submitted by facsimile or e-mail will be rejected by the employer, unless stated otherwise in the tender data.

F.2.14 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 employer as non-responsive.

F.2.15 Closing time

F.2.15.1 Ensure that the employer receives the tender offer at the address specified in the tender data not later than the closing time stated in the tender data. Accept that proof of posting shall not be accepted as proof of delivery.

F.2.15.2 Accept that, if the employer extends the closing time stated in the tender data for any reason, the requirements of these conditions of tender apply equally to the extended deadline.

F.2.16 Tender offer validity

F.2.16.1 Hold the tender offer(s) valid for acceptance by the employer at any time during the validity period stated in the tender data after the closing time stated in the tender data.

F.2.16.2 If requested by the employer, consider extending the validity period stated in the tender data for an agreed additional period with or without any conditions attached to such extension.

F.2.16.3 Accept that a tender submission that has been submitted to the employer may only be withdrawn or substituted by giving the employer's agent written notice before the closing time for tenders that a tender is to be withdrawn or substituted.

F.2.16.4 Where a tender submission is to be substituted, submit a substitute tender in accordance with the requirements of F.2.13 with the packages clearly marked as —SUBSTITUTE.

F.2.17 Clarification of tender offer after submission

Provide clarification of a tender offer in response to a request to do so from the employer during the evaluation of tender offers. This may include providing a breakdown of rates or prices and correction of arithmetical errors by the adjustment of certain rates or item prices (or both). No change in the competitive position of tenderers or substance of the tender offer is sought, offered, or permitted.

Note: Sub-clause F.2.17 does not preclude the negotiation of the final terms of the contract with a preferred tenderer following a competitive selection process, should the Employer elect to do so.

F.2.18 Provide other material

F.2.18.1 Provide, on request by the employer, any other material that has a bearing on the tender offer, the tenderer's commercial position (including notarized joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the employer for the purpose of a full and fair risk assessment. 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 employer's request, the employer may regard the tender offer as non-responsive.

F.2.18.2 Dispose of samples of materials provided for evaluation by the employer, where required.

F.2.19 Inspections, tests and analysis

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

F.2.20 Submit securities, bonds and policies

If requested, submit for the employer's acceptance before formation of the contract, all securities, bonds, guarantees, policies and certificates of insurance required in terms of the conditions of contract identified in the contract data.

F.2.21 Check final draft

Check the final draft of the contract provided by the employer within the time available for the employer to issue the contract.

F.2.22 Return of other tender documents

If so instructed by the employer, return all retained tender documents within 28 days after the expiry of the validity period stated in the tender data.

F.2.23 Certificates

Include in the tender submission or provide the employer with any certificates as stated in the tender data.

F.3 The employer's undertakings

F.3.1 Respond to requests from the tenderer

F.3.1.1 Unless otherwise stated in the tender Data, respond to a request for clarification received up to five working days before the tender closing time stated in the Tender Data and notify all tenderers who drew procurement documents.

F.3.1.2 Consider any request to make a material change in the capabilities or formation of the tendering entity (or both) or any other criteria which formed part of the qualifying requirements used to prequalify a tenderer to submit a tender offer in terms of a previous procurement process and deny any such request if as a consequence:

- a) an individual firm, or a joint venture as a whole, or any individual member of the joint venture fails to meet any of the collective or individual qualifying requirements;
- b) the new partners to a joint venture were not prequalified in the first instance, either as individual firms or as another joint venture; or
- c) in the opinion of the Employer, acceptance of the material change would compromise the outcome of the prequalification process.

F.3.2 Issue Addenda

If necessary, issue addenda that may amend or amplify the tender documents to each tenderer during the period from the date that tender documents are available until three days before the tender closing time stated in the Tender Data. If, as a result a tenderer applies for an extension to the closing time stated in the Tender Data, the Employer may grant such extension and, shall then notify all tenderers who drew documents.

F.3.3 Return late tender offers

Return tender offers received after the closing time stated in the Tender Data, unopened, (unless it is necessary to open a tender submission to obtain a forwarding address), to the tenderer concerned.

F.3.4 Opening of tender submissions

F.3.4.1 Unless the two-envelope system is to be followed, open valid tender submissions in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data. Tender submissions for which acceptable reasons for withdrawal have been submitted will not be opened

F.3.4.2 Announce at the meeting held immediately after the opening of tender submissions, at a venue indicated in the tender data, the name of each tenderer whose tender offer is opened and, where applicable, the total of his prices, number of points claimed for its BBBEE status level and time for completion for the main tender offer only.

F.3.4.3 Make available the record outlined in F.3.4.2 to all interested persons upon request.

F.3.5 Two-envelope system

F.3.5.1 Where stated in the tender data that a two-envelope system is to be followed, open only the technical proposal of valid tenders in the presence of tenderers' agents who choose to attend at the time and place stated in the tender data and announce the name of each tenderer whose technical proposal is opened.

F.3.5.2 Evaluate functionality of the technical proposals offered by tenderers, then advise tenderers who remain in contention for the award of the contract of the time and place when the financial proposals will be opened. Open only the financial proposals of tenderers, who score in the functionality evaluation more than the minimum number of points for functionality

stated in the tender data, and announce the score obtained for the technical proposals and the total price and any points claimed on BBBEE status level. Return unopened financial proposals to tenderers whose technical proposals failed to achieve the minimum number of points for functionality.

F.3.6 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, the final evaluation price and recommendations for the award of a contract, until after the award of the contract to the successful tenderer.

F.3.7 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.

F.3.8 Test for responsiveness

F.3.8.1 Determine, after opening and before detailed evaluation, 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.

F.3.8.2 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 Employer's opinion, would:

- a) detrimentally affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work,
- b) significantly change the Employer'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 the non-conforming deviation or reservation.

F.3.9 Arithmetical errors, omissions and discrepancies

F.3.9.1 Check the highest ranked tender or tenderer with the highest number of tender evaluation points after the evaluation of tender offers in accordance with F.3.11 for:

- a) the gross misplacement of the decimal point in any unit rate;
- b) omissions made in completing the pricing schedule or bills of quantities; or
- c) arithmetic errors in:
 - i) line item totals resulting from the product of a unit rate and a quantity in bills of quantities or schedules of prices; or
 - ii) the summation of the prices.

F.3.9.2 The employer 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 bills of quantities or 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 quoted 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 bills of quantities 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.

F.3.10 Clarification of a tender offer

Obtain clarification from a tenderer on any matter that could give rise to ambiguity in a contract arising from the tender offer.

F.3.11 Evaluation of tender offers

F.3.11.1 General

Appoint an evaluation panel of not less than three persons. Reduce each responsive tender offer to a comparative offer and evaluate them using the tender evaluation methods and associated evaluation criteria and weightings that are specified in the tender data.

F.3.11.2 Method 1: Price and Preference

In the case of a price and preference:

- 1) Score tender evaluation points for price
- 2) Score points for BBBEE contribution
- 3) Add the points scored for price and BBBEE.

F.3.11.3 Method 2: Functionality, Price and Preference

In the case of a functionality, price and preference:

- 1) Score functionality, rejecting all tender offers that fail to achieve the minimum number of points for functionality as stated in the Tender Data.
- 2) No tender must be regarded as an acceptable tender if it fails to achieve the minimum qualifying score for functionality as indicated in the tender invitation.
- 3) Tenders that have achieved the minimum qualification score for functionality must be evaluated further in terms of the preference points system prescribed in paragraphs 4 and 4 and 5 below.
The 80/20 preference point system for acquisition of services, works or goods up to Rand value of R50 million
- 4) (a)(i) The following formula must be used to calculate the points for price in respect of tenders(including price quotation) with a rand value equal to, or above R 30 000 and up to Rand value of R 50 000 000 (all applicable taxes included):

80/20

$$P_s = 80 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$$

Where

P_s = Points scored for comparative price of tender or offer under consideration;

P_t = Comparative price of tender or offer under consideration; and

P_{min} = Comparative price of lowest acceptable tender or offer.

- (4) (a)(ii) An employer of state may apply the formula in paragraph (i) for price quotations with a value less than R30 000, if and when appropriate:
- (4) (b) Subject to subparagraph(4)(c), points must be awarded to a tender for attaining the B-BBEE status level of contributor in accordance with the table below:

B-BBEE Status Level of Contributor	Number of points (80/20 system)
1	20
2	18
3	16
4	12
5	8
6	6
7	4
8	2
Non-compliant contributor	0

- 4) (c) A maximum of 20 points may be allocated in accordance with subparagraph (4)(b)
- (4) (d) The points scored by tender in respect of B-BBEE contribution contemplated in contemplated in subparagraph (4) (b) must be added to the points scored for price as calculated in accordance with subparagraph (4)(a).
- (4) (e) Subject to paragraph 4.3.8 the contract must be awarded to the tender who scores the highest total number of points.

The 90/ 10 preference points system for acquisition of services, works or goods with a Rand value above R 1 million

- (5) (a) The following formula must be used to calculate the points for price in respect of tenders with a Rand value above R50 000 000 (all applicable taxes included):

90/10

$$P_s = 90 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$$

Where

P_s = Points scored for comparative price of tender or offer under consideration;

P_t = Comparative price of tender or offer under consideration; and

P_{min} = Comparative price of lowest acceptable tender or offer.

(5)(b) Subject to subparagraph(5)(c), points must be awarded to a tender for attaining the B- BBEE status level of contributor in accordance with the table below. **B-BBEE status level of contributor Number of points**

B-BBEE status level of contributor	Number of points
1	10
2	9
3	8
4	5
5	4
6	3
7	2
8	1
Non-compliant contributor	0

- (5) (c) A maximum of 10 points may be allocated in accordance with subparagraph (5)(b).
- (5) (d) The points scored by tender in respect of B-BBEE contribution contemplated in subparagraph (5) (b) must be added to the points scored for price as calculated in accordance with subparagraph (5)(a).
- (5) (e) Subject to paragraph 4.3.8 the contract must be awarded to the tender who scores the highest total number of points.

F.3.11.6 Decimal places

Score price, preference and functionality, as relevant, to two decimal places.

F.3.11.7 Scoring Price

Score price of remaining responsive tender offers using the following formula:

$$Nfo = W_1 \times A$$

where: Nfo is the number of tender evaluation points awarded for price.

W_1 is the maximum possible number of tender evaluation points awarded for price as stated in the Tender Data.

A is a number calculated using the formula and option described in Table F.1 as stated in the Tender Data.

Table F.1: Formulae for calculating the value of A

Formula	Comparison aimed at achieving	Option 1a	Option 2 a
1	Lowest price or percentage commission / fee	$A = (1 + (P - P_m) / P_m)$	$A = P / P_m$
2	Lowest price or percentage commission / fee	$A = (1 - (P - P_m) / P_m)$	$A = P_m / P$
a P_m is the comparative offer of the most favourable comparative offer. P is the comparative offer of the tender offer under consideration.			

F.3.11.8 Scoring preferences

Confirm that tenderers are eligible for the preferences claimed in accordance with the provisions of the tender data and reject all claims for preferences where tenderers are not eligible for such preferences. Calculate the total number of tender evaluation points for preferences claimed in accordance with the provisions of the tender data.

F.3.11.9 Scoring functionality

Score each of the criteria and subcriteria for quality in accordance with the provisions of the Tender Data. Calculate the total number of tender evaluation points for quality using the following formula:

$N_0 = W_2 \times S_0 / M_S$

where: S_0 is the score for quality allocated to the submission under consideration;

M_S is the maximum possible score for quality in respect of a submission; and

W_2 is the maximum possible number of tender evaluation points awarded for the quality as stated in the tender data

F.3.12 Insurance provided by the employer

If requested by the proposed successful tenderer, submit for the tenderer's information the policies and / or certificates of insurance which the conditions of contract identified in the contract data, require the employer to provide.

F.3.13 Acceptance of tender offer

Accept the tender offer, if in the opinion of the employer, it does not present any risk and only if the tenderer:

- a) is not under restrictions, or has principals who are under restrictions, preventing participating 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,
- c) 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,
- e) complies with the legal requirements, if any, stated in the tender data, and
- f) is able, in the opinion of the employer, to perform the contract free of conflicts of interest.

F.3.14 Prepare contract documents

F.3.14.1 If necessary, revise documents that shall form part of the contract and that were issued by the employer as part of the tender documents to take account of:

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

F.3.14.2 Complete the schedule of deviations attached to the form of offer and acceptance, if any.

F.3.15 Complete adjudicator's contract

Unless alternative arrangements have been agreed or otherwise provided for in the contract, arrange for both parties to complete formalities for appointing the selected adjudicator at the same time as the main contract is signed.

F.3.16 Notice to unsuccessful tenderers

F.3.16.1 Notify the successful tenderer of the employer's acceptance of his tender offer by completing and returning one copy of the form of offer and acceptance before the expiry of the validity period stated in the tender data, or agreed additional period.

F.3.16.2 After the successful tenderer has been notified of the employer's acceptance of the tender, notify other tenderers that their tender offers have not been accepted.

F.3.17 Provide copies of the contracts

Provide to the successful tenderer the number of copies stated in the Tender Data of the signed copy of the contract as soon as possible after completion and signing of the form of offer and acceptance.

F.3.18 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.

F.3.19 Transparency in the procurement process

F.3.19.1 The CIDB prescripts require that tenders must be advertised and be registered on the CIDB i-Tender system.

F.3.19.2 The employer must adopt a transparency model that incorporates the disclosure and accountability as transparency requirements in the procurement process.

F.3.19.3 The transparency model must identify the criteria for selection of projects, project information template and the threshold value of the projects to be disclosed in the public domain at various intervals of delivery of infrastructure projects.

F.3.19.4 The client must publish the information on a quarterly basis which contains the following information:

- Procurement planning process
- Procurement method and evaluation process
- Contract type
- Contract status
- Number of firms tendering
- Cost estimate
- Contract title
- Contract firm(s)
- Contract price
- Contract scope of work
- Contract start date and duration
- Contract evaluation reports

F.3.19.5 The employer must establish a Consultative Forum which will conduct a random audit in the implementation of the transparency requirements in the procurement process.

F.3.19.6 Consultative Forum must be an independent structure from the bid committees.

F.3.19.7 The information must be published on the employer's website.

F.3.19.8 Records of such disclosed information must be retained for audit purposes.

PRICING SCHEDULE – FIRM PRICES (PURCHASES)

NOTE: PRICE ADJUSTMENTS WILL BE ALLOWED AT THE PERIODS AND TIMES SPECIFIED IN THE BIDDING DOCUMENTS (INCLUDING PRICES SUBJECT TO RATES OF EXCHANGE VARIATIONS)

IN CASES WHERE DIFFERENT DELIVERY POINTS INFLUENCE THE PRICING, A SEPARATE PRICING SCHEDULE MUST BE SUBMITTED FOR EACH DELIVERY POINT

Name of Bidder..... Bid Number.....

Closing Time Closing Date

OFFER TO BE VALID FOR..... DAYS FROM THE CLOSING DATE OF BID.

ITEM NO.	QUANTITY	DESCRIPTION	BID PRICE IN RSA CURRENCY ** (ALL APPLICABLE TAXES INCLUDED)
1	1	Cost per unit	R

Note:

- Required by:
- At:
- Brand and Model
- Country of Origin
- Does the offer comply with the specification(s)? *YES/NO
- If not to specification, indicate deviation(s)
- Period required for delivery
- Delivery basis

Note: All delivery costs must be included in the bid price, for delivery at the prescribed destination.

** "all applicable taxes" includes value-added tax, pay as you earn, income tax, unemployment insurance fund contributions and skills development levies.

PRICE ADJUSTMENTS

NON-FIRM PRICES SUBJECT TO ESCALATION

IN CASES OF PERIOD CONTRACTS, NON FIRM PRICES WILL BE ADJUSTED (LOADED) WITH THE ASSESSED CONTRACT PRICE ADJUSTMENTS IMPLICIT IN NON FIRM PRICES WHEN CALCULATING THE COMPARATIVE PRICES

THIS CATEGORY PRICE ESCALATIONS WILL ONLY BE CONSIDERED IN TERMS OF THE FOLLOWING FORMULA:

$$Pa = (1 - V) P_t \left(D_1 \frac{R_{1t}}{R_{10}} + D_2 \frac{R_{2t}}{R_{20}} + D_3 \frac{R_{3t}}{R_{30}} + D_4 \frac{R_{4t}}{R_{40}} \right) + V P_t$$

Where:

Pa	=	The new escalated price to be calculated.
(1-V) Pt	=	85% of the original bid price. Note that Pt must always be the original bid price and not an escalated price.
D1, D2..	=	Each factor of the bid price eg. labour, transport, clothing, footwear, etc. The total of the various factors D1, D2... etc. must add up to 100%.
R1t, R2t.....	=	Index figure obtained from new index (depends on the number of factors used).
R10, R20	=	Index figure at time of bidding.
VPt	=	15% of the original bid price. This portion of the bid price remains firm i.e. it is not subject to any price escalations.

The following index/indices must be used to calculate your bid price:

Index.....	Dated.....	Index.....	Dated.....	Index.....	Dated.....
Index.....	Dated.....	Index.....	Dated.....	Index.....	Dated.....

FURNISH A BREAKDOWN OF YOUR PRICE IN TERMS OF ABOVE-MENTIONED FORMULA. THE TOTAL OF THE VARIOUS FACTORS MUST ADD UP TO 100%.

FACTOR (D1, D2 etc. eg. Labour, transport etc.)	PERCENTAGE OF BID PRICE

PRICES SUBJECT TO RATE OF EXCHANGE VARIATIONS

Please furnish full particulars of your financial institution, state the currencies used in the conversion of the prices of the items to South African currency, which portion of the price is subject to rate of exchange variations and the amounts remitted abroad.

PARTICULARS OF FINANCIAL INSTITUTION	ITEM NO	PRICE	CURRENCY	RATE	PORTION OF PRICE SUBJECT TO ROE	AMOUNT IN FOREIGN CURRENCY REMITTED ABROAD
				ZAR=		
				ZAR=		
				ZAR=		
				ZAR=		
				ZAR=		
				ZAR=		
				ZAR=		

Adjustments for rate of exchange variations during the contract period will be calculated by using the average monthly exchange rates as issued by your commercial bank for the periods indicated hereunder: (Proof from bank required)

AVERAGE MONTHLY EXCHANGE RATES FOR THE PERIOD:	DATE DOCUMENTATION MUST BE SUBMITTED TO THIS OFFICE	DATE FROM WHICH NEW CALCULATED PRICES WILL BECOME EFFECTIVE	DATE UNTIL WHICH NEW CALCULATED PRICE WILL BE EFFECTIVE

CONTRACT FORM - PURCHASE OF GOODS/WORKS

THIS FORM MUST BE FILLED IN DUPLICATE BY BOTH THE SUCCESSFUL BIDDER (PART 1) AND THE PURCHASER (PART 2). BOTH FORMS MUST BE SIGNED IN THE ORIGINAL SO THAT THE SUCCESSFUL BIDDER AND THE PURCHASER WOULD BE IN POSSESSION OF ORIGINALLY SIGNED CONTRACTS FOR THEIR RESPECTIVE RECORDS.

PART 1 (TO BE FILLED IN BY THE BIDDER)

1. I hereby undertake to supply all or any of the goods and/or works described in the attached bidding documents to (name of institution)..... in accordance with the requirements and specifications stipulated in bid number..... at the price/s quoted. My offer/s remain binding upon me and open for acceptance by the purchaser during the validity period indicated and calculated from the closing time of bid.
2. The following documents shall be deemed to form and be read and construed as part of this agreement:
 - (i) Bidding documents, viz
 - Invitation to bid;
 - Tax clearance certificate;
 - Pricing schedule(s);
 - Technical Specification(s);
 - Preference claims for Broad Based Black Economic Empowerment Status Level of Contribution in terms of the Preferential Procurement Regulations 2011;
 - Declaration of interest;
 - Declaration of bidder's past SCM practices;
 - Certificate of Independent Bid Determination;
 - Special Conditions of Contract;
 - (ii) General Conditions of Contract; and
 - (iii) Other (specify)
3. I confirm that I have satisfied myself as to the correctness and validity of my bid; that the price(s) and rate(s) quoted cover all the goods and/or works specified in the bidding documents; that the price(s) and rate(s) cover all my obligations and I accept that any mistakes regarding price(s) and rate(s) and calculations will be at my own risk.
4. I accept full responsibility for the proper execution and fulfilment of all obligations and conditions devolving on me under this agreement as the principal liable for the due fulfillment of this contract.
5. I declare that I have no participation in any collusive practices with any bidder or any other person regarding this or any other bid.
6. I confirm that I am duly authorised to sign this contract.

NAME (PRINT)

CAPACITY

SIGNATURE

NAME OF FIRM

DATE

WITNESSES	
1
2.
DATE:

CONTRACT FORM - PURCHASE OF GOODS/WORKS

PART 2 (TO BE FILLED IN BY THE PURCHASER)

1. I.....in, my, capacity as.....accept
your bid under reference numberdated.....for the supply of goods/works
indicated hereunder and/or further specified in the annexe(s).
2. An official order indicating delivery instructions is forthcoming.
3. I undertake to make payment for the goods/works delivered in accordance with the terms and conditions of the
contract, within 30 (thirty) days after receipt of an invoice accompanied by the delivery note.

ITEM NO.	PRICE (ALL APPLICABLE TAXES INCLUDED)	BRAND	DELIVERY PERIOD	B-BBEE STATUS LEVEL OF CONTRIBUTION	MINIMUM THRESHOLD FOR LOCAL PRODUCTION AND CONTENT (if applicable)

4. I confirm that I am duly authorized to sign this contract.

SIGNED ATON.....

NAME (PRINT)

SIGNATURE

OFFICIAL STAMP

WITNESSES

1.

2.

DATE

3.2 CONTRACT DATA

3.2.1 PURCHASE PRICE

3.2.1 The Purchase Price shall be the amount set out in the PURCHASE ORDER.

3.2.2 Unless otherwise stipulated in the PURCHASE ORDER, no additional costs of whatever nature shall be payable by CITY POWER.

3.2.3 VAT shall be deemed to be included from the Purchase Price.

3.2.4 All other taxes payable in respect of the items stipulated on the PURCHASE ORDER shall be deemed to be included in the Purchase Price.

3.2.5 PURCHASE ORDERS placed on a "Price to be Agreed" (PTBA), "Estimated Price" or "Price Subject to Adjustment" basis, are issued on the condition that CITY POWER shall be advised, in writing, of the details of the proposed Purchase Price prior to execution of the order CITY POWER may demand, prior to payment, that the price computation be substantiated by documentary evidence.

3.3 TERMS OF PAYMENT

CITY POWER payment terms are 30 days from the date of receipt of the invoice and statement of account.

3.4 METHOD OF PAYMENT

3.4.1 SUPPLIER must elect payment by cheque or electronic fund transfer for the purpose of a contract within 14 (fourteen) days of a purchase order being awarded. SUPPLIER must exercise its choice in writing and submit it to CITY POWER's Financial Department, failing which all payments in terms of this contract will be by cheque. The onus is on the SUPPLIER to ensure that the Financial Department has received and recorded its choice in this regard.

3.4.2 The method of payment elected by SUPPLIER may only be altered with CITY POWER's consent.

3.4.3 If payment is made by cheque, same will be posted.

3.4.4 SUPPLIER assumes the entire risk in cheques from the moment of posting and CITY POWER's liability is deemed to be met when the cheque is posted.

3.4.5 If cheque(s) will be delivered by hand to SUPPLIER or be collected from CITY POWER by SUPPLIER or its representative. The receiver should acknowledge the receipt.

3.4.6 SUPPLIER shall ensure that CITY POWER at all times has the correct banking information of SUPPLIER in order to make an electronic fund transfer, by submitting a cancelled cheque and a letterhead to:

FINANCIAL ACCOUNTANT
FINANCIAL DEPARTMENT
CITY POWER
P.O. BOX 38766
BOOYSENS
2016

If any aspect of SUPPLIER's banking information changes, SUPPLIER shall timeously inform CITY POWER in writing of such changes.

SUPPLIER assumes the entire risk of incorrect electronic fund transfers arising from changes in SUPPLIER's banking information.

3.4.7 Settlement discount as agreed upon and stated in the contract will be deducted from payment.

3.5 INVOICING

3.5.1 Invoices shall comply with the VAT Act, failing which payment will not be made.

3.5.2 All invoices, monthly statements and other related documentation must be submitted to:

THE FINANCIAL DEPARTMENT
CITY POWER
P.O. BOX 38766
BOOYSENS
2016

3.5.3 SUPPLIERS invoice(s) shall be fully detailed in respect of:

3.5.3.1 Information

- The CITY POWER Purchase Order Number.
- The full description of item(s) to which the Invoice(s) relate(s)
- A unique Invoice Number.
- Date of issue of the invoice.
- Company/Close Corporation Registration Number
- VAT Registration Number
- Delivery Notes Number

3.5.3.2 Value Added Tax

- Amount of VAT.
- In the event of VAT being levied at differentiated rates, each rate invoiced.

3.5.3.3 Structure of Invoice

- Total value of GOODS AND SERVICES excluding VAT
- VAT on amount payable
- Total amount payable
- Comments if applicable
- Settlement Discount ... %

3.6 STATEMENT OF ACCOUNTS

3.6.1 SUPPLIER shall submit an original monthly statement to the Financial Department by not later than the 10th day of the month following the month in which the GOODS AND SERVICES were delivered.

3.6.2 Said statement must reflect the following:

- Opening balance (which shall be the closing balance of the immediate preceding statement).
- Add: Amount of the current month's invoices
Debit notes
(Detailed as per document number)
- Deduct: Credit notes
Payments received during month
Settlement discounts allowed
(Detailed as per document number)
- Closing balance

3.7 ORIGINAL DOCUMENTS

SUPPLIER must submit original invoices, debit/credit notes, for GOODS AND SERVICES supplied and relevant information or documentation and monthly statements. Faxed documents will not be accepted and processed for payment.

3.8 SET OFF

CITY POWER may deduct any amount owed by the SUPPLIER to CITY POWER from any liquidated and fully due amount owed by CITY POWER to SUPPLIER.

3.9 STANDARD COMMERCIAL TERMS AND CONDITIONS

3.9.1 ENTIRE CONTRACT

The CONTRACT constitutes the entire CONTRACT between the parties and all previous negotiations, proposals and writings pertaining to the procurement of GOODS AND SERVICES or the subject matter thereof are superseded by this CONTRACT as are SUPPLIERS terms and conditions contained in any of its documentation, invoices and/or delivery notes.

3.9.2 SUPPLY OF GOODS AND

SUPPLIER shall supply the GOODS AND SERVICES as specified in the PURCHASE ORDER in accordance with these Standard Commercial Terms for Procurement of GOODS AND SERVICES.

3.9.3 QUOTATIONS

3.9.3.1 SIGNED AND ACCEPTED IN WRITING:

3.9.3.1.1 Quotations in response to a request by CITY POWER shall be in writing when requested and be signed by the SUPPLIER.

3.9.3.1.2 The quotation must be signed by an authorised representative of the SUPPLIER.

3.9.3.1.3 Failure to sign the quotation will invalidate the quotation.

3.9.3.1.4 CITY POWER does not hold itself liable to be bound by any agreement, arrangement or order for the procurement of GOODS AND SERVICES, not entered into by and on behalf of CITY POWER by authorised CITY POWER Procurement and Supply Management personnel.

3.9.3.1.5 The representative of the SUPPLIER signing the quotation warrants his/her authority by his/her signature on the quotation.

3.9.3.1.6 Unless otherwise advised, only written acceptance of a quotation, by means of a Purchase Order, by an authorised CITY POWER Official shall be valid.

3.10 TERMS AND CONDITIONS:

3.10.1 CITY POWER reserves the right to adjust arithmetical errors in quotations. CITY POWER will not accept any liability whatsoever for errors in quotations.

3.10.2 The SUPPLIER must prepare and submit its quotations at its own expense.

3.10.3 CITY POWER reserves the right to invite quotations from several potential SUPPLIERS for the supply of GOODS AND SERVICES.

3.10.4 CITY POWER may in its discretion accept or reject quotations without furnishing reasons.

3.10.5 CITY POWER may accept any part of or an item of a quotation without being obliged to accept such quotation in its entirety.

3.10.6 Notwithstanding clause 4.3.1.5, whoever submits an accepted quotation, shall satisfy CITY POWER, if so required by CITY POWER, in the manner and detail required:

3.10.6.1 As to the authority of the person who signed the quotation and the SUPPLIER's legal capacity to enter into a CONTRACT;

3.10.6.2 As to the SUPPLIER's capability (financially, technically and otherwise) to successfully supply the GOODS AND SERVICES in accordance with the specifications of the GOODS AND SERVICES.

3.10.7 For purposes of making an offer and acceptance thereof the parties agree that the following shall be deemed as acceptable in execution thereof.

-Facsimile Message delivered by CITY POWER

3.10.8 An offer shall be deemed to be accepted upon the terms and conditions contained in the CONTRACT as Follows

3.10.8.1 Facsimile Message - Successful despatch per facsimile confirmed by CITY POWER's fax transmission report.

3.10.9 It is the responsibility of the SUPPLIER to ensure that their sets of documents relating to the GOODS AND SERVICES are complete and legible, and if not, SUPPLIER must apply to CITY POWER for the required documents of portions thereof. CITY POWER will not accept any liability whatsoever for errors in quotations if the SUPPLIER has failed to perform its obligation in terms thereof.

3.10.10 Both parties undertake to act only on the basis of utmost good faith and trust in the execution of this CONTRACT. Should the SUPPLIER commit any act which compromise or may compromise such relationship, or which is contrary to CITY POWER's Commercial Ethics with which the SUPPLIER declares itself fully familiar then CITY POWER shall be entitled, notwithstanding the provisions of clause 4.15, to terminate this CONTRACT forthwith.

3.10.11 DISCREPANCY IN DESCRIPTION

The SUPPLIER shall immediately inform the relevant Procurement Officer of any discrepancy or ambiguity between the Request for Quotation and the PURCHASE ORDER with respect to the description, dimension or quantities in the PURCHASE ORDER prior to executing the PURCHASE ORDER, failing which the SUPPLIER shall indemnify CITY POWER against any and all damages arising as a result thereof.

3.11 DELIVERY AND INSPECTION UPON DELIVERY

3.11.1 DELIVERY

3.11.1.1 The SUPPLIER rendering the GOODS AND SERVICES to be done in terms of the PURCHASE ORDER to CITY POWER as specified by the project engineer during the hours stipulated in 3.11.1.2. CITY POWER reserves the right to withdraw SUPPLIER's permits should SUPPLIER not adhere hereto.

3.11.1.2 The GOODS AND SERVICES shall be done during normal working hours at the following times:
Monday – Friday: 08:00 to 17:00

3.11.1.3 In the event that delivery of the GOODS AND SERVICES can only be effected outside of the above stipulated times, the CITY POWER Project co-ordinator shall be contacted.

3.11.1.4 SUPPLIER must ensure that the GOODS AND SERVICES are accompanied by the works completion certificate with a valid CITY POWER purchase order number failing which CITY POWER will not accept the GOODS AND SERVICES. The GOODS AND SERVICES must physically be identifiable per PURCHASE ORDER and line number, failing which no acceptance of the GOODS AND SERVICES can and will be made. In the event that SUPPLIER delivers the GOODS AND SERVICES by sub contractor, SUPPLIER must ensure that its official works completion certificate accompanies the GOODS AND SERVICES as the sub contractor's documentation shall not be acceptable. The GOODS AND SERVICES shall be provisionally accepted upon delivery and such provisional acceptance shall be indicated on the works completion certificate by CITY POWER.

3.11.1.5 In the event that the GOODS AND SERVICES are not rendered in accordance with the Standard Commercial Terms of Procurement of GOODS AND SERVICES and the CONTRACT, CITY POWER shall be entitled to withhold payment.

3.11.1.6 SUPPLIER must submit its invoices to the Financial Department as indicated in clause 3.5. The project co-ordinator shall not direct invoices to the Financial Department. CITY POWER shall not be responsible for delays in payment emanating as a result of incorrect submission of invoices or incorrect invoicing procedures followed by the SUPPLIER and no interest shall accrue on such outstanding amounts due the SUPPLIER.

3.11.2 INSPECTION UPON DELIVERY

3.11.2.1 CITY POWER shall inspect the GOODS AND SERVICES upon receipt thereof on site with a signed works completion certificate.

3.11.2.2 GOODS AND SERVICES shall be subject to one or more of the following inspections, whatever the case may be and whichever may be applicable, under the circumstances

- Statutory
- Technical in accordance with applicable specifications
- Visual
- Statutory and Technical inspection shall take place within 3 (three) business days from date of delivery.

3.11.2.3 Where GOODS AND SERVICES are subject to statutory, technical and visual inspections, the GOODS AND SERVICES will:

- be provisionally accepted upon delivery and such provisional acceptance shall be indicated by CITY POWER on the works completion certificate.

3.11.2.4 In the event that the GOODS AND SERVICES are rejected after either a statutory, technical or visual inspection, CITY POWER shall notify the SUPPLIER verbally or in writing of such rejection and the GOODS AND SERVICES must be rectified by the SUPPLIER within 7 (seven) business days of receipt of notice of the rejection. Should the SUPPLIER not rectify the DEFECTS within 7 (seven) days, CITY POWER shall notify the SUPPLIER in writing that the GOODS AND SERVICES have not been rectified.

3.11.2.5 CITY POWER reserves the right to rectify the GOODS AND SERVICES should the DEFECTS not be rectified within the above-specified period. CITY POWER shall supply the SUPPLIER with the following documentation:

- Dispatch Advice
- Non-conformance Report, stating the reason for the non-acceptance of the GOODS AND SERVICES,
- Any certification documentation, which accompanied the GOODS AND SERVICES.

3.12 INSPECTION OF GOODS AND SERVICES

3.12.1 CITY POWER shall be entitled to inspect the GOODS AND SERVICES to be performed in terms of a CONTRACT

3.12.2 Failure to inspect the GOODS AND SERVICES shall in no way impair and prejudice any of CITY POWER's rights set out in clause 3.11.2 hereunder nor be deemed to constitute acceptance of the GOODS AND SERVICES by CITY POWER.

3.11 RISK AND INSURANCE

3.12.1 RISK

All risk in the GOODS AND SERVICES which are to be rendered by the SUPPLIER, shall remain with the SUPPLIER until delivery and commissioning of said GOODS AND SERVICES has been made to the point of delivery as stated in the PURCHASE ORDER or clause 4.6 of this CONTRACT and the works completion form signed and accepted by the designated CITY POWER official, at which point the risk shall pass to CITY POWER.

3.12.2 INSURANCE

- a) The minimum limit of indemnity for insurance in respect of loss or damage to property (except the works, Plant, Machinery and Equipment) and liability for bodily injury to or death of a person (*not an employee of the Contractor*) caused by activity in connection with this contract for any one event is R5m
- b) The contractor is liable for insurance in respect of death of or bodily injury to employees of the *Contractor* arising out and in the course of their employment in connection with this contract.
- c) The insurance against loss of or damage to the works, Plant and Materials which includes cover for Plant and Materials provided by the *Employer* for an amount of R50m. The *Contractor* is liable for any amount exceeding R50m.

3.13 WARRANTIES

The SUPPLIER warrants that the GOODS AND SERVICES supplied by it in terms of the PURCHASE ORDER complies with the specifications of the GOODS AND SERVICES as stipulated in the CONTRACT.

3.14. COMMUNICATIONS

The SUPPLIER must indicate the PURCHASE ORDER number on all its documentation which shall include but not be limited to, invoices, delivery notes, consignment notes, bills of lading, packing lists, packaging and communications, failure to do so will result in delayed payment. No interest will accumulate in respect of such payments and settlement discount shall still be deducted.

3.15. FORCE MAJEURE

3.16.1 Should circumstances which were not foreseeable with reasonable foresight or avoidable with reasonable care ("circumstances"), arise (or be reasonably anticipated) and delay, (or have the potential to delay) performance, (whether in whole or in part) or make performance, (whether in whole or in part) impossible, the party who's performance is affected, (or who's performance may be affected) ("affected party") shall forthwith, in good faith and by the most expeditious means, notify the other party in writing of:

3.16.1.1 the cause(s), nature and extent of the circumstances;

3.16.1.2 the expected duration of the circumstances;

3.16.1.3 the extent to which the performance will be affected.

3.16.2 If the circumstances change after the affected party has notified the other party in accordance with clause 4.11.1, the affected party shall forthwith, in good faith and by the most expeditious means inform the other party of such changes and keep the other party updated on such changes.

3.16.3 Subject to paragraphs 3.16.1 and 3.16.2 the circumstances shall NOT terminate the CONTRACT between the parties or absolve the affected party from performance.

3.16.3.1 Should the circumstances make the agreed performance impossible, the affected party shall, having regard to all relevant factors, as soon as possible and in good faith submit proposals for alternatives to the other party. Such proposals shall be in sufficient detail(s) to enable the other party to technically and financially assess the alternative(s) and to decide whether any alternative is acceptable.

3.16.3.2 Should there be no alternative acceptable to the other party, it may elect to cancel the CONTRACT.

3.16.4 Should the circumstances delay the agreed performance?

3.16.4.1 the affected party shall forthwith and in good faith take all reasonable steps to mitigate the delay and to recover lost time, and

3.16.4.2 having regard to all relevant factors and in good faith notify the other party as soon as possible of the steps to be taken to mitigate the delay and recover lost time and keep the other party updated on changes and progress thereof;

3.16.4.3 the other party may, if the extent to which the delay may be mitigated and lost time be recovered are unacceptable to it, elect to cancel the CONTRACT.

3.16.5 Neither of the parties shall have any claim, arising from the circumstances, on the other.

3.16.6 Without limiting the generality and intention of clause 3.16.1 in any way, the circumstances may include, without being limited thereto:

- Acts of God;
- War, riots, civil- or military insurrection and like political happenings;
- Natural disasters such as earthquakes, fire, storms and floods;
- Governmental acts or omissions;
- Terrorism or sabotage;
- Labour unrest such as strikes and lockouts.

3.17 ADDITIONS AND OMISSIONS

3.17.1 The AGREEMENT may only be amended in writing by "Change Order" under signature of the parties and SUPPLIER shall only react to written amendments.

3.17.2 No amendment shall be valid unless it is signed on behalf of CITY POWER by:

3.17.2.1 A duly authorised commercial officer or his/her superior.

3.17.3 Terms and conditions in SUPPLIER's documentation, which conflict with the contents hereof, shall be of no force or effect.

3.18 CONCESSIONS

3.18.1 Concessions made by CITY POWER shall not prejudice its rights.

3.19 DISPUTE RESOLUTION

3.19.1 Should any dispute arise at any time and in any way in connection with this CONTRACT, the dispute will be referred to contracting parties nominated senior management to resolve the dispute within ten (7) days after referral of the dispute to them.

3.19.2 Should the PARTIES fail to resolve the dispute or difference within the aforesaid period or such longer period as the PARTIES may agree, such dispute shall be determined by arbitration in terms of the following:

3.19.2.1 Within 3 (three) days after the negotiations in paragraph 3.19.1. became deadlocked, CITY POWER and SUPPLIER shall by negotiating in good faith, agree on a arbitrator, failing which either may refer the matter to Arbitration Board of South Africa for appointment.

3.19.2.2 The PARTIES shall within 14 (fourteen) days of the appointment of the arbitrator or such other period as the arbitrator considers reasonable, submit written representations to him. Thereafter the arbitrator shall give his determination in writing and furnish CITY POWER and the SUPPLIER each with a copy thereof, provided that the arbitrator may, in his discretion, convene a hearing of the parties and their witnesses or accept further representations from the PARTIES, before giving his determination.

3.19.2.3 The cost of appointment of the arbitration, whatever the case may be shall be determined by the arbitrator hearing the dispute.

3.19.2.4 The appointment of an arbitrator shall be in no way prejudice the rights that either party have to institute legal proceedings in a competent Court of Law with jurisdiction over the subject matter.

3.20 TERMINATION

3.20.1 In the event that the GOODS AND SERVICES stipulated in the PURCHASE ORDER:

- not conform to the provisions of the order;
- be defective in any way;
- not be delivered by the stipulated date of performance

CITY POWER shall be entitled to:

- cancel the order, either wholly or in part and claim any damages it may have suffered as a result thereof;
- demand that the rejected GOODS AND SERVICES be re-done at no cost to CITY POWER.

3.20.2 CITY POWER may in its sole and unfettered discretion, unless agreed to otherwise in writing, and at Any time, with or without cause, terminate the agreement by written notice to SUPPLIER.

3.20.2.1 Unless otherwise agreed in writing such termination shall become effective 3 (three) business days after date on which SUPPLIER is notified in writing of the termination.

3.20.2.2 Should either of the parties fail to comply with the terms and conditions of this agreement and remain in default for 3 (three) days or any other period as agreed to by the parties after having been given notice to remedy the default, then the other party may cancel this agreement without further notice.

3.20.2.3 Should CITY POWER, at any time, have reason to suspect that SUPPLIER is no longer capable (financially, technically or otherwise) of supplying the GOODS AND SERVICES, then CITY POWER may cancel this agreement in terms of 3.20.2.1

3.20.2.4 Cancellation in terms of 3.20.2.1 shall be without prejudice to the cancelling party's other rights.

3.20.2.5 If CITY POWER cancels this agreement in terms of 3.20.2.1, it shall be entitled to retain all Monies due to SUPPLIER until such time as the WORK is completed.

3.20.3 Time is of the essence to the extent that it goes to the root of agreements be between CITY POWER and SUPPLIER in respect of the delivery date of the GOODS AND SERVICES, and entitles CITY POWER to cancel in terms of Clause 3.20.

3.21 CESSIONS

3.21.1 SUPPLIER shall not cede, assign, factorise or otherwise make over its right, or obligations, or any part or aspect thereof, in terms of any agreement with CITY POWER, unless consented to in writing by CITY POWER.

3.21.2 SUPPLIER shall in no way encumber its rights or obligations in terms of any agreement with CITY POWER.

3.21.3 Should the SUPPLIER be taken over, or should control of the SUPPLIER pass to anybody other than those disclosed to CITY POWER, then CITY POWER may at its discretion cancel the agreement without prior notice.

3.21.4 SUPPLIER shall immediately advise CITY POWER, in writing, of any actual or proposed transfer of ownership, passing of or change of directors, partners or other stakeholders.

3.22 CONFIDENTIALITY

3.22.1 SUPPLIER hereby undertakes not to disclose, in whole or in part, any Confidential Information to anybody without the express prior written approval thereto by CITY POWER.

3.22.2 The SUPPLIER shall restrict access to the Confidential Information only to a limited number of its employees, officers, agents or associates and directors ("representatives") who have a clear need to know the same for the purpose of this Contract.

3.22.3 The SUPPLIER shall be responsible for ensuring that all representatives are underwritten obligation of sufficient scope to obligate them to comply with the terms and conditions of this Contract.

3.22.4 The Confidential Information shall remain the property of CITY POWER and CITY POWER may demand the return thereof at any time upon giving written notice to the SUPPLIER. Within 30 days of receipt of such notice, the SUPPLIER shall return all of the original Confidential Information and shall destroy all copies and reproductions (including in electronic form) in its possession and in the possession of its representatives to whom it was disclosed pursuant to this Contract. The SUPPLIER may however retain one copy of the Confidential Information in its confidential legal files for the sole purpose of identifying and maintaining its obligations under this Contract.

3.22.5 Without derogating from the generality of the foregoing, SUPPLIER hereby binds itself not to do anything, directly or indirectly, which will or may prejudicially affect CITY POWER's position in the markets, local and international.

3.22.6 Each party shall, in respect of information received from the other, employ the same methods and endeavours to prevent such information becoming known to others as they do in respect of their own.

3.22.7 Should there be a breach of the provisions of clause 3.22.1, 3.22.2, 3.22.3, 3.22.4 or 3.22.6 of this CONTRACT, CITY POWER shall, without limiting any other rights that it might have, be entitled to forthwith cancel any CONTRACT that it has with SUPPLIER.

3.23 TRANSPORT

3.23.1 SUPPLIER shall arrange transport in accordance with CITY POWER's instructions which shall be obtained in good time before the transport is required; however CITY POWER may elect to arrange transport.

3.24 FOREIGN CURRENCY

- 3.24.1 SUPPLIER shall arrange forward cover for foreign currency, in accordance with CITY POWER's instructions, however CITY POWER may elect to arrange forward cover for foreign currency.

3.25 JURISDICTION

- 3.25.1 The parties consent to the jurisdiction of the Magistrates Court in proceedings arising from the CONTRACT.
- 3.25.2 The above consent is without prejudice to the right of either of the parties to institute proceedings in any other South African court of competent jurisdiction, at will.

3.26 LABOUR RELATIONS

- 3.26.1 CITY POWER practices labour relations in the spirit of its Mission.
- 3.26.3 SUPPLIER shall do nothing to the detriment of CITY POWER's labour relations or which may prejudice harmonious labour relations on CITY POWER's premises, regardless of whether CITY POWER's labour or the labour of others are involved.
- 3.26.4 SUPPLIER shall not recruit personnel:
- 3.26.4.1 in the employ of CITY POWER or any of its other SUPPLIERS/CONTRACTORS, or their SUB-CONTRACTORS,
- 3.26.4.2 anywhere on CITY POWER's premises without CITY POWER's consent which shall be obtained beforehand in writing.
- 3.26.5 Should SUPPLIER experience any labour disharmony which may have an impact on CITY POWER's operation or SUPPLIER's supply of the GOODS AND SERVICES it shall immediately inform CITY POWER thereof and keep it informed.

3.27 COMPLIANCE WITH LAW AND CITY POWER'S RULES

- 3.27.1 SUPPLIER shall comply with the law.
- 3.27.2 Without limiting the generality of 3.26.1, SUPPLIER shall in particular comply with:
- 3.27.2.1 all laws relating to Security, Safety, Occupational Health and Environment;
- 3.27.2.2 **CITY POWER'S SAFETY AND HEALTH REQUIREMENTS i.e.**
1. CITY POWER maintains high standards with respect to Safety and Health.
2. SUPPLIER may enter areas which may be hazardous.
3. In order to maintain Safety Standards, SUPPLIER shall at all times fully comply with the provisions of the provisions of the Occupational Health and Safety Act 85 of 1993, as amended and all regulations published therewith.
4. No delivery SUPPLIER may enter the premises without a guide.
5. All hazardous materials must be delivered with Safety Data Sheets.
6. If any delivery must take place after hours, the standby person of the Plant or Standby from Procurement and Supply Management must guide the truck to the correct place.
7. After the delivery has been completed it is the responsibility of the guide to ensure that the truck is guided out to the Secondary area.
- 3.27.2.3 The latest revision of all CITY POWER's rules and in particular those relating to Security, Safety, Occupational Health and Environment which SUPPLIER admits it is fully acquainted with,

3.27.2.4 The successful bidder would be required to submit a signed written agreement with CITY POWER on occupational health and safety regulations in accordance with the provision of Section 37 (2) of the Occupational Health and Safety Act 85 of 1993.

3.27.3 SUPPLIER must acquaint itself with CITY POWER's Procurement Policy that is available on request.

3.28 NON-EXCLUSIVITY

CITY POWER shall not in any way be precluded from contracting with any other party the supply of the GOODS AND SERVICES during performance of or after expiration of this agreement.

3.29 CONFLICT OF LAWS

The provision of this CONTRACT shall be governed by South African Law and the parties agree to the inclusive jurisdiction of South African courts.

3.30 PENALTY CLAUSE

3.30.1 CITY POWER may deduct from the Contract Price of the GOODS AND SERVICES concerned an amount equal to 0.5% of outstanding purchase order value for each day beyond the specified delivery time.

3.30.2 In the event that the supplier fails to perform and the penalty clause is imposed for a period of more than four weeks, CITY POWER shall terminate the agreement with immediate effect. The SUPPLIER shall not be entitled to claim for damages or for outstanding amount after the aforesaid termination.

3.30.3 CITY POWER may in its sole and absolute discretion, obtain the GOODS AND SERVICES from other suppliers and provided that the failure to perform is not attributable to any of the circumstances set out in the vis major or casus fortuitous clause, CITY POWER may recover from SUPPLIER any amount by which the price so paid exceeds of the Contract Price of the GOODS AND SERVICES concerned. The cost to CITY POWER if any of collection of GOODS AND SERVICES shall be taken into account in determining the amount of any such excess.

AGREEMENT ON OCCUPATIONAL HEALTH AND SAFETY AND REGULATIONS REGARDING MANDATARIES

1. Background

The Occupational Health and Safety Act 85 of 1993 (OHS Act) (Republic of South Africa) schedules comprehensive requirements for employers such as contractors. The Construction Regulations lay down requirements with respect to clients and designers.

Clients shall, inter alia:

- prepare Health & Safety specification for the construction work
- appoint full-time competent employees in writing
- perform Risk Assessments
- develop a Health and Safety Plan
- train and involve employees on matters pertaining to Health and Safety

2. Purpose

To determine the procedure necessary for the implementation and management of all construction projects to be undertaken.

3. Objectives

- To comply with the provisions of OHS Act section 37(2) in implementing and maintaining an effective control system with regard to managing contractors within city power premises.
- implement and maintain an effective management system for each construction project
- minimize and or mitigate risks and hazards associated with construction activities
- develop a cost-effective program for both the contractor and principal contractor

4. References

- Occupational Health &, Safety Act 85 of 1993 (Construction Regulations)
- Compensation for Injuries and Diseases Act 130 of 1993
- Integrated ISO Management System
- SANS 16001:2013 (Wellness and Diseases Management System)
- Basic Conditions of Employment Act, 1983 (Act 3 of 1983)
- King III Code of Conduct

CITY POWER JHB (SOC) LTD

**WRITTEN AGREEMENT ON OCCUPATIONAL
HEALTH AND SAFETY AND REGULATIONS**

In accordance with the provision of Section 37 (2) of the
Occupational Health and Safety Act 85 of 1993

AS ENTERED INTO BY AND BETWEEN

City Power of Johannesburg (SOC) Ltd
(Hereinafter referred to as "the Employer")

AND

COMPANY

(Hereinafter referred to as "the Mandatory")

WORKMAN'S COMPENSATION FUND NUMBER

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CONTRACT/ORDER NO.

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PART “A”

GENERAL RULES FOR PROMOTING THE HEALTH, SAFETY AND DISCIPLINE OF CONTRACTORS

1. DEFINITIONS

In these rules, unless inconsistent with the context, the following words of expression shall be interpreted to have the following meaning:

1.1 Act

The Occupational Health and Safety Act 85 of 1993

1.2 City Power

City Power Johannesburg (SOC) Ltd

1.3 City Power controlled area

The City Power Loss Control department controls entry to the area of City Power works in Johannesburg including all the areas within the works perimeter security fence.

1.4 City Power premises

The whole of City Power control area, together with all other buildings, land, etc. which are owned, rented or leased by City Power or which in any other way fall under the authority of City Power in Johannesburg area.

1.5 Risk area

An area with a probability that a hazard can result in injury to persons or damage

1.6 Competent person

A person who complies with the definition in the regulations of the Act.

1.7 Authorized person

A competent person employed, appointed and authorized by City Power to perform a specific task, operation or duty.

1.8 City Power authorized person

The authorized City Power official appointed to represent City Power in all matters relating to a particular contractor, sub-contractor or contract works. For matters concerning construction and erection work on City Power premises, City Power’s authorized representative shall be either:

- a. the area manager, team leader, maintenance manager or his/her nominated representative; or
- b. the manager concerned , or his/her nominated representative as indicated to the Contractor in writing at the time of, or subsequent to, the placing of the contract or order, or as indicated to the Contractor’s head representative in writing at the time of or subsequent to, his/her appointment.

1.9 Contractor

Any company, business, firm or individual who has a contract or agreement with or an order from City Power to carry out work or to perform any task or operation for City Power to carry out work or to perform any task or operation for City Power or on City Power premises.

Where appropriate to the context, the word contractor shall be understood to include sub-contractor.

1.10 Sub-contractor

Any company, business, firm or partnership or individual who has a contract or agreement with or an order from a contractor to carry out work or to perform any task or operation for the contractor to carry out work or to perform any task or operation for the contractor or on City Power premises.

1.11 Contract Works

The materials, plant and equipment to be supplied, work to be done and tasks and operations to be performed under terms of a contractor's contractor order from agreement with City Power or a sub-contractor's contract or order from or agreement with a contractor.

1.12 Contractor's head representative

The competent person appointed as a Managing Director, in terms of the Act and as the contractor's head representative and responsible person for the contract works.

1.13 Contractor's employees

Includes any of the following:

- a. any person employed by the contractor or a sub-contractor, including the contractor's head representative.
- b. any person, other than an employee of City Power, who carries out work or performs any task on City Power premises for or on behalf of the contractor or any sub-contractor.
- c. any principal, partner, shareholder, director, consultant, executive, manager, staff member or employee of the contractor or any sub-contractor any contractor's employee, for any reason whatsoever.

1.14 Site or construction site

Includes the following:

- a. the buildings, ground or any other place on City Power premises, in which or over or under which the contract works are to be executed.
- b. any off-loading, stacking or storage areas, yards, workshops, offices, permanent or temporary buildings or other areas erected by, occupied by or allocated to the contractor or sub-contractor for the purpose of carrying out any contract works.

1.15 Regulation

Refers to any rule in these "General Rules" aimed at improving health, safety and discipline of contractors and/or sub-contractors.

1.16 **Rule**

Refers to any rule in these “General Rules” aimed at improving health, safety and discipline of contractors and/or sub-contractors.

1.17 **Gender, singular and plural**

Where consistent with the text, any word in these rules implying the masculine gender shall be interpreted as including the feminine gender and vice-versa.

Similarly, any word implying the singular shall be interpreted as including the plural and vice-versa.

2. **APPLICABLE LEGISLATION**

2.1 City Power premises (offices and depots) are defined as factory, in terms of the Act. Therefore, whilst contractors or sub-contractors or contractor’s employees are on City Power premises, they shall adhere strictly to the requirements of this Act and associated regulations.

2.2 In addition to City Power’s general conditions of contract and the requirements of the Act, these rules are issued in accordance with duties allocated to the Managing Director, as appointed in terms of the Act to draw attention to certain regulations and requirements of the said Act, together with other requirements necessary for safety, health and proper discipline on City Power premises.

2.3 Apart from the Act and Regulations and special instructions issued by the chief inspector, these rules and instructions may be amended, substituted or deleted by authorized City Power officials as and when circumstances and conditions require, in the interest of health and safety and in provision for proper discipline.

2.4 The contractor shall comply with the requirements of the OHS Act and other relevant statutes; Code of Practices; Policies; Standards and Guidelines and Protocols.

3. **ENTERING AND WORKING IN RISK AREAS**

3.1 **Medical Certificate of fitness**

The contractor shall, in compliance with the Act, be responsible for the medical examination of his/her employees and shall provide City Power with written proof that medical examination of his/her employees engaged on the site has been done and that the necessary certificates of fitness have been obtained. These medical examinations shall be conducted before the employee will be allowed to commence working on City Power sites. The Wellness department (City Power) can conduct the examinations at a prescribed fee payable by the contractor.

3.2 **Hazard Identification and Risk Assessment**

Prior to contract work commencing on site, the contractor together with City Power project team shall conduct HIRA’s related to the specific task to be performed. A HIRA shall be completed before the start of commissioning.

3.3 **Safe Work Procedures**

The contractor shall prepare written safe work procedures for all tasks to be performed.

3.4 **Safety Induction Course**

All the contractor’s employees shall attend a safety induction course presented by City Power before commencing work on site

3.5 **Protection Services (Loss Control)**

City Power Loss Control is responsible for the security of and controls the movement of persons on City Power premises. In terms of the Control of Access to Public Premises and Vehicles Act, Act No 53 of 1985, security officers have the authority to arrest, search and question any person without a warrant.

It is expected that the contractor's representative and all contractors employees will give full co-operation to the security officers in the execution of their duties

PART "B"

AGREEMENT ON OCCUPATIONAL HEALTH AND SAFETY AND REGULATIONS REGARDING MANDATARIES

1. **General**

The Mandatory and City Power are individual employers, each in its own right, with duties and obligations prescribed by the Occupational Health and Safety Act 85 of 1993 and Regulations.

The Mandatory accepts, in terms of the general conditions of the contract and in terms of the Act, his/her obligations as an Employer in respect of all persons in his/her employ, other persons on the premises or on the site or place of work to be executed by him/her and under his/her control. S/He shall, before commencement with the execution of the contract work, comply with the procedures stipulated in the Act, and shall implement and maintain a Health and Safety Policy and Programme on the Site and Work for the duration of the contract.

City Power accepts, in terms of the Act, its obligations as an employer of its own employees working on or associated with the site or place of work, and the Mandatory and his/her responsible person shall at all times, co-operate in respect of the health and safety management of the site, and shall agree on the practical arrangements and procedures to be implemented and maintained during execution of work.

2. **Special Permits**

Where special permits are required before work may be carried out such as for work, isolation permits, work permits and occupations, the Mandatory shall apply to City Power Representative or the relevant external Authority for such permit to be issued. The Mandatory shall comply with the conditions and requirements pertaining to the issue of such permits.

3. **Health and Safety Programme**

The Mandatory shall, with his/her tender, submit a Health and Safety Programme setting out the practical arrangements and procedures to be implemented by him/her to ensure compliance by him/her with the Act and Regulations and particularly in respect of :-

(i) the provision, as far as is reasonably practical, of a working environment that is safe and without risk to the health and safety of his/her employees and sub-contractors in terms of section 8 of the OHS Act.

(ii) the execution of the contract work in such a manner as to ensure in terms of section 9 of the OHS Act that persons other than those in the Mandatory's employment, who may be directly affected by the contract work are not thereby exposed to hazards to their health and safety.

(iii) ensuring, as far as is reasonably practical, in terms of section 37 of the OHS Act that no employee or sub-contractor of the Mandatory does or omits to do any act which could be an offence for the Mandatory to do or omit to do.

3.2 The Mandatory's Health and Safety Programme shall be based on a Risk Analysis in respect of the hazards to health and safety of his/her employees and other persons under his/her control, that are associated with or directly affected by the Mandatory's activities in performing the contract work and shall establish precautionary measures as are reasonable and practical in protecting the safety and health of such employees and persons.

3.2.1 The Health and Safety Programme shall include full particulars in respect of:

3.2.1.1 **Reporting**

The Mandatory and/or his designated person appointed in terms of Section 16(2) of the Occupational Health and Safety Act 85 of 1993 (OHS Act) shall report to the Regional Manager and/or representative designated by the Employer prior to commencing the work at the premises.

3.2.1.2 **Compliance**

- (i) In terms of this agreement the Mandatory warrants that s/he agrees to the arrangements and procedures as prescribed by City Power and as provided for in terms of Section 37 (2) of OHS Act for the purposes of compliance thereto.
- (ii) The Mandatory acknowledges that this agreement constitutes an agreement in terms of Section 37 (2) of OHS Act, whereby all responsibility for health and safety matters relating to the work that the Mandatory and his employees are to perform on the premises shall bathe obligation of the Mandatory.
- (iii) The Mandatory further warrants that he and/or his employees undertake to maintain such compliance with the OHS Act. Without derogating from the generality of the above, or from the provisions of the said agreement, the Mandatory shall ensure that the clauses as hereunder described are at all times adhered to by him or her
- (iv) The Mandatory hereby undertakes to ensure that the health and safety of any other person on the premises is not endangered by the conduct and/or activities of all his employees while they are on the premises of City Power
- (v) City Power may terminate this agreement with immediate effect on written notice to the contractor in the event that the mandatory fails to comply with the signed agreement. This may further lead to liquidation, judgement etc.

3.2.1.3 **Mandatory**

The Mandatory shall be deemed to be an employer in his own right while on the premises of City Power. In terms of Section 16 (1) of the OHS Act, the Mandatory shall accordingly ensure that the requirements of the OHS Act are complied with by himself and/or his nominated Managing Director.

3.2.1.4

Appointments and training

The Mandatory shall appoint competent persons as per Section 16 (2) of the OHS Act. Any such appointed person shall be trained on any occupational health and safety matter and the OHS Act provisions pertinent to the work that is to be performed under his responsibility. Copies of any appointments made by the Mandatory shall immediately be provided to the Safety, Health and Environmental Risk (SHEQ) Manager's office.

The Mandatory shall further ensure that all his/her employees are trained on the health and safety aspects relating to the work and that they understand the hazards associated with such work being carried out on the premises. Without derogating from the afore going, the Mandatory shall, in particular, ensure that all his/her users or operators of any materials, machinery or equipment are properly trained in the use of such materials, machinery or equipment.

Notwithstanding the provision of the above, the Mandatory shall ensure that the appointed responsible persons and his employees are at all times familiar with the provisions of the OHS Act, and that they comply with the provisions thereof.

3.2.1.5

Supervision, disciplinary and reporting

The Mandatory shall ensure that all work performed on City Power premises are done under strict supervision and that no unsafe or unhealthy work practices are permitted. Discipline regarding health and safety matters shall be strictly enforced against any of his/her employees regarding non-compliance by such employee with any health and safety matters.

The Mandatory shall further ensure that his/her employees report to him/her all unsafe or unhealthy work situations immediately after they become aware of the same and that he/she in turn immediately reports these to City Power representative.

3.2.1.6

Access to the OHS Act

The Mandatory shall ensure that he/she has an updated copy of the OHS Act on site at all times and that this is accessible to his/her appointed responsible persons and employees, save that the parties may make arrangements for the Mandatory and his/her appointed responsible persons and employees to have access to the Employer's updated copy/copies of the Act.

3.2.1.7

Co-operation

The Mandatory and/or his/her responsible persons and employees shall provide full co-operation and information if and when City Power or a representative inquiry into occupational health and safety issues concerning the Mandatory. It is hereby recorded that City Power or a representative shall at all times be entitled to make such inquiry.

Without derogating from the generality of the above, the Mandatory and his/her responsible person/s shall make available to City Power or a representative/s, on request, all and any checklists and inspection register/s required to be kept by him/her in respect of any of his/her materials, machinery or equipment.

3.2.1.8

Work procedures

The Mandatory shall be entitled to utilize the procedures, guidelines and other documentation as used by City Power for the purposes of ensuring a healthy and safe working environment. The Mandatory shall then ensure that his/her responsible persons and employees are familiar with and utilize the documents.

The Mandatory shall implement safe work practices as prescribed by City Power and shall ensure that his/her responsible persons and employees are made conversant with and adhere to such Safe Work Practices.

The Mandatory shall ensure that work for which a permit is required by the Employer is not performed by his employees prior to the obtaining of such a permit.

3.2.1.9

Health and safety meetings

If required in terms of the OHS Act, the Mandatory shall establish his/her own health and safety committee(s) and ensure that his/her employees, being the committee members, hold health and safety meetings as often as may be required and at least once every three (3) months. City Power may elect to permit the Mandatory's health and safety representatives to attend City Power's health and safety committee meetings.

3.2.1.10

Compensation registration

The Mandatory shall ensure that he/she has a valid registration with the Compensation Commissioner, as required in terms of the Compensation for Occupational Injuries and Diseases Act 130 of 1993 (COIDA), and that all payments owing to the Commissioner are discharged.

The Mandatory shall further ensure that the cover shall remain in force while any such employee is present on the premises

3.2.1.11

Medical Examinations

The Mandatory shall ensure that all his/her employees undergo routine medical examinations and that they are medically fit for the purposes of the work they are to perform.

3.2.1.12

Incident Reporting and Investigation

All incidents referred to in Section 24 of the OHS Act shall be reported by the Mandatory to the Department of Labour and to City Power. City Power shall further be provided with copies of any written documentation relating to any incident.

City Power retains an interest in the reporting of any incident as described above as well as in any formal investigation and/or inquiry conducted in terms of Section 32 of the OHS Act into such incident.

3.2.1.13

Subcontractors

The Mandatory shall notify City Power or a representative of any subcontractor he/she may wish to perform work on the Employer's premises. It is hereby recorded that all the terms and provisions contained in this clause shall be equally binding upon the subcontractor commencing with the work.

Without derogating from the generality of this paragraph:

- [a] The Mandatory shall ensure that training as discussed under Appointments and training, is provided prior to the subcontractor commencing work on City Power premises.
- [b] The Mandatory shall ensure that work performed by the subcontractor is done under strict supervision and discipline, as described under the section Supervision, discipline and reporting.
- [c] The Mandatory shall inform the Employer of any health and safety hazard and/or issue that the subcontractor may have brought to his attention.
- [d] The Mandatory shall inform City Power or a representative of any difficulty encountered regarding compliance by the subcontractor with any health and safety instruction, procedure and/or legal provision applicable to the work the subcontractor performs on City Power premises.

3.2.1.14

Security and Access

The Mandatory and his/her employees shall enter and leave the premises only through the main gate(s) and/or checkpoint(s) designated by City Power. The Mandatory shall ensure that employees observe the security rules of City Power at all times and shall not permit any person who is not directly associated with the work from entering the premises.

The Mandatory and his/her employees shall not enter any area of the premises that is not directly associated with the work.

The Mandatory shall ensure that all materials, machinery or equipment brought by him/her onto the premises are recorded at the main gate(s) and/or checkpoint(s). A failure to do this may result in a refusal by the Employer to allow the materials, machinery or equipment to be removed from the premises.

3.2.1.15

Fire Precautions and Facilities

The Mandatory shall ensure that an adequate supply of fire-protection and first-aid facilities are provided for the work to be performed on the Employer's premises, save that the parties may mutually make arrangements for the provision of such facilities.

The Mandatory shall further ensure that all his/her employees are familiar with fire precautions at the premises, which include fire-alarm signals and emergency exits, and that such precautions are adhered to.

3.2.1.16

Hygiene and Cleanliness

The Mandatory shall ensure that the work site and surrounding area is at all times maintained to a reasonably practicable level of hygiene and cleanliness. In this regard, no loose materials shall be left lying about unnecessarily and the work site shall be cleared of waste material regularly and on completion of the work.

3.2.1.17

Nuisance

The Mandatory shall ensure that neither he nor his employees undertake any activity that may cause environmental impairment or constitute any form of nuisance to the Employer and/or his surroundings.

The Mandatory shall ensure that no hindrance, hazard, annoyance or inconvenience is inflicted on the Employer, another Mandatory or any tenants. Where such situations are unavoidable, the Mandatory shall give prior notice to the Employer.

3.2.1.18

Intoxication

No intoxicating substance of any form shall be allowed on site. Any person suspected of being intoxicated shall not be allowed on the site. Any person required to take medication shall notify the relevant responsible person thereof, as well as the potential side effects of the medication.

3.2.1.19

Personal Protective Equipment

NB: Non-conformance to the PPE Policy and any instruction regarding the use of PPE is regarded as a serious and dismissible misconduct.

The Mandatory shall ensure that his responsible persons and employees are provided with adequate personal protective equipment (PPE) for the work they may perform and in accordance with the requirements of General Safety Regulation 2(1) of the OHS Act, Construction Regulation Sec.4 (e) & (h) and the approved City Power PPE Policy. The Mandatory shall further ensure that his responsible persons and employees wear the PPE issued to them all material times.

The Mandatory shall supply his/her employees with the necessary safety clothing and equipment as required by the areas worked in, which includes amongst others:

- o Hard hats
- o Safety shoes
- o Eye protection
- o Respirators
- o Safety gloves
- o Hearing protection
- o Overalls (fire/acid resistant)
- o Safety harness and any other appropriate PPE relevant to the scope of the activity.

The Mandatory shall ensure that the equipment is maintained in a good condition. In the event of the Mandatory committing a breach of this agreement and failing to remedy such breach within seven (07) days of receiving a Non-Conformance Notice from City Power to remedy such breach, City Power shall be entitled to terminate the contract with immediate effect.

3.2.1.20

Plant, Machinery and Equipment

The Mandatory shall ensure that all the plant, machinery, equipment and/or vehicles he may wish to utilize on the Employer's premises is/are at all times of sound order and fit for the purpose for which they intended, and that it/they complies/comply, with the requirements of Section 10 of the OHS Act.

In accordance with provisions of Section 10(4) of the OHS Act, the Mandatory hereby assumes the liability for taking the necessary steps to ensure that any article or substance that it erects or installs at the premises, or manufactures, sells or supplies to or for the Employer, complies with all the prescribed requirements and will be safe and without risks to health and safety when properly used.

3.2.1.21

Usage of the Employer's Equipment

The Mandatory hereby acknowledges that his employees shall not be permitted to use any materials, machinery or equipment of the Employer unless the prior written consent of the Employer has been obtained, in which case the Mandatory shall ensure that only those persons authorized to make use of same, have access thereto.

3.2.1.22

Transport

The Mandatory shall ensure that all road vehicles used on the premises are in a roadworthy condition and are licensed and insured. All drivers shall have relevant and valid driving licenses and no vehicle shall carry passengers unless it is specifically designated to do so. All drivers shall adhere to the speed limits and road signs on the premises at all time.

In the event that any hazardous substances are to be transported on premises, the Mandatory shall ensure that the requirements of then Regulations for Hazardous Chemical Substances (OHS Act 85 of 1993) are complied with at all times.

3.2.1.23

Clarification

In the event that the Mandatory requires clarification of any of the terms of provisions of this agreement, he should contact the Safety Health and Environmental Risk Department.

3.2.1.24

Duration of Agreement

This agreement shall remain in force for the duration of the work to be performed by the Mandatory and/or while any of the Mandatory's workmen are present on the Employer's premises.

3.2.1.25

Headings

The headings as contained in this agreement are for reference purposes only and shall not be construed as having any interpretative value in themselves or as giving any indication as to the meaning of the contents of the paragraphs contained in this agreement.

In the event of the Mandatory committing a breach of this agreement City Power shall be entitled to suspend and or terminate the Contract with immediate effect as per 11.2.1.2 (v)(Compliance).

Signatories

Thus done and signed at _____ on

for and on behalf of the Employer

for and on behalf of the Mandatory

Witnesses:

1. _____

2. _____

INDEMNITY CLAUSE

I/We the undersigned do hereby indemnify and hold harmless City Power Johannesburg (Pty) Ltd in respect of all loss, damage or injury that may be caused to any premises or to any person or animal by reason of the performance of this contract.

I/We, further indemnify City Power Johannesburg (Pty) Ltd in respect of all legal and other expenses that may be incurred by City Power Johannesburg in examining, resisting or settling any claims which may be made by the third party in respect of any damage, injury or loss that may in any way be occasioned by work necessary in terms of the contract.

BUSINESS NAME AND ADDRESS

NAME OF PERSON AUTHORISED

TO SIGN THIS BID

(Block Letters)

SIGNATURE

WITNESSES (Block Letters)

(1)

(2)

Telephone

Facsimile

DECLARATION OF INTEREST

1. No bid will be accepted from persons in the service of the state¹.

 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 bidder 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 bidder or his or her representative:.....
 - 3.2 Identity Number:
 - 3.3 Position occupied in the Company (director, trustee, shareholder²)
.....
 - 3.4 Company Registration Number:
 - 3.5 Tax Reference Number:.....
 - 3.6 VAT Registration Number:
 - 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.
.....
- ¹MSCM 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) a 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.

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 bidder 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:
.....
.....

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

Full Name	Identity Number	State Employee Number

.....
Signature **Date**

.....
Capacity **Name of Bidder**

CERTIFICATION

I, THE UNDERSIGNED (NAME)

**CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS
CORRECT.**

**I ACCEPT THAT THE STATE MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE
TO BE FALSE.**

.....
Signature

.....
Date

.....
Position

.....
Name of Bidder

MBD5

DECLARATION FOR PROCUREMENT ABOVE R10 MILLION (ALL APPLICABLE TAXES INCLUDED)

For all procurement expected to exceed R10 million (all applicable taxes included), bidders must complete the following questionnaire:

1 Are you by law required to prepare annual financial statements for auditing?

1.1 If yes, submit audited annual financial statements for the past three years or since the date of establishment if established during the past three years.

.....

.....

2 Do you have any outstanding undisputed commitments for municipal services towards any municipality for more than three months or any other service provider in respect of which payment is overdue for more than 30 days?

2.1 If no, this serves to certify that the bidder has no undisputed commitments for municipal services towards any municipality for more than three months or other service provider in respect of which payment is overdue for more than 30 days.

2.2 If yes, provide particulars. ***YES / NO**

.....

.....

.....

.....

3 Has any contract been awarded to you 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?

3.1 If yes, provide particulars. ***YES / NO**

.....

.....

4. Will any portion of goods or services be sourced from outside the Republic, and, if so, what portion and whether any portion of payment from municipality / municipal entity is expected to be transferred out of the Republic?

4.1 If yes, provide particulars. *YES / NO

.....
.....

CERTIFICATION

I, THE UNDERSIGNED (NAME)

CERTIFY THAT THE INFORMATION FURNISHED ON THIS DECLARATION FORM IS CORRECT.

I ACCEPT THAT THE STATE MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

Signature Date

Position Name of Bidder

PREFERENCE POINTS CLAIM FORM IN TERMS OF THE PREFERENTIAL PROCUREMENT REGULATIONS 2017

This preference form must form part of all bids invited. It contains general information and serves as a claim form for preference points for Broad-Based Black Economic Empowerment (B-BBEE) Status Level of Contribution

NB: BEFORE COMPLETING THIS FORM, BIDDERS MUST STUDY THE GENERAL CONDITIONS, DEFINITIONS AND DIRECTIVES APPLICABLE IN RESPECT OF B-BBEE, AS PRESCRIBED IN THE PREFERENTIAL PROCUREMENT REGULATIONS, 2017.

1. GENERAL CONDITIONS

1.1 The following preference point systems are applicable to all bids:

- the 80/20 system for requirements with a Rand value of up to R50 000 000 (all applicable taxes included); and
- the 90/10 system for requirements with a Rand value above R50 000 000 (all applicable taxes included).

1.2

- a) The value of this bid is estimated to exceed/not exceed R50 000 000 (all applicable taxes included) and therefore the..... preference point system shall be applicable; or
- b) Either the 80/20 or 90/10 preference point system will be applicable to this tender (*delete whichever is not applicable for this tender*).

1.3 Points for this bid shall be awarded for:

- (a) Price; and
- (b) B-BBEE Status Level of Contributor.

1.4 The maximum points for this bid are allocated as follows:

	POINTS
PRICE	90
B-BBEE STATUS LEVEL OF CONTRIBUTOR	10
Total points for Price and B-BBEE must not exceed	100

1.5 Failure on the part of a bidder to submit proof of B-BBEE Status level of contributor together with the bid, will be interpreted to mean that preference points for B-BBEE status level of contribution are not claimed.

1.6 The purchaser reserves the right to require of a bidder, either before a bid is adjudicated or at any time subsequently, to substantiate any claim in regard to preferences, in any manner required by the purchaser.

DEFINITIONS

DEFINITIONS

- (a) **“B-BBEE”** means broad-based black economic empowerment as defined in section 1 of the Broad-Based Black Economic Empowerment Act;
- (b) **“B-BBEE status level of contributor”** means the B-BBEE status of an entity in terms of a code of good practice on black economic empowerment, issued in terms of section 9(1) of the Broad-Based Black Economic Empowerment Act;
- (c) **“bid”** means a written offer in a prescribed or stipulated form in response to an invitation by an organ of state for the provision of goods or services, through price quotations, advertised competitive bidding processes or proposals;
- (d) **“Broad-Based Black Economic Empowerment Act”** means the Broad-Based Black Economic Empowerment Act, 2003 (Act No. 53 of 2003);
- (e) **“EME”** means an Exempted Micro Enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;
- (f) **“functionality”** means the ability of a tenderer to provide goods or services in accordance with specifications as set out in the tender documents.
- (g) **“prices”** includes all applicable taxes less all unconditional discounts;
- (h) **“proof of B-BBEE status level of contributor”** means:
 - 1) B-BBEE Status level certificate issued by an authorized body or person;
 - 2) A sworn affidavit as prescribed by the B-BBEE Codes of Good Practice;
 - 3) Any other requirement prescribed in terms of the B-BBEE Act;
- (i) **“QSE”** means a qualifying small business enterprise in terms of a code of good practice on black economic empowerment issued in terms of section 9 (1) of the Broad-Based Black Economic Empowerment Act;
- (j) **“rand value”** means the total estimated value of a contract in Rand, calculated at the time of bid invitation, and includes all applicable taxes;

POINTS AWARDED FOR PRICE

3.1 THE 80/20 OR 90/10 PREFERENCE POINT SYSTEMS

A maximum of 80 or 90 points is allocated for price on the following basis:

$$P_s = 80 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right) \quad \text{or} \quad P_s = 90 \left(1 - \frac{P_t - P_{\min}}{P_{\min}} \right)$$

Where

P_s = Points scored for price of bid under consideration

Pt = Price of bid under consideration

P_{min} = Price of lowest acceptable bid

4. POINTS AWARDED FOR B-BBEE STATUS LEVEL OF CONTRIBUTOR

- 4.1 In terms of Regulation 6 (2) and 7 (2) of the Preferential Procurement Regulations, preference points must be awarded to a bidder for attaining the B-BBEE status level of contribution in accordance with the table below:

B-BBEE status level of contributor	Number of points
1	10
2	9
3	8
4	5
5	4
6	3
7	2
8	1
Non-compliant contributor	0

5. BID DECLARATION

- 5.1 Bidders who claim points in respect of B-BBEE Status Level of Contribution must complete the following:

6. B-BBEE STATUS LEVEL OF CONTRIBUTOR CLAIMED IN TERMS OF PARAGRAPHS 1.4 AND 4.1

- 6.1 B-BBEE Status Level of Contributor: . =(maximum of 10 or 20 points)

(Points claimed in respect of paragraph 7.1 must be in accordance with the table reflected in paragraph 4.1 and must be substantiated by relevant proof of B-BBEE status level of contributor.

7. SUB-CONTRACTING

- 7.1 Will any portion of the contract be sub-contracted?

(*Tick applicable box*)

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

- 7.1.1 If yes, indicate:

- i) What percentage of the contract will be subcontracted.....%
- ii) The name of the sub-contractor.....
- iii) The B-BBEE status level of the sub-contractor.....
- iv) Whether the sub-contractor is an EME or QSE

(*Tick applicable box*)

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

- v) Specify, by ticking the appropriate box, if subcontracting with an enterprise in terms of Preferential Procurement Regulations,2017:

Designated Group: An EME or QSE which is at last 51% owned by:	EME	QSE
Black people	√	√
Black people who are youth		
Black people who are women		
Black people with disabilities		
Black people living in rural or underdeveloped areas or townships		
Cooperative owned by black people		
Black people who are military veterans		
OR		
Any EME		
Any QSE		

SUB CONTRACTING

REQUIREMENTS FOR SUB-CONTRACTING

The Implementation Guide for Preferential Procurement Regulations, 2017 pertaining to the Preferential Procurement Policy Framework Act, Act No 5 2000 states the following;

Paragraph 5.9 states that “Tenderers must, where subcontracting is a prequalification requirement, submit proof of subcontracting arrangement between the main tenderer and the subcontractor. Proof of subcontracting arrangement may include a subcontracting agreement between main tenderer and subcontractor.

Also, paragraph 5.14 states that “It is the responsibility of the tenderer to select competent subcontractors that meet all requirements of the tender so that their tender is not jeopardized by the subcontractor when evaluated. Tenderers are responsible for all due diligence on their subcontractors”.

In line with the above requisites for subcontracting, the tenderer is required to furnish City Power Johannesburg with the following particulars;

- Subcontracting agreement
- Municipal Bidding Document, MBD 4; Declaration of Interest for the Subcontractor
- Central Supplier Database (CSD) Report of the Subcontractor
- BEE certificate/sworn affidavit of the Subcontractor
- Accounts Financials
- Municipal Accounts
- SARS Tax Pin of the Subcontractor

Also, please note the following

- Main contractors/ suppliers are discouraged from subcontracting with their subsidiary companies as this may be interpreted as subcontracting with themselves and / or using their subsidiaries for fronting. Where primary contractor subcontracts with a subsidiary this must be declared in tender documents.
- Tenderers who fail to comply with this requirement would be disqualified.

DECLARATION BY THE COMPANY/FIRM

<p>WITNESSES</p> <p>1.</p> <p>2.</p>	<p>..... SIGNATURE(S) OF BIDDERS(S)</p> <p>DATE:</p> <p>ADDRESS</p>
--	---

DECLARATION BY THE SUB-CONTRACTOR

<p>WITNESSES</p> <p>1.</p> <p>2.</p>	<p>..... SIGNATURE(S) OF SUB- CONTRACTOR(S)</p> <p>DATE:</p> <p>ADDRESS</p> <p>.....</p> <p>.....</p>
--	---

8. DECLARATION WITH REGARD TO COMPANY/FIRM

- 8.1 Name of company/firm:.....
- 8.2 VAT registration number:.....
- 8.3 Company registration number:.....
- 8.4 TYPE OF COMPANY/ FIRM

Partnership/Joint Venture / Consortium
One person business/sole propriety
Close corporation
Company
(Pty) Limited
[Tick APPLICABLE BOX]

- 8.5 DESCRIBE PRINCIPAL BUSINESS ACTIVITIES

.....

- 8.6 COMPANY CLASSIFICATION

Manufacturer
Supplier
Professional service provider
Other service providers, e.g. transporter, etc.
[Tick APPLICABLE BOX]

- 8.7 MUNICIPAL INFORMATION

Municipality where business is situated:

Registered Account Number:

Stand Number:.....

- 8.8 Total number of years the company/firm has been in business:.....

- 8.9 I/we, the undersigned, who is / are duly authorised to do so on behalf of the company/firm, certify that the points claimed, based on the B-BBE status level of contributor indicated in paragraphs 1.4 and 6.1 of the foregoing certificate, qualifies the company/ firm for the preference(s) shown and I / we 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 6.1, the contractor may be required to furnish documentary proof to the satisfaction of the purchaser that the claims are correct;
- iv) If the B-BBEE status level of contributor has been claimed or obtained on a fraudulent basis or any of the conditions of contract have not been fulfilled, the purchaser may, in addition to any other remedy it may have –

- (a) disqualify the person from the bidding 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 bidder or contractor, its shareholders and directors, or only the shareholders and directors who acted on a fraudulent basis, be restricted by the National Treasury 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.

<p style="text-align: center; margin: 0;">WITNESSES</p> <p>1.</p> <p>2.</p>	<p style="text-align: center; margin: 0;">..... SIGNATURE(S) OF BIDDER(S)</p> <p>DATE:</p> <p>ADDRESS</p> <p style="text-align: center;">.....</p>
--	---

DECLARATION CERTIFICATE FOR LOCAL PRODUCTION AND CONTENT

This Municipal Bidding Document (MBD) must form part of all bids invited. It contains general information and serves as a declaration form for local content (local production and local content are used interchangeably).

Before completing this declaration, bidders must study the General Conditions, Definitions, Directives applicable in respect of Local Content as prescribed in the Preferential Procurement Regulations, 2017, the South African Bureau of Standards (SABS) approved technical specification number SATS 1286:2011 (Edition 1) and the Guidance on the Calculation of Local Content together with the Local Content Declaration Templates [Annex C (Local Content Declaration: Summary Schedule), D (Imported Content Declaration: Supporting Schedule to Annex C) and E (Local Content Declaration: Supporting Schedule to Annex C)].

1. General Conditions

1.1. Preferential Procurement Regulations, 2017 (Regulation 8) make provision for the promotion of local production and content.

1.2. Regulation 8.(2) prescribes that in the case of designated sectors, organs of state must advertise such tenders with the specific bidding condition that only locally produced or manufactured goods, with a stipulated minimum threshold for local production and content will be considered.

1.3. Where necessary, for tenders referred to in paragraph 1.2 above, a two stage bidding process may be followed, where the first stage involves a minimum threshold for local production and content and the second stage price and B-BBEE.

1.4. A person awarded a contract in relation to a designated sector, may not sub-contract in such a manner that the local production and content of the overall value of the contract is reduced to below the stipulated minimum threshold.

1.5. The local content (LC) expressed as a percentage of the bid price must be calculated in accordance with the SABS approved technical specification number SATS 1286: 2011 as follows:

$$LC = [1 - x / y] * 100$$

Where

x is the imported content in Rand
y is the bid price in Rand excluding value added tax (VAT)

Prices referred to in the determination of x must be converted to Rand (ZAR) by using the exchange rate published by South African Reserve Bank (SARB) on the date of advertisement of the bid as indicated in paragraph 3.1 below.

The SABS approved technical specification number SATS 1286:2011 is accessible on [http://www.thedti.gov.za/industrial development/ip.jsp](http://www.thedti.gov.za/industrialdevelopment/ip.jsp) at no cost.

1.6. A bid may be disqualified if this Declaration Certificate and the Annex C (Local Content Declaration: Summary Schedule) are not submitted as part of the bid documentation;

2. The stipulated minimum threshold(s) for local production and content for this bid is/are as follows:

Description of services, works or goods

Stipulated minimum threshold

NOTE: BIDDERS HAVE TO COMPLETE ANNEX C PER ITEM/COMMODITY BEFORE COMPLETING ANNEX D and E.

3. Does any portion of the goods or services offered have any imported content?
(*Tick applicable box*)

YES	<input type="checkbox"/>	NO	<input type="checkbox"/>
-----	--------------------------	----	--------------------------

- 3.1 If yes, the rate(s) of exchange to be used in this bid to calculate the local content as prescribed in paragraph 1.5 of the general conditions must be the rate(s) published by SARB for the specific currency on the date of advertisement of the bid.

The relevant rates of exchange information is accessible on www.reservebank.co.za

Indicate the rate(s) of exchange against the appropriate currency in the table below (refer to Annex A of SATS 1286:2011):

Currency	Rates of exchange
US Dollar	
Pound Sterling	
Euro	
Yen	
Other	

NB: Bidders must submit proof of the SARB rate (s) of exchange used.

4. Where, after the award of a bid, challenges are experienced in meeting the stipulated minimum threshold for local content the DTI must be informed accordingly in order for the DTI to verify and in consultation with the AO/AA provide directives in this regard.

LOCAL CONTENT DECLARATION
(REFER TO ANNEX B OF SATS 1286:2011)

LOCAL CONTENT DECLARATION BY CHIEF FINANCIAL OFFICER OR OTHER LEGALLY RESPONSIBLE PERSON NOMINATED IN WRITING BY THE CHIEF EXECUTIVE OR SENIOR MEMBER/PERSON WITH MANAGEMENT RESPONSIBILITY (CLOSE CORPORATION, PARTNERSHIP OR INDIVIDUAL)

IN RESPECT OF BID NO.

ISSUED BY: (Procurement Authority / Name of Institution):

NB

- 1 The obligation to complete, duly sign and submit this declaration cannot be transferred to an external authorized representative, auditor or any other third party acting on behalf of the bidder.
- 2 Guidance on the Calculation of Local Content together with Local Content Declaration Templates (Annex C, D and E) is accessible on http://www.thedti.gov.za/industrial_development/ip.jsp. Bidders should first complete Declaration D. After completing Declaration D, bidders should complete Declaration E and then consolidate the information on Declaration C. **Declaration C should be submitted with the bid documentation at the closing date and time of the bid in order to substantiate the declaration made in paragraph (c) below.** Declarations D and E should be kept by the bidders for verification purposes for a period of at least 5 years. The successful bidder is required to continuously update Declarations C, D and E with the actual values for the duration of the contract.

I, the undersigned, (full names), do hereby declare, in my capacity as of (name of bidder entity), the following:

- (a) The facts contained herein are within my own personal knowledge.
- (b) I have satisfied myself that:
 - (i) the goods/services/works to be delivered in terms of the above-specified bid comply with the minimum local content requirements as specified in the bid, and as measured in terms of SATS 1286:2011; and
- (c) The local content percentage (%) indicated below has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 3.1 above and the information contained in Declaration D and E which has been consolidated in Declaration C:

Bid price, excluding VAT (y)	R
Imported content (x), as calculated in terms of SATS 1286:2011	R
Stipulated minimum threshold for local content (paragraph 3 above)	
Local content %, as calculated in terms of SATS 1286:2011	

If the bid is for more than one product, the local content percentages for each product contained in Declaration C shall be used instead of the table above.

The local content percentages for each product has been calculated using the formula given in clause 3 of SATS 1286:2011, the rates of exchange indicated in paragraph 3.1 above and the information contained in Declaration D and E.

- (d) I accept that the Procurement Authority / Institution has the right to request that the local content be verified in terms of the requirements of SATS 1286:2011.
- (e) I understand that the awarding of the bid is dependent on the accuracy of the information furnished in this application. I also understand that the submission of incorrect data, or data that are not verifiable as described in SATS 1286:2011, may result in the Procurement Authority / Institution imposing any or all of the remedies as provided for in Regulation 14 of the Preferential Procurement Regulations, 2017 promulgated under the Preferential Policy Framework Act (PPFA), 2000 (Act No. 5 of 2000).

SIGNATURE: _____

WITNESS No. 1 _____

DATE: _____

WITNESS No. 2 _____

DATE: _____

DECLARATION OF BIDDER'S PAST SUPPLY CHAIN MANAGEMENT PRACTICES

- 1 This Municipal Bidding Document must form part of all bids invited.
- 2 It serves as a declaration to be used by municipalities and municipal entities in ensuring that when goods and services are being procured, all reasonable steps are taken to combat the abuse of the supply chain management system.
- 3 The bid of any bidder may be rejected if that bidder, or any of its directors have:
 - a. abused the municipality's / municipal entity's supply chain management system or committed any improper 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).

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

Item	Question	Yes	No
4.1	<p>Is the bidder or any of its directors listed on the National Treasury's Database of Restricted Suppliers as companies or persons prohibited from doing business with the public sector?</p> <p>(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).</p> <p>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.</p>	<input type="checkbox"/> Yes	<input type="checkbox"/> No

4.1.1	If so, furnish particulars:		
4.2	Is the bidder or any of its directors 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)?	Yes <input type="checkbox"/>	No <input type="checkbox"/>
	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.		
4.2.1	If so, furnish particulars:		
4.3	Was the bidder or any of its directors 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 <input type="checkbox"/>	No <input type="checkbox"/>
4.3.1	If so, furnish particulars:		
Item	Question	Yes	No
4.4	Do you 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 <input type="checkbox"/>	No <input type="checkbox"/>
4.4.1	If so, furnish particulars:		
4.5	Was any contract between the bidder 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 <input type="checkbox"/>	No <input type="checkbox"/>
4.7.1	If so, furnish particulars:		

CERTIFICATION

**I, THE UNDERSIGNED (FULL NAME)
CERTIFY THAT THE INFORMATION FURNISHED ON THIS
DECLARATION FORM TRUE AND CORRECT.**

**I ACCEPT THAT, IN ADDITION TO CANCELLATION OF A CONTRACT,
ACTION MAY BE TAKEN AGAINST ME SHOULD THIS DECLARATION
PROVE TO BE FALSE.**

.....
Signature **Date**

.....
Position **Name of Bidder**

CERTIFICATE OF INDEPENDENT BID DETERMINATION

MBD 9

- 1 This Municipal Bidding Document (MBD) must form part of all bids¹ invited.
- 2 Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding (or bid rigging).² Collusive bidding is a *pe se* prohibition meaning that it cannot be justified under any grounds.
- 3 Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system, and must enable the accounting officer, among others, to:
 - a. take all reasonable steps to prevent such abuse;
 - b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the municipality or municipal entity or has committed any improper conduct in relation to such system; and
 - c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.
- 4 This MBD serves as a certificate of declaration that would be used by institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.
- 5 In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid:

¹ Includes price quotations, advertised competitive bids, limited bids and proposals.

² Bid rigging (or collusive bidding) occurs when businesses, that would otherwise be expected to compete, secretly conspire to raise prices or lower the quality of goods and / or services for purchasers who wish to acquire goods and / or services through a bidding process. Bid rigging is, therefore, an agreement between competitors not to compete.

CERTIFICATE OF INDEPENDENT BID DETERMINATION

I, the undersigned, in submitting the accompanying bid:

(Bid Number and Description)

in response to the invitation for the bid made by:

(Name of Municipality / Municipal Entity)

do hereby make the following statements that I certify to be true and complete in every respect:

I certify, on behalf of: _____ that:

(Name of Bidder)

1. I have read and I understand the contents of this Certificate;
2. I understand that the accompanying bid will be disqualified if this Certificate is found not to be true and complete in every respect;
3. I am authorized by the bidder to sign this Certificate, and to submit the accompanying bid, on behalf of the bidder;
4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;
5. For the purposes of this Certificate and the accompanying bid, I understand that the word "competitor" shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:
 - (a) has been requested to submit a bid in response to this bid invitation;
 - (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience; and
 - (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder
6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium³ will not be construed as collusive bidding.

7. In particular, without limiting the generality of paragraphs 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 bid;
 - (e) the submission of a bid which does not meet the specifications and conditions of the bid; or
 - (f) bidding with the intention not to win the bid.
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 bid invitation relates.
9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or of the awarding of the contract.

³ **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.**

10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids 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 No 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 ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No 12 of 2004 or any other applicable legislation.

.....
Signature Date

.....
Position Name of Bidder

PART 5.1: EVALUATION CRITERIA

MINIMUM THRESHOLD OF 80% ON TECHNICAL FUNCTIONALITY MUST BE ACHIEVED FAILING WHICH, THE BID WILL NOT BE FURTHER EVALUATION

Bid No:2480GS- DESIGN, SUPPLY, INSTALLATION & COMMISSIONING OF SOLAR ROOFTOP PV & BATTERY STORAGE SYSTEMS FOR CITY POWER		
Mandatory requirements		Yes/ No
1. Technical schedules to be completed in full and signed for all specifications, failure to complete all technical schedules will result in a bid being regarded as non-responsive and will not be considered further.		
2. Provide a valid letter of good standing from the Compensation for Occupational Injuries and Diseases Act (COIDA) from the Department of Labour (Note all copies of certificates must be certified and not older than three months)		
3. Provide a valid certificate of compliance with the Unemployment Insurance Fund (UIF) from the Department of Labour (Note all copies of certificates must be certified and not older than three months)		
4. CIDB requirement minimum of 7EB		
1st Stage Evaluation: a minimum of 80% threshold must be achieved to proceed to the 2nd stage Evaluation will be done in relation to the weighting on a scale of 0-10		
Technical Evaluation:		Weight
1. Design Provide a design as per all the specification provided below, covering the following 1.1 Battery Storage =2. 5 points 1.2 Solar PV =2. 5 points 1.3 Inverter = 5 Points Max score points = 10 points NB Failure to provide battery storage and solar PV design will results in the score of zero (0) point.		25
2. Type Test Reports From the OEMs Provide type test reports in accordance to, 2.1 Battery Storage – IEC 62933-2-1= 5 points 2.2 Solar PV – SANS 61215 = 5 points 2.3 Inverter SANS 62109-2 =5 points Max score points = 10 points NB Failure to provide type test reports for battery storage and solar PV from the OEMs will results in the score of zero (0) point.		40
3. ISO Certificate from the OEMs 3.1 Quality Management Systems :ISO 9001-2015 =4 points 3.2 Environmental Management System: ISO 14001= 4 points 3.3 OHSAS 45001 : 2018 = 2 points Max score points = 10 points NB Failure to provide all three (3) ISOs will results in the score of zero (0) point. Note all certificates must be certified and not older than three months		10
4. Company Experience Provide a minimum of three (3) contactable references of similar projects. 4.1 ≥3 reference letters = 10 points 4.2 2 reference letters = 8 points 4.3 1 reference letter = 5 points 4.4 No reference letter = 0 points Max score points = 10 points Note to bidders: Contactable references that are not on a signed client letter head that includes Duration and scope of work will not be considered. No appointment letters ,contracts or purchased orders will be viewed as reference letters		25
Total		100
2nd Stage Evaluation		
PRICE		80
B-BBEE		20

Maximum of one (1) bidder
NB City Power will require (Certificate of Compliance) COCs for both inverter, Installation and Installer

5.2: SPECIFICATIONS

INTRODUCTION

The power produced by the solar power system is to be injected into the reticulation system at City Power Reuven and is to be used for re-charging the energy storage system and to power the facility.

The energy storage system is to be used for daily energy arbitrage or as backup power for critical loads (situated at City Power Reuven head office block and B block) in the event of power interruption (see appendix A for the City Power Reuven, Head Office load profile to determine the baseline energy consumption of critical loads).

The battery storage is required to cater for up to three (3) hours of power interruption as well as up to three (3) hours of peak demand period shifting (morning and evening peak demand period). The control system must cater for both modes of operation, the default program mode being daily arbitrage, which may be suspended to cater for load shedding avoidance on a daily basis.

The battery will be charged by the solar PV or by the grid. The control system must cater for both re-charging modes, the operational mode will be determined by the economics associated with the cost of solar versus the cost of grid power. At minimum, the battery storage system shall be capable to run as a power island.

This site is located at 40 Henrommere Road, Booysens, and Johannesburg. It consists of various industrial type buildings that mainly serve as workshops or storage areas. The Solar panels will be installed in the carpenters, painters, welders, boilermakers, plumbers and blacksmiths building with a total available space of 5 831 square meters. The site is well accessible from the M1, the M2, the N17 via N1 as well as the N12 freeways. The exact coordinates of Reuven Depot are: 26° 13' 55.03" S, 28° 1' 48.44" E.

Bidders shall provide all the tests certificate as per the specifications and standards provided by City Power in the bid document, including certificate of compliance for the inverter as per NRS 097-2-1, electrical certificate of compliance from the department of labour.

REFER TO ATTACHED PDF DOCUMENTS FOR THE DETAILED SPECIFICATION AND APPENDIX A FOR CITY RUEVEN LOAD PROFILE

5.3: PRICING SCHEDULE

Page 26 is Standard Total Bid Value; the bidder is ALSO required to provide Pricing Breakdown

NOTE: Page 26 is Standard Total Bid Value; the bidder is ALSO required to provide Pricing Breakdown FOR EVERY QUOTED ITEM

5.3.1 PRICING INSTRUCTION

REFER TO ATTACHED PDF DOCUMENT

Prices to be reviewed annually, review are limited to CPI and is subject to City Power accepting the new rates. It need to be bear in mind that prices may also decrease.

Please ensure that the correct annexures are completed in full.

The total value must be written on Page 26 "FORM OF OFFER AND ACCEPTANCE"

5.4 DRAWINGS AND MEASUREMENTS

The Solar panels is to be installed on Welding shop building with a total available space of 5 831 square meters. Also, refer to the attached drawings.



a world class African city



**TITLE: STANDARD FOR ENERGY
STORAGE SYSTEMS**

REFERENCE REV
CP_TSSTAN_150 0
DATE: APRIL 2021
PAGE: 1 OF 17

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FOREWORD

Recommendations for corrections, additions or deletions should be addressed to the:

Technology Services General Manager
City Power Johannesburg (SOC) Ltd
P O Box 38766
BooySENS
2016

INTRODUCTION

Energy storage system (ESS) can be broadly defined as a system or technology that enables energy produced during a certain period to be used at a different period. Energy storage offers a range of opportunities/applications for standalone developers, consumers, generators as well as network operators, and therefore an opportunity for City Power.

1. SCOPE

This specification covers BESS requirements for grid-connected and off-grid storage applications suitable for City Power.

The supplier/contractor shall be fully responsible for selecting suitable energy storage systems for the City Power grid and its satisfactory performance in service.

2. NORMATIVE REFERENCES

The following document contain provisions that, through reference in the text, constitute requirements of this standard. At the time of publication, the editions indicated were valid. All standards and specification are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

IEC 60050 (all parts), International Electrotechnical Vocabulary (available from:

<http://www.electropedia.org>)

IEC 62933-1 Ed. 1: Electrical energy storage (EES) systems – Part 1: Vocabulary

SANS 10228:2012-The identification and classification of dangerous goods for transport by road and rail modes

SANS 60623, Secondary cells and batteries containing alkaline or other non-acid electrolytes –

Vented nickel-cadmium prismatic rechargeable single cells

SANS 60730-1, Automatic electrical controls – Part 1: General requirements

IEC 60812, Analysis techniques for system reliability – Procedure for failure mode and effects analysis (FMEA)

IEC 61025, Fault tree analysis (FTA)

SANS 61427-1, Secondary cells and batteries for renewable energy storage – General

requirements and methods of test – Part 1: Photovoltaic off-grid application

SANS 61508 (all parts), Functional safety of electrical/electronic/programmable electronic safety-related systems

SANS 62133, Secondary cells and batteries containing alkaline or other non-acid electrolytes –

Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications

ANS 62485-1, Safety requirements for secondary batteries and battery installations – Part 1: General safety information

SANS 62485-2, Safety requirements for secondary batteries and battery installations – Part 2: Stationary batteries

SANS 61439, Low-voltage switchgear and control-gear assemblies

SANS 61641, Enclosed low-voltage switchgear and controlgear assemblies - Guide for testing under conditions of arcing due to internal fault

SANS 62040-1, Uninterruptible power systems (UPS) Part 1: General and safety requirements for UPS
SANS 62040-1-2, Uninterruptible power systems (UPS) Part 1-2: General and safety requirements for
UPS used in restricted access locations

IEC 62933-2-1 Ed. 1: Electrical energy storage (EES) systems – Part 2-1: Unit Parameters and Testing
Methods – General specification

IEC 62619, Secondary cells and batteries containing alkaline or other non-acid electrolytes – Safety
requirements for large format secondary lithium cells and batteries for use in industrial
applications¹

IEC 62620, Secondary cells and batteries containing alkaline or other non-acid electrolytes – Secondary
lithium cells and batteries for use in industrial applications

IEC 62897, Stationary Energy Storage Systems with Lithium Batteries – Safety Requirements

SANS 62109-2, Safety of power converters for use in photovoltaic power systems - Part 2: Particular
requirements for inverters

CP_TSSPEC_017, Specification for Miniature Circuit Breakers

CP_TSSPEC_018, Specification for Moulded Case Circuit Breakers

CP_TSSPEC_214, Specification for Protection Relays

3. DEFINITIONS AND ABBREVIATIONS

The definitions and abbreviations in the above documents shall apply to this specification.

4. REQUIREMENTS

4.1. General

4.1.1. The energy storage system shall be of Lithium-Ion or Vanadium Flow battery technologies and
shall be suitable for grid and off-grid applications requirements in table 1.

4.1.2. The battery system shall have life expectancy of 15-20 years rating under normal operating
conditions, suitable for outdoor installation, and a battery management system (BMS).

4.1.3. The system shall be modular and scalable.

4.1.4. The batteries shall be supplied in robust containers.

4.1.5. Battery string connectors shall be insulated and configured for single and multiple unit
installations.

4.1.6. Balancing of a string/module shall be done online without affecting the operation and required
availability of the system.

4.1.7. Any faulty string/module shall be flagged and isolated without affecting the operation and required
availability of the system.

4.1.8. It shall be possible to introduce improved battery technologies / models in future, whether for
augmentation or upgrading purposes, without changing the connection of the existing battery
modules. The Service provider/contractor shall state how this "future-proofing" shall be
accommodated in existing designs in terms of the Energy Management System (EMS), Battery
Management System (BMS) and Power Conversion System (PCS).

4.2. Environmental Conditions

The system shall be suitable to be operated under the following conditions:

4.2.1. At an altitude above sea level up to 1800m

4.2.2. At ambient air temperatures; maximum 40 °C and minimum –10 °C

4.2.3. Relative humidity of not more than 90 %

Table 1: Battery Storage Grid Applications requirements

Application	Description	Response Time	Typical discharge time	Typical size	Charge / Discharge behavior
Peak shaving	Peak shaving to reduce NMD	Minutes	2 – 4 hours	100 kW – 10 MW	50 – 500 cycles per year
Energy Arbitrage	Generating energy at low-cost periods, storing, and selling at peak periods.	Minutes	1 – 6 hours	1 kW – 1 MW	50 – 250 cycles per year
Load levelling / peak shaving for grid upgrade deferral	Reducing limited-time peak loads to assist in maintaining thermal load and voltage within planning limits, thereby deferring network upgrade.	Minutes	1 – 8 hours	1 – 100 MW	10 – 365 cycles per year
Electrification (hybrid PV and storage)	Off-grid systems. Inverter must be capable of grid forming.	Minutes	4 – 12 hours	10 kW – 1 MW	365 cycles per year (charges during middle of day, discharges morning and evening)
Reliability	Micro grid / islanded operation during planned or unplanned system outages. Inverter must be capable of grid forming.	Minutes	1 – 12 hours	1 – 10 MW	< 10 cycles per year
Frequency regulation	Automatic absorption or supply of power during a frequency deviation event	Milliseconds	2 minutes – 1 hour	1 MW – 1 GW	1 000 – 10 000 cycles per year
Renewables smoothing	For small fluctuations in intermittent renewable energy generation.	Seconds	30 minutes – 6 hours	1 – 100 MW	250 – 10 000 cycles per year
Load following	Used to supply or absorb power to compensate for system load variations around the forecast level.	Milliseconds – 1 s	15 minutes – 1 hour	MW – 100 MW	250 – 10 000 cycles per year

The contractor shall include a description of the intended energy storage application/s as requested by City Power. This shall include details and sizing calculations (and or simulations) of how the proposed BESS will meet the anticipated operation scheme for each application. The BESS capacity apportionment to provide the different stacked benefits shall be tabulated and additional benefits shall be stated. Calculation factors to account for operating temperature, expected growth, various discharge rates under various control modes; capacity degradation etc. shall be stated.

4.3. Battery management system (BMS)

- 4.3.1. The BMS shall be designed to ensure automatic, unattended operation of the BESS.
- 4.3.2. The BMS shall provide the necessary monitoring and control to protect the battery cells/module/string from out of tolerance or unsafe operating conditions.
- 4.3.3. The BMS shall automatically control the safe charge and discharge of the individual cells/modules/strings.
- 4.3.4. The BMS shall automatically control balancing between cells/modules/strings (where applicable) to ensure optimised state-of-charge, state-of-health and life expectancy.
- 4.3.5. The BMS shall automatically monitor cell/module/string health and provide critical safeguards to protect the batteries from damage.
- 4.3.6. The BMS shall monitor and report in real time (via SCADA) on the following parameters for each lowest maintainable unit / module:
 - a) State-of-Charge (SoC)
 - b) State-of-Energy (SoE)
 - c) State-of-Health (SoH)
 - d) Battery temperature
 - e) Charge current
 - f) Discharge current
 - g) DC bus voltage
 - h) Cell / Module / Stack voltages (Minimum and maximum)
 - i) Cell / Module / Stack / Electrolyte temperatures (Minimum and maximum)
- 4.3.7. The BMS shall monitor and report in real time (via SCADA) on the following alarm or warning conditions for each lowest maintainable unit / module:
 - a) Over-temperature
 - b) Overcharge
 - c) Over-discharge
 - d) Undercharge

4.4. Power conversion system (PCS)/BESS Inverter

4.4.1. General

- 4.4.1.1. The Power Conversion System (PCS) is the interface between the DC battery system and the AC system and provides for charging and discharging of the battery. It may consist of one or more parallel units.
- 4.4.1.2. The PCS shall function as both an AC→DC power factor controlled rectifier and a DC→AC inverter and can smoothly transition between these operations while in the online state. While acting as a rectifier, it can provide DC power while drawing clean sinusoidal input current with low harmonic distortion from the power grid. While acting as an inverter, it draws DC power and delivers clean sinusoidal current to the power grid.
- 4.4.1.3. The PCS shall consist of solid state electronic switches (IGBTs) along with associated control & protection, filtering, measuring instruments and data logging devices.
- 4.4.1.4. The PCS shall be bi-directional inverter that can provide real and reactive AC power simultaneously with full four quadrant operation.
- 4.4.1.5. The PCS shall comply with SANS 62109-2.
- 4.4.1.6. All LV switchgear and control gear shall comply with the requirements of SANS 61439/CP_TSSPEC_017/CP_TSSPEC_018.
- 4.4.1.7. The ability of the assembly of LV switchgear to limit the risk of personal injury, damage of assemblies and its suitability for further service as a result of an internal arcing fault shall be in accordance with SANS 61641.

4.4.2. System Operation

- 4.4.2.1. The PCS shall be modular and scalable. Hot-plug ability is preferred, but not mandatory. The modules may be rack-mounted facilitating easy and safe handling.
- 4.4.2.2. Multiple PCS shall be capable of operating in parallel, assuming isolation is provided on the AC bus, while maintaining adequate load sharing with failure proof controls.
- 4.4.2.3. The PCS shall operate on the always-on principle where power output is derated based on operating temperature limitations.

4.4.3. Monitoring and Controls

- 4.4.3.1. The PCS shall be capable to adjust the output voltage & frequency to suit the grid condition. The PCS shall be able to synchronize with the grid frequency and provide a stable output – appearing to the grid to be a synchronous generator.
- 4.4.3.2. Suitably rated contactors or equivalent automated disconnecting devices shall be provided for the connection of the inverter input – and output terminals to the battery DC bus and to the three phase AC isolation power transformer, respectively.
- 4.4.3.3. A disconnect switch, with padlock capability, shall be provided for isolation of the inverter from the DC battery string.
- 4.4.3.4. A lockable AC disconnect shall be provided for the connection of the PCS to the isolation power transformer.
- 4.4.3.5. An option for disconnects with visible contacts may be provided upon customer request.
- 4.4.3.6. Suitably rated overcurrent protection devices shall be provided on both the AC and DC buses.
- 4.4.3.7. Communication ports shall be provided for interaction with the BMS and EMS, where applicable.
- 4.4.3.8. Local connection via a computer shall be possible for maintenance purposes.
- 4.4.3.9. All fault conditions and events shall be date-and-time stamped and shall be retained in memory in the event of power loss for later recall.
- 4.4.3.10. The operator interface shall consist of an emergency stop button, a means to enable and disable the system and status indicators.
- 4.4.3.11. The operator interface shall be capable of controlling the PCS, displaying system status, and annunciating any fault conditions.
- 4.4.3.12. Where the PCS is not part of the battery system container / cabinet, it shall be installed in an outdoor rated cabinet.
- 4.4.3.13. The following PCS parameters shall be monitored and reported on in real time for each lowest and High maintainable unit / module:
 - a) DC current
 - b) DC bus voltage
 - c) DC power
 - d) AC phase currents
 - e) AC phase voltages
 - f) Power factor
 - g) AC real power
 - h) AC reactive power
 - i) AC apparent power
- 4.4.3.14. The Service Provider/Contractor shall specify a list of all critical PCS parameters that can be monitored via the EMS.

4.5. Balance of System

- 4.5.1. The Service Provider/Contractor shall list all equipment / sub-systems that make up the balance of plant and indicate how it interfaces with the EMS.
- 4.5.2. All LV switchgear and control gear shall comply with the requirements of SANS 61439/ CP_TSSPEC_017/ CP_TSSPEC_018

4.6. BESS Management and Control

4.6.1. General

Safety management functions and operational management functions shall be embedded at different levels of the BESS.

4.6.2. Energy management system (EMS)

- 4.6.2.1. The BESS management system (also referred to as the Energy Management System) shall facilitate the real time monitoring, operation, control, reliable, efficient and safe operation and performance optimization of the BESS system.
- 4.6.2.2. The EMS shall be able to acquire real time data, status – and alarm information from all critical subsystems necessary for the effective and safe operation of the BESS:
- a) Switchgear (HV/MV or LV)
 - b) Transformers (MV or LV)
 - c) Protection relays and schemes (CP_TSSPEC_214)
 - d) Energy and power meters
 - e) UPS
 - f) Power Conversion System
 - g) Fire System
 - h) GPS Time Synchronisation unit
 - i) Battery Management System
 - j) HVAC system
 - k) Any other equipment deemed necessary
- 4.6.3. The EMS shall display the following system parameters:
- a) Grid Voltages
 - b) Grid Currents
 - c) Power factor
 - d) Apparent Power
 - e) Reactive Power
 - f) Active Power
 - g) System status and alarms
 - h) System temperature
 - i) Ambient temperature
 - j) All other data necessary for operation and fault finding, including diagnostics and self-check functions
- 4.6.3.1. It shall be possible to configure operational settings (e.g. set points, etc.) of all subsystems from the EMS.
- 4.6.3.2. The ramp rate of charging and discharging of the BESS shall be programmable or set to a defined value by manually entering a value into the BESS HMI or by the SCADA system communicating a ramp rate set point.
- 4.6.3.3. All modes of operation and its operational set-point functionality shall be remotely adjustable to allow change in settings and to turn on/off all controls or modes when appropriate.
- 4.6.3.4. The EMS shall log and store critical system parameters, alarms, events and trends required for the effective performance management of the BESS. This data shall be date and time stamped.
- 4.6.3.5. It shall be possible to configure the EMS with user-friendly configuration files.
- 4.6.3.6. It shall be possible to generate, store and retrieve user configurable periodic reports. It shall be possible to generate these reports in MS Office (MS Word or MS Excel) formats.
- 4.6.3.7. The EMS of each BESS installation shall be capable of operating on autonomous control as well as control from a Central SCADA that manages a fleet of installations.
- 4.6.3.8. The EMS shall ensure safe BESS operation under all operating conditions, inclusive of any plant disturbances and component failures.
- 4.6.3.9. The BESS shall remain functional in the absence or loss of communication from the remote controller. The BESS shall continue its current mode of operation for a set time period (variable setting, 15 minutes default). On expiration of the time, the BESS shall standby.
- 4.6.3.10. During an interruption to communications, the remote controller will make repeated attempts to re-establish communications at a set time interval (variable setting, default of 5 minutes). When communications have been re-established, the BESS and remote controller shall make any necessary updates to resume performance.
- 4.6.3.11. The EMS design shall incorporate redundancy to ensure the continued operation of the BESS in the event of the failure of a main processing unit. The vendor shall indicate in the Tender how redundancy is achieved and how will this impact on the HMI and SCADA functionality of the EMS.

- 4.6.3.12. There shall not be redundant communication between the SCADA control centres and the EMS which shall be taken into account in the redundancy design of the EMS (e.g. switch over of SCADA communications between the main EMS and standby EMS).
- 4.6.3.13. Manual (local and remote) intervention shall always be possible at any stage of operation in compliance with the following priority assignment: Protective commands shall have priority over manual command and manual commands shall prevail over automatic commands.
- 4.6.3.14. The control algorithms shall be designed to fulfil primary use cases and optimise stacked benefits.
- 4.6.3.15. The EMS shall be capable of computing and displaying business case benefit in the form of cumulative revenue earned and operating costs incurred, for the life of the asset. Revenue shall be based on contracted earning formulas and costs shall be based on energy costs and operating and maintenance costs. These figures shall be included in the reporting and analytics capability of the installation.
- 4.6.3.16. The EMS shall be capable of keeping track of how the BESS perform compared to warranty requirements and report on exceptions.
- 4.6.3.17. Taking into account the manufacturer's expected lifespan of the installed battery technology, the time and date at which the unit was commissioned, the number of charge and discharge cycles, the depth of discharge etc. the EMS shall be able to indicate the estimated remaining lifespan of a battery cell, rack and/or string.
- 4.6.3.18. The EMS shall also indicate based on the estimated lifespan what the maximum charge/discharge capability of each battery cell, rack and/or string is as a percentage (with 100% representing the designed charge/discharge capacity of the battery when new).

4.6.4. Human Machine Interface (HMI)

- 4.6.4.1. The BESS system shall provide a local HMI in the BESS control room which will provide a facility to locally control the system while providing a view of the plant statuses and alarm conditions at the station.
- 4.6.4.2. The HMI shall provide a graphical interface for monitoring and control of the substation. The HMI shall allow the battery and electrical system to be drawn with the appropriate status points and alarms being indicated. It shall be IEC approved electrical components/symbols be used/supported on the HMI drawing tool (e.g. bi-directional converter symbol, energy storage device symbol).
- 4.6.4.3. It is preferred that the ability to access settings and configure BESS subsystem components is possible via the HMI.
- 4.6.4.4. The HMI system shall be rated for 24/7 continuous use.
- 4.6.4.5. All interactions (viewing and control) of the HMI shall be done via a display (non-touch/touch).
- 4.6.4.6. The HMI hardware and display shall be suitably rated for operation in the harsh environments in which it will be installed in.
- 4.6.4.7. The life expectancy of the HMI hardware shall be greater than 10 years.
- 4.6.4.8. Fanless, redundant solid state drives shall be provided.
- 4.6.4.9. The HMI shall be remotely accessible from the City Power Network.
- 4.6.4.10. It is recommended that the HMI support a web-based view that can be served to external web-browsers. If supported, such functionality shall use HTML5.
- 4.6.4.11. A safety requirement of this system is that the HMI from which the City Power/third party operator can monitor and control the BESS system shall be located in an environment that is free of equipment that can cause any harm to the operator during their operating processes (e.g. switches, inverters, battery banks).
- 4.6.4.12. It is recommended that all incorrect operations shall be indicated to the operator by suitable text messages on the HMI screen.
- 4.6.4.13. All control functions relating to output data (i.e. control of primary plant) shall include a confirmation window to ensure accidental operations are avoided.
- 4.6.4.14. All control actions initiated via the local HMI shall be subject appropriately interlocked to ensure safety to person and plant at all times.
- 4.6.4.15. The HMI shall support the viewing of this Sequence of Event data captured by via a Gateway.

4.6.5. GPS Time Synchronisation Device

The BESS shall include a Global Positioning System (GPS) Time Synchronisation unit (master clock) suitable for use in substation/industrial environments for the purposes of time synchronising all the devices and events within the BESS.

4.6.6. Power Supplies Requirements

- 4.6.6.1. There shall be no equipment malfunction, damage or spurious event, under any of the following conditions:
- a) As a result of the loss or restoration of supply.
 - b) As a result of an under-voltage (-20%) or over-voltage (20%) condition of the nominal voltage supply.
 - c) If either AC or DC supplies to the unit are switched off and on repeatedly at a random rate.
 - d) Short interruptions on any of the power supply voltages for not longer than 20ms occurring in a random sequence for a period of no longer than 20s.
- 4.6.6.2. All critical sub-systems shall be powered from an UPS in order to remain operational in the event of an auxiliary power supply failure. This is necessary to ensure the safe shutdown of the BESS and also to enable continued remote monitoring and control from the Network Management Centre.
- 4.6.6.3. The UPS shall comply with the requirements of IEC 62040-1 and IEC 62040-1-2.
- 4.6.6.4. The power supplies shall have the necessary over-temperature protection, current overload cut-outs and over-voltage limiting, with automatic reset on removal of the fault.
- 4.6.6.5. If the EMS Gateway is supplied from a DC source, the noise measured across the power supply terminals of the equipment under test shall not be greater than 2 mV peak-to-peak or -58dBV (0dBV = 0,775V).
- 4.6.6.6. The power supply unit shall provide galvanic isolation between the primary supplies and the electronic circuitry.
- 4.6.6.7. The output terminals for powering the external DCE/converters shall be capable of accepting 2,5mm² cable.

4.6.7. System Operation

- 4.6.7.1. When the auxiliary power supply to the control system fails and cannot be maintained by any other means, the control system shall shutdown the BESS in a safe manner.
- 4.6.7.2. The BESS control system shall be designed to provide for automatic, unattended operation of the BESS. However, the control system design also shall provide for local manual operation, remote operation, or dispatch of the BESS from City Power's SCADA system or remote access point.

4.7. EMS/BESS SCADA gateway

- 4.7.1. Consideration shall be given to 'tried and tested off-the-shelf' solutions/equipment and firmware.
- 4.7.2. The Gateway hardware shall be suitably rated for operation in the harsh environments.
- 4.7.3. The life expectancy shall be greater than 10 years.
- 4.7.4. The BESS SCADA Gateway shall comply with the requirements specified in Grid connection code for Renewable Power Plants connected to the Electricity Transmission System (TS) or the Distribution System (DS) in South Africa.

4.8. Safety Requirements

- 4.8.1. The service provider/contractor shall identify and classify any dangerous substance/s in the BESS as per SANS 10228. Any claims of no hazardous / dangerous substances shall be supported with applicable certification or expert, 3rd party assessment reports.
- 4.8.2. The ability of the assembly to limit the risk of personal injury, damage of assemblies and its suitability for further service as a result of an internal arcing fault shall be in accordance with SANS 61641.

5. LABELLING

The system description shall cover the following information:

- 5.1. BESS type / classification (either Lithium-Ion or Flow battery).
- 5.2. BESS Chemistry.
- 5.3. Identify and classify any dangerous substance/s in the BESS as per SANS 10228. Any claims of no hazardous / dangerous substances shall be supported with applicable certification or expert, 3rd party assessment reports.
- 5.4. Battery Nameplate Energy rating [kWh] – from smallest cell, module, string, container to full system.
- 5.5. Battery Nameplate Power rating [kW] – from smallest cell, module, string, container to full system.
- 5.6. Number of battery cells, modules, strings and how they are aggregated to the complete systems.
- 5.7. Information on the internal cells or stack are to be provided including specifics of the technology, cell format, electrolyte, electrical rating of the cell or stack, and how many are contained within a full battery.
- 5.8. Internal resistance (i.e. the resistance to power flow of the ESS during charge and discharge)
- 5.9. Tank configuration and sizes (for flow batteries). Labelling sub-section
- 5.10. A complete description (inclusive of their functions) of the balance of plant components such as cooling systems, controls including BMS, pumps, etc.
- 5.11. Complete footprint [m²] – i.e. physical dimensions with all components in place. Labelling sub-section
- 5.12. System placement configuration e.g. stacked or side-by-side or back-to-back, etc.
- 5.13. Battery manufacturer, model or part number. Labelling sub-section
- 5.14. Date of manufacture.
- 5.15. PCS manufacturer, model or part number, nameplate power rating [kW], modularity and number of PCSs, hardware and software versions. Labelling sub-section
- 5.16. BMS supplier, model or part number, hardware and software versions. Labelling sub-section
- 5.17. EMS supplier, model or part number, hardware and software versions
- 5.18. Photos, diagrams, drawings and schematics should be provided to give a complete description of the full system.

6. TESTS

6.1. General

- 6.1.1. The supplier shall cover the cost of all testing required and is requested to provide City Power with the details of when and where these tests will be conducted.
- 6.1.2. All type testing shall be done at accredited local test facilities or accredited international testing authorities/facilities, unless otherwise permitted for specific BESS.
- 6.1.3. Only type tested and service proven BESS designs (all components) shall be tendered and accepted for use by City Power.
- 6.1.4. Service provider/contractor shall submit all the required type test reports. Certification and type test reports shall be applicable to the system/solution being proposed.
- 6.1.5. If the units offered have been tested for compliance with an internationally accepted standard, City Power may accept those test reports in place of the tests covered by this specification. These type test reports and alternative test standards shall be submitted with the service provider/contractor, for City Power's consideration. However, the Service provider/contractor shall state clearly the difference between the requested standard and the offered standard by way of a tabulated comparison. This shall also be noted on the deviation schedule.
- 6.1.6. The FAT, SAT and routine tests procedures shall be agreed to between City Power and the manufacturer or supplier of the equipment.
- 6.1.7. The service provider/contractor shall provide FAT, SAT and routine/periodic tests procedures and schedules for previous BESS projects that have been executed.

6.2. Type Test

6.2.1. BESS component type test certificates and type test reports shall be provided in the tender submission.

6.2.2. Type test reports and certification of the entire energy storage system, whereby the individual components are integrated into the system providing overall system functionality shall be provided in the tender submission.

6.3. Factory acceptance test

The factory acceptance tests (FAT) are tests conducted at the manufacturers premises prior to equipment release and dispatch to the customer. The tests are conducted on each BESS unit/components to verify the manufacturer's declared equipment performance criteria and rectify any defects arising on the equipment prior to dispatch to the customer.

6.3.1. As a minimum, factory acceptance test certificates shall be provided for the following components:

- a. Battery modules;
- b. Power Converters;
- c. Transformers
- d. Control and Management systems.

6.3.2. The manufacturer or supplier shall perform a pre-FAT according to the accepted Factory Acceptance Test (FAT) Procedure.

6.3.3. The pre-FAT and, FAT procedures shall include as a minimum the following:

- a. Proposed FAT
- b. Testing methodology and set up process
- c. Tests to be performed
- d. Test acceptance criteria.

6.3.4. The FAT shall only commence once City Power has approved this pre-FAT report and results. The manufacturer or supplier and City Power shall agree upon a date when formal FAT shall commence. The testing shall then be carried out in accordance with the FAT procedure.

6.3.5. In the event of any tests malfunctioning, City Power may elect to restart the complete test procedure from the beginning.

6.3.6. City Power may elect to conduct an unstructured testing programme (Free-form Tests), at its discretion, on the manufacturer or suppliers premises for a duration of two weeks. This two-week period shall not include the time taken to repair any faults.

6.3.7. The manufacturer or supplier, at no extra charge to City Power, shall correct any errors detected.

6.3.8. Once City Power has satisfied itself that the system has passed the prescribed tests, the BESS unit(s) shall officially be released for factory dispatch.

6.4. Site acceptance test

6.4.1. After delivery of the BESS unit to the pre-determined City Power site, the Supplier, assisted by the City Power where agreed, shall install the equipment in a substation in accordance with the applicable standards and OEM manuals.

6.4.2. The SAT procedures shall include as a minimum the following:

- a. Proposed SAT
- b. Testing methodology and set up process
- c. Tests to be performed
- d. Test acceptance criteria.

6.4.3. The manufacturer or supplier shall make available at no extra charge to City Power the relevant hardware, software and/or system specialist.

6.4.4. For a period of one month after the successful completion of the formal SAT, the equipment shall be subjected to a soak test.

6.4.5. In the event of any non-conformance being detected, the manufacturer or supplier shall be required to commence the correction of the errors within a 72 h period. Only on completion of the correction procedure, the one-month test and soak test period shall commence.

6.4.6. In the event that fundamental error(s) are detected and depending on the nature of the fault, City Power may at its sole discretion elect to restart the SAT.

6.5. Functionality and Performance Tests

6.5.1. Performance of the BESS or subsystems shall be conducted by agreed to testing methodologies, thereby verifying that the declared BESS parameters are in accordance with customer applications and technical requirements.

6.5.2. Performance tests of the BESS shall conform to:

- a) IEC 62933-2-1: Electrical energy storage (EES) systems – Part 2-1 and
- b) IEEE Std 2030.3-2016 Standard Test Procedures for Electric Energy Storage Equipment and Systems for Electric Power Systems Applications, whereby the BESS parameters, system performance and system implementation shall be tested and verified at various life cycle phases in the BESS development.

6.5.3. In compliance to IEEE Std 2030.3-2016 Standard Test Procedures for Electric Energy Storage Equipment and Systems for Electric Power Systems Applications, the BESS system functionality shall be proven at various phases of the BESS development.

6.5.4. The Service Provider/Contractor shall confirm conformance to the minimum following functionality tests in Table 2 and deviations to the testing IEC/IEEE methodology or declared values shall be provided in the deviation schedule.

Table 2: Minimum BESS Test Overview

Item	Test Description	IEC 62933-2-1 Sub-clause	Type Test	FAT	SAT	Routine Tests
1	Environmental Conditions	5.1.2 & 5.1.3	✓			
2	Actual energy test	6.2.1	✓	✓	✓	✓
3	Input and output power rating test	6.2.2	✓	✓	✓	✓
4	Roundtrip efficiency test	6.2.3	✓	✓	✓	✓
5	Expected service life test	6.2.4	✓			✓
6	Dynamic Tests					
6.1	System response test		✓			✓
6.2	Step response time test	6.2.5	✓			✓
6.3	Ramp rate test		✓			✓
7	Auxiliary Power	6.2.6	✓			✓
8	Self-Discharge ESS system test	6.2.6	✓			
9	Rated voltage and frequency test	6.2.8	✓	✓		
10	Visual Inspection	6.4.1	✓		✓	✓
11	Continuity and validity of the Conductors	6.4.2	✓		✓	
12	Earthing test	6.4.3	✓		✓	
13	Insulation test	6.4.4	✓		✓	
14	Protection Device Test	6.4.5	✓	✓	✓	✓
15	Equipment and basic function test	6.4.6	✓		✓	✓
16	Grid connection compatibility test	6.4.7	✓		✓	
17	Voltage Immunity Test	6.4.7.2	✓			
18	Available Energy test	6.4.8	✓			
19	EMC immunity test	6.4.9	✓			
20	Voltage Unbalance (IEEE 2030)		✓			✓
21	Unintentional Islanding (IEEE 2030)		✓			✓

7. QUALITY MANAGEMENT

A quality management system shall be set up in order to assure the quality during manufacture, installation, removal, transportation and disposal of scrap material/Waste/E-waste. Guidance on the requirements for a quality management system may be found in the following standards: ISO 9001:2015. The details shall be subject to agreement between the purchaser and supplier.

8. ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to ensure the proper environmental management and compliance is adhered to during manufacture, installation, removal, transportation and disposal of scrap material/Waste/E-waste. Guidance on the requirements for an environmental management system shall be found in ISO 14001:2015 standards. The details shall be subject to agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy.

9. HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance during manufacture, installation, removal, transportation and disposal of scrap material/Waste/E-waste. Guidance on the requirements of a health and safety plan shall be found in OHSAS 18001:2007/ ISO 45001:2018 standards. The details shall be subject to agreement between City Power and the Supplier.

ANNEXURE A - BIBLIOGRAPHY

240-139687256: Battery Energy Storage Systems for Grid-Scale Applications-Eskom

ANNEXURE B: Revision Information

DATE	REV. NO.	NOTES
April 2021	0	First issue.



Reuven Electrical Workshop

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**TITLE: SPECIFICATION FOR PHOTOVOLTAICS
MODULES**

REFERENCE	REV
CP_TSSPEC_303	0
DATE: SEPTEMBER 2021	
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FOREWORD

Recommendations for corrections, additions or deletions should be addressed to the:

Research and Asset Development General Manager

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BooySENS

2016

INTRODUCTION

City Power has implemented sustainable energy solutions to offset the energy usage of their depots by using more sustainable energy solutions. This is in accordance with the current IRP/VUCA strategy plan towards a greener economy to lower the energy demand of City Power and City owned buildings from the grid.

1. SCOPE OF WORK

The document covers only the requirements for the equipment to be used, i.e., solar PV modules. The detailed design of plant, Procurement, Construction, Commissioning is not covered in this document. All works shall be executed as described in the specifications, as well as all other supplies or works as deemed necessary for a complete and functional Solar PV system. The work shall be carried out in compliance with relevant Environmental Requirements.

2. NORMATIVE REFERENCES

The following documents contain provisions that, through reference in the text, constitute requirements of this specification. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

- SANS 61215: Design qualification and type test approval (Crystalline)
- SANS 61730: Photovoltaic (PV) module safety qualification
- IEC 61701: Salt mist corrosion testing of photovoltaic modules
- IEC 62716: Ammonia corrosion testing of photovoltaic modules
- IEC 62759-1: Transportation testing pf photovoltaic modules

3. ABBREVIATIONS

DC- Direct current
EVA- Ethylene vinyl acetate
IRP – Integrated resource plan
kWp- Kilowatt peak

PV-Photovoltaic

MW-Mega watt

STC –Standard test condition

VUCA-Volatility, uncertainty, complexity, and ambiguity

Wp- Watt peak

4. REQUIREMENTS

4.1 General

This chapter describes the detailed specifications of the required Solar PV Module for the project. The Contractor is responsible for ensuring that each line item specification is adhered to in the provision of all equipment and material.

The PV Modules specified shall be a low Iron glass laminate using crystalline technology with a minimum of 60 cells. The glass laminate shall use a high grade EVA laminate material. Preferably, fly lead interconnects shall be used inclusive of an IP65 or IP67 or IP68 junction box rated which includes bypass diode protection. Furthermore, the PV module shall be framed with a sturdy anodized Aluminium frame with easy mounting holes and an earth connection.

4.2 PV MODULE

The Photovoltaic (PV) modules shall meet the following minimum requirements:

- 4.2.1 The module rated peak power shall be ≥ 355 Wp at STC (25°C). The peak power shall be of the manufacturer's name plate data sheets for each individual module
- 4.2.2 The modules shall be crystalline material with a minimum module efficiency $\geq 17.5\%$
- 4.2.3 Crystalline modules shall meet SANS 61215 of class II: Crystalline (mono) PV modules — Design qualification and type approval.
- 4.2.4 A certificates stating compliance to the relevant standard above shall be submitted
- 4.2.5 The module shall have a minimum performance guarantee of 80% for the

required design life of 25 years under any prevailing site environmental conditions

4.2.6 Preference shall be given to Bloomberg listed Tier 1 manufacturers or a manufacturers who has 5 years' experience producing at least 150MW PV modules per year. (Tier 1 in this context refers to the Tier 1 list of Bloomberg New).

4.2.7 The PV module shall be on the PVEL and PV-Tech score or shall pass their tests in addition to SANS 61215.

4.2.8 The tolerance of the rated output of the PV modules offered shall be - 0/+5%

4.2.9 Sample of Flash test reports for modules shall be made available to City Power with the actual certificates of modules installed prior to installation stage

4.2.10 Labelling: each module shall be labelled indicating: Manufacturer, model number, serial number, maximum power point watt rating ($V_{peak} \pm$ tolerance), maximum power point current, maximum power point voltage, open circuit voltage and short circuit current of each module and the maximum system voltage.

4.2.11 Each module shall be factory equipped with output cables which are connected in a weather proof junction box. The cables shall be a suitably rated solar cable.

4.2.12 The modules shall be framed with an anodised aluminium frame in such a way as to allow secure fastening to the PV array mounting structure.

4.2.13 All PV modules shall be of the same type, size and age hence interchangeable.

5 MATERIAL AND INSTALLATIONS

5.1 PV module clamping points

- 5.1.1 PV modules shall be installed according to the manufactures instruction to avoid damage by an accredited installer.
- 5.1.2 The mechanical stress test according to SANS 61215, the module shall be mounted as per the manufacturer's and load of 2400 Pa (push and pull 3 times) is applied
- 5.1.3 Sufficient distance between the modules to avoid needless loads shall apply
- 5.1.4 Module clamps shall be correctly selected and fit securely on the module frame

5.2 Connectors

- 5.2.1 The solar PV connectors shall be MC4 male and female connector type

5.3 Cables

- 5.3.1 Cables shall be UV-resistant, double insulated, ozone-resistant, temperature resistant, rubber type cable, and equivalent to 4 mm² to 6mm² solar cables

5.4 Outside cable laying

- 5.4.1 Module cables and connectors shall not lie on the roof
- 5.4.2 UV protection shall be used if cables are exposed directly to the sun

5.5 Cable inlet

- 5.5.1 Cable laying shall be done under consideration of fire protection and existing thermal installation

5.6 Inside cable laying

- 5.6.1 Cables and other components shall be clearly marked

5.7 Hooks

- 5.7.1 Number and position of the hooks shall be determined by structural analysis, rafter spacing and tile dimensions.
- 5.7.2 Screws shall withstand the loads

5.8 Rail Mounting

- 5.8.1 Rail cutting: preferably on the ground to avoid metal scarf on the roof

5.8.2 A circular saw shall be used as compared to angle grinder

6 ROUTINE MAINTENANCE OF PHOTOVOLTAIC MODULES

Maintenance for the Solar PV systems shall be done monthly. This includes cleaning the panels and checking all system components. Any issues raised with system components are brought to awarded contactors' attention and then rectified via a report after site inspection.

Maintenance may be required at a higher rate should the performance of the system dip below the desired outcome.

6.1 Constant monitoring

The PV modules shall be constantly monitored, and informed via email if any faults occur. There shall be a 24 hour reaction time to any fault condition.

6.2 Monthly checks

Maintenance of the PV modules shall be cleaned monthly to keep the production high and the following maintenance shall be done:

6.2.1 Panel cleaning (cleaned with purely water and micro-fibre brushes)

6.2.2 String test (tested with 1000V multimeter)

6.2.3 Infrared images of electrical connections

6.2.4 Overall system overview (cracks or loose connections etc.)

6.3 Annual service

The annual service report shall provide preventative maintenance procedures to ensure the validity of any warranties on the system. It shall comprised mechanical and a portal (any approved/accepted software) report.

6.3.1 Mechanical Inspection

- i) Ensure all penetrations are watertight.
- ii) Check for vegetation growth, accumulation & shading.
- iii) Confirm safety signage in place as per construction file.
- iv) Confirm all electrical enclosures secure, locked and have required signage.
- v) Check all conduits/cable trays and ensure secure and in good condition.
- vi) Check for corrosion on any enclosures/trays/conduit/structure.

vii) Check for corrosion at all cable entry/exit points to conduit.

6.3.2 Array/Module inspection:

- i) Check all panels for damage/cracks, water ingress and potential hot spots.
- ii) Inspect general condition of roof sheet structure and report any signs of loose connections.
- iii) Torque all middle and end clamps to manufacturers specifications using torque wrench or similar.
- iv) Check for corrosion on any enclosures structure.
- v) Check for signs of animal drops in array.
- vi) Check labelling on cable trays and cables in order.

6.4 Earthing:

6.4.1 Check that all earthing along trunking/cable trays is present and tight.

6.4.2 Lightning protection: check finials and other protection devices are in good condition

6.4.3 Conduct grounding tests on all earthing points

7 TRAINING

7.1 The suppliers shall provide comprehensive training courses on the configuration, installation, operation and maintenance of its vending.

7.2 The suppliers shall provide technical support on vending system's and equipment queries for the duration of the contract

7.3 User, Functional & System Support Training

7.3.1 Technical system support training for City Power employees

7.3.2 Training on DQM operations/monitoring/control for the managers/supervisors/data stewards

7.3.3 The service provider shall provide a copy of the training materials and user documentation to the City Power in an electronic readable and printable format.

8. QUALITY MANAGEMENT

A quality management system shall be set up in order to assure the quality during manufacture, installation, removal, transportation and disposal of scrap material/Waste/E-waste .Guidance on the requirements for a quality management system may be found in the following standards: ISO 9001:2015. The details shall be subject to agreement between the purchaser and supplier.

9. HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance during manufacture, installation, removal, transportation and disposal of scrap material/Waste/E-waste. Guidance on the requirements of a health and safety plan shall be found in OHSAS 18001:2007/ ISO 45001:2018 standards. The details shall be subject to agreement between City Power and the Supplier.

10. ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to ensure the proper environmental management and compliance is adhered to during manufacture, installation, removal, transportation and disposal of scrap material/Waste/E-waste. Guidance on the requirements for an environmental management system shall be found in ISO 14001:2015 standards. The details shall be subject to agreement between City Power and the Supplier.

This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy.

ITEM No. 1 SAP No.: PV Modules 355Wp

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

Item No.	Description	Unit	Required	Tendered
1	Product information			
1.1	Manufacturer			
1.2	Product Type			
2	PV Module Characteristics			
2.1	PV Module technology	N/A	Crystalline(Mono)	
2.2	Module rated power (c-si)	Wp	$\geq 355 \text{ Wp} / \geq 370 \text{ Wp}$	
2.3	Module Efficiency	%	$\geq 17.5\%$	
2.4	Temperature coefficient on Pmpp (negative on sign)	- %/°C	$\geq -0.38\%/^{\circ}\text{C}$	
2.5	Nominal Power Tolerances from Manufacturer (used for acceptance to the module)	± %	$0\% \leq P_{nom} \leq +5\%$ (positive tolerance only)	
2.6	Module Maximum System Voltage	V	48V	
3	Product Warranty and Performance Guarantee			
3.1	Power output guaranteed during the first year of operation	%	Minimum : 97%	
3.2	Linear degradation coefficient after year 1 to year 25	%/year	Maximum degradation of -0.7%/year	
3.3	Guaranteed output of the nominal power after 10 years	%	Minimum 90%	
3.4	Guaranteed output of the nominal power after 25 years	%	Minimum 80%	
3.5	Product Warranty against Manufacturing defects	Years	Minimum 10	
4	Minimum Certificates for acceptance of PV modules			

Item No.	Description	Unit	Required	Tendered
4.1	IEC 61730- Photovoltaic (PV) module safety class II qualification	N/A	Required	
4.2	IEC 61730-2 Testing requirements for PV modules in order to provide safe electrical and mechanical operation	N/A	Required	
4.3	SANS 61215 – PV module safety certification	N/A	Required	
4.4	UL 1703- Fire resistance rating is acceptable	N/A	Required	
4.5	CE-European conformity if exported	N/A	Required	
4.6	PV Cycle-recycling approved waste disposal	N/A	Required	
4.7	ISO 9001:2015/Quality management system	N/A	Required	
4.8	ISO 14001:2015/Standards for environmental management system	N/A	Required	
4.9	OHSAS18001:2007/international standard for occupational health and safety	N/A	Required	
5	Documentation for evaluation of PV modules			
5.1	Detailed Technical Specifications	N/A	Required	
5.2	Limited Product and Peak Power Warranty	N/A	Required	
5.3	Installation, Operation and Maintenance manual	N/A	Required	
5.4	Description of the cleaning strategy Instruction	N/A	Required	
5.5	Recycling strategy	N/A	Required	
5.6	Flash Test Report	N/A	Required	

5.7	Potential Induced Degradation (PID) free test report	N/A	Required	
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DEVIATION SCHEDULE:

ITEM No. 1 SAP No.: PV Modules 355WP

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item No.	Sub-clause of ?	Proposed deviation

ANNEX A – Bibliography

PV GREECARD Training Material: 2019

**SPECIFICATION FOR SOLAR PHOTOVOLTAIC
MODULES**

REFERENCE CP_TSSPEC_303 **REV** 0

PAGE 14 **OF** 14

Annex B - Revision information

DATE	REV. NO.	NOTES
AUGUST 2021	0	First issue



**TITLE SPECIFICATION FOR MINIATURE
AND EARTH LEAKAGE CIRCUIT
BREAKERS**

REFERENCE CP_TSSPEC_017 **REV** 7
DATE: AUGUST 2021
PAGE: 1 **OF** 44

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Annex C- Item 12 - MCB 25A 6KA SP - SAP34

Annex C- Item 13 - MCB 125A 6KA SP DC- SAP36

Annex C- Item 14 - MCB 150A 6KA SP - SAP38

Annex C- Item 15 - ELCB 63A 6KA SP - SAP40

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540 42

Annex D – Stock Items44

FOREWORD

Recommendations for corrections, additions or deletions should be addressed to the:

Technology Services General Manager

City Power Johannesburg (SOC) Ltd

P O Box 38766

BooySENS

2016

INTRODUCTION

City Power utilise miniature circuit breakers for protection and control of LV circuits. The primary function of circuit breakers is to protect an installation or appliance against sustained overloading and short circuit faults. It is therefore important to ensure that low voltage CB's comply with the required specifications and are of acceptable quality. The implication to suppliers is that City Power will only purchase miniature circuit breakers that comply with the compulsory specification.

1 SCOPE

This specification covers City Power's requirements for miniature and earth leakage circuit breakers in accordance with the compulsory specification VC 8036 and VC 8035.

2 NORMATIVE REFERENCES

The following documents contain provisions that, through reference in the text, constitute requirements of this specification. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

SANS 556 -1, *Moulded case circuit breakers*

SANS 556 -2-1, *Earth leakage circuit breakers*

SANS 60947- 2: *Low Voltage Switchgear and Controlgear Part 2: Circuit-breakers*

SANS VC 8036: *Moulded-Case Circuit-breakers*

SANS VC 8035: *Earth leakage protection devices*

3 DEFINITIONS AND ABBREVIATIONS

The definitions and abbreviations in SANS 556-1, SANS 556-2-1 and SANS IEC 60947- 2 shall apply to this specification.

4 REQUIREMENTS

4.1 General

- 4.1.1 All live parts shall be shielded against inadvertent contact by strong covers of insulating material.
- 4.1.2 The design of the circuit breaker shall not endanger the safety of City Power personnel.
- 4.1.3 Circuit breakers shall be suitable for use at an altitude of 1800m
- 4.1.4 The CB shall comply with VC 8036.
- 4.1.5 The Earth Leakage Circuit Breakers shall comply with VC 8035

4.2 Physical characteristics

4.2.1 Construction

- 4.2.1.1 The terminals shall be of robust construction and galvanically compatible with copper conductors.
- 4.2.1.2 When the circuit breaker is mounted the terminals shall be accessible from the front.
- 4.2.1.3 A slotted screw type connection shall be provided which will not require the use of special tools.

4.2.2 Sealing Facilities

- 4.2.2.1 In order to prevent unauthorized tampering with the mechanism or access to the terminals, provision shall be made for sealing the shroud of the CB.
- 4.2.2.2 The toggle(s) shall also be capable of being sealed in the "OFF" position.
- 4.2.2.3 The sealing facilities provided shall be suitable for sealing the circuit breaker by means of wire and lead seals.
- 4.2.2.4 It must not be possible for the sealing wire, when inserted in the sealing hole of the circuit breaker cover, to touch live terminals or penetrate the shroud.

4.2.3 Markings

- 4.2.3.1 Each circuit breaker shall be legibly and indelibly marked in accordance with VC 8036 and for earth leakages with VC 8035.
- 4.2.3.2 The toggle position shall be clearly indicated with on and off.
- 4.2.3.3 These positions shall be indicated with the symbols referred to in SANS IEC 60947-2.

4.3 Electrical characteristics

4.3.1 Time-delay characteristics

- 4.3.1.1 All current-time tripping characteristics must comply with the requirements of SANS 60947-2.
- 4.3.1.2 Circuit breakers shall trip within the parameters set in VC 8036.

4.3.2 Rated service short-circuit breaking capacity

All MCBs shall have a rated service breaking capacity (Ics) equal to at least 50% of the ultimate breaking capacity (Icu). Rated service breaking capacity, as a percentage of ultimate breaking capacity, will be in accordance with SANS 60947-2.

4.3.3 Current ratings

4.3.3.1 Rated service breaking capacity and current rating shall be as follows:

Item number	SAP material name	Required Breaking Capacity	Required Rating	Type of Curve
1	MCB 2A 6KA SP	6KA	2A	D
2	MCB 5A 6KA SP	6KA	5A	D
3	MCB 10A 6KA SP DC	6KA	10A	N/A
4	MCB 15A 6KA SP	6KA	15A	D
5	MCB 20A 6KA SP	6KA	20A	D
6	MCB 20A 6KA SP	6KA	25A	D
7	MCB 30A 6KA SP	6KA	30A	D
8	MCB 40A 6KA SP	6KA	40A	D
9	MCB 50A 6KA SP	6KA	50A	D
10	MCB 60A 6KA SP	6KA	60A	D
11	MCB 80A 6KA SP	6KA	80A	D
12	MCB 100A 6KA SP	6KA	100A	D
13	MCB 125A 6KA SP DC	6KA	125A	N/A
14	MCB 150A 6KA 2P	6KA	150A	D
15	ELMCB 150A 6KA 2P	6KA	63A	D

4.3.3.2 These ratings shall not show significant change as a result of ambient temperature.

Note: Take cognisance of point 4.6.2 e)

4.4 Accessories

4.4.1 Mounting requirements

Standard 35mm DIN rail mounting is required.

NOTE: Circuit breakers capable of dual mounting, both Din rail and clip tray would be advantageous from a maintenance point of view.

4.4.2 Shrouds and pole top covers

4.4.2.1 Shrouds shall be suitable for the circuit breakers offered.

4.4.2.2 The CB's housed within the shrouds and pole top covers could be accessed by semi-skilled personnel. The shrouds and pole top covers, when in position, shall provide adequate protection against inadvertent contact with the live terminals of the circuit breaker, at least IP2X.

4.4.2.3 The circuit breakers, shrouds and pole top covers will be housed within enclosures where the ambient temperature shall be equals or greater than 80°C. Shrouds shall not be adversely affected at this temperature.

4.4.2.4 The shrouds shall comply with the requirements in this specification.

4.4.2.5 Pole top covers shall consist of a non – conductive base and removable cover suitable for mounting on the cross – arm of LV bare overhead mains.

4.4.2.6 Pole top covers and shrouds shall be supplied with all necessary fixing and mounting equipment.

4.5 Labeling and packaging

4.5.1 Packaging shall prevent damage or deterioration of the product during transport, handling and storage.

4.5.2 The box shall be labelled with the contract number, City Power SAP number, supplier name, and basic circuit breaker details.

4.6 Documentation

4.6.1 Full technical and descriptive details, relating to all the items offered in this enquiry, shall be submitted so the offer can be fully evaluated.

4.6.2 The information shall include:

- a) Company history
- b) Business address
- c) Contact person and details
- d) Relevant current-time curves
- e) Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade.
- f) Training details (see 6).
- g) Completed Annexure C.
- h) Copy of type test certificates.
- i) Catalogue detailing the specific items on offer.

5 TESTS

5.1 Type tests

Circuit breakers shall be type tested as per SANS 60947-2, SANS 556-1 and SANS 556-2-1.

- a) Temperature-rise
- b) Tripping limits and characteristics
- c) Dielectric properties
- d) Operational performance capability
- e) Overload performance (where applicable)
- f) Short-circuit breaking capacities
- g) Short-time withstand current (where applicable)
- h) Performance of integrally fused circuit-breakers
- i) Critical d.c. load current

5.2 Routine tests

Circuit breakers shall be routine tested as per SANS 60947-2, SANS 556-2-1 and SANS 556-1.

- a) mechanical operation
- b) verification of the calibration of overcurrent releases
- c) verification of the operation of undervoltage and shunt releases
- d) additional tests for CBRs to Annex B
- e) dielectric tests
- f) verification of clearances

6 TRAINING

The supplier shall provide certified training to City Power staff on the correct application and installation of the CB.

7 QUALITY MANAGEMENT

A quality management plan shall be set up in order to assure the proper quality management of the miniature and earth leakage circuit breakers during design, development, production, installation and servicing phases. Guidance on the requirements for a quality management plan may be found in the ISO 9001:2015. The details shall be subject to agreement between City Power and the Supplier.

8 ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to assure the proper environmental management of the miniature and earth leakage circuit breakers throughout its entire life cycle (i.e. during design, development, production, installation, operation and maintenance, decommissioning and disposal phases). Guidance on the requirements for an environmental management system may be found in ISO 14001:2015 standards. The details shall be subject to agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy

9 HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance of the miniature and earth leakage circuit breakers during installation, operation, maintenance, and decommissioning phases. Guidance on the requirements of a health and safety plan may be found in OHSAS 18001:2007 standards. This is to ensure that the asset conforms to standard operating procedures and City Power SHERQ Policy. The details shall be subject to agreement between City Power and the Supplier.

Annex A - Bibliography

none

Annex B - Revision information

DATE	REV. NO.	NOTES
Nov 2002	0	First issue
Sept 2004	1	4.3.3.1-info in table form 4.3.3.2-table added 4.4.-note re dual mounting added 4.6.2-more detail re documentation required, Annexure C - more detailed, and a separate form for each item, following problems with tender
Nov 2007	2	All reference to SANS 159 changed to SANS 556-1 4.4.2 Shrouds and pole top covers Technical schedules for shrouds and pole top covers
Nov 2011	3	Format changes Added ranges
Feb 2016	4	Added trip curves
March 2020	5	Added new study committee Added clause 7, 8 and 9, Added clause 4.3.3.1
May 2021	6	General Editing Added new work group
Aug 2021	7	Added Type Tests

Annex C - Item 1 - MCB 20A 6KA SP - SAP 5455

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 20	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Dual Mounting	Yes	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [N, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Item 1 - MCB 20A 6KA SP - SAP 5455
Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

REFERENCE REV
CP_TSSPEC_017 7
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Annex C - Item 2 - MCB 30A 6KA SP - SAP 6242

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 30	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Item 2 - MCB 30A 6KA SP - SAP 6242
Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

REFERENCE REV
CP_TSSPEC_017 7

PAGE 16 OF 44

Annex C -Item 3 - MCB 40A 6KA SP - SAP 5494

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 40	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes/No Required	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

**Item 3 - MCB 40A 6KA SP - SAP 5494
Technical schedules A and B**

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

REFERENCE REV
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Annex C - Item 4 - MCB 50A 6KA SP - SAP 5449

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 50	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

Item 4 - MCB 50A 6KA SP - SAP 5449
Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

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Annex C - Item 5 - MCB 60A 6KA SP - SAP 5169

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 60	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail REQUIRED	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

**Item 5 - MCB 60A 6KA SP - SAP 5169
Technical schedules A and B**

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

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Annex C- Item 6 - MCB 80A 5KA SP - SAP 5451

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 80	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes/No REQUIRED	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

**Item 6 - MCB 80A 5KA SP - SAP 5451
Technical schedules A and B**

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

REFERENCE REV
CP_TSSPEC_017 7
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Annex C- Item 7 - MCB 100A 6KA SP - SAP 5315

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 100	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [N, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Item 7- MCB 100A 6KA SP - SAP 5315

Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

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Annex C- Item 8 - MCB 2A 6KA SP - SAP 3811

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 2	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

**Item 8- MCB 2A 6KA SP – SAP 3811
Technical schedules A and B**

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

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Annex C- Item 9 - MCB 5A 6KA SP - SAP 3812

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 5	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Item 9- MCB 5A 6KA SP – SAP 3812

Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

REFERENCE REV
CP_TSSPEC_017 7
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Annex C- Item 10 - MCB 10A 6KA SP DC- SAP 3813

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 500	
4	4.3.3.1	Current ratings	A 10	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

**Item 10 - MCB 10A 6KA SP DC- SAP 3813
Technical schedules A and B**

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

REFERENCE REV
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Annex C- Item 11 - MCB 15A 6KA SP - SAP 3814

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 15	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

**Item 11 - MCB 15A 6KA SP – SAP 3814
Technical schedules A and B**

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

Annex C- Item 12 - MCB 25A 6KA SP - SAP 3815

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 25	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Item 12 - MCB 25A 6KA SP – SAP 3815
Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

Annex C- Item 13 - MCB 125A 6KA SP DC- SAP 3816

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 125	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

**Item 13 - MCB 125A 6KA SP DC- SAP 3816
Technical schedules A and B**

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

REFERENCE REV
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Annex C- Item 14 - MCB 150A 6KA SP - SAP 3817

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 150	
5	4.2.3	Marking requirements in compliance with VC 8036	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

**Item 14 - MCB 150A 6KA SP – SAP 3817
Technical schedules A and B**

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

REFERENCE REV
CP_TSSPEC_017 7
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Annex C- Item 15 - ELCB 63A 6KA SP - SAP 3818

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3	4.3	Nominal voltage rating	V 230	
4	4.3.3.1	Current ratings	A 63	
5	4.2.3	Marking requirements in compliance with VC 8035	Yes	
6		Circuit breaker width	mm REQUIRED	
7	4.3.2	Ics = 50% Icu or greater	% REQUIRED	
8	4.4.1	Mounting	35mm DIN rail	
9		Escutcheon height	mm REQUIRED	
10	4.1.3	Suitable for use at 1800m above sea level?	Yes	
11	4.3.1.1	Type of over current release	Non-adjustable time delay	
12	4.4.2.3	Maximum ambient temperature at which circuit breaker is designed to operate	°C ≥80	
13		Catalogue to be provided	Yes	
14	4.6	Relevant temperature derating tables showing current ratings at 30, 40 and 80 degrees centigrade provided.	Yes	
15	5	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Item 15 - ELCB 63A 6KA SP – SAP 3818
Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**Annex C- Item 16 to 19 – Miscellaneous MCB related products – SAP
7075, 5303, 1686 and 540**

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Sub clause of CP_TSSPEC_017	Description	Schedule A	Schedule B
1	4.4.2	Circuit breaker shroud 26mm wide	REQUIRED	
2	4.4.2	Circuit breaker shroud 78mm wide	REQUIRED	
3	4.4.2	Circuit breaker shroud 104mm wide	REQUIRED	
4	4.4.2	Pole mounted domed circuit breaker cover	REQUIRED	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**Items 16 to 19 16 to 19 – Miscellaneous MCB related products – SAP 7075,
5303, 1686 and 540**

Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_017	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MINIATURE AND
EARTH LEAKAGE CIRCUIT BREAKERS**

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Annex D – Stock Items

Material Group: ELEC-MCB

Item	SAP No.	SAP Material Name	SAP Short Specification
1	5455	MCB 20A 6KA SP	MINIATURE CIRCUIT BREAKER 20A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
2	6242	MCB 30A 6KA SP	MINIATURE CIRCUIT BREAKER 30A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
3	5494	MCB 40A 6KA SP	MINIATURE CIRCUIT BREAKER 40A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
4	5449	MCB 50A 6KA SP	MINIATURE CIRCUIT BREAKER 50A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
5	5169	MCB 60A 6KA SP	MINIATURE CIRCUIT BREAKER 60A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
6	5451	MCB 80A 6KA SP	MINIATURE CIRCUIT BREAKER 80A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
7	5315	MCB 100A 6KA SP	MINIATURE CIRCUIT BREAKER 100A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
8	3811	MCB 2A 6KA SP	MINIATURE CIRCUIT BREAKER 2A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
9	3812	MCB 5A 6KA SP	MINIATURE CIRCUIT BREAKER 5A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
10	3813	MCB 10A 6KA SP DC	MINIATURE CIRCUIT BREAKER 10A 6KA SINGLE POLE DC. ITEM SPECIFICATION NO. CP_TSSPEC_017
11	3814	MCB 15A 6KA SP	MINIATURE CIRCUIT BREAKER 15A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
12	3815	MCB 25A 6KA SP	MINIATURE CIRCUIT BREAKER 25A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
13	3816	MCB 125A 6KA SP	MINIATURE CIRCUIT BREAKER 125A 6KA SINGLE POLE DC. ITEM SPECIFICATION NO. CP_TSSPEC_017
14	3817	MCB 150A 6KA SP	MINIATURE CIRCUIT BREAKER 150A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
15	3818	ELCB 63A 6KA SP	EARTH LEAKAGE CIRCUIT BREAKER 63A 6KA SINGLE POLE. ITEM SPECIFICATION NO. CP_TSSPEC_017
16	7075	SHROUD MCB 26MM	SHROUD MINIATURE CIRCUIT BREAKER 26MM ITEM SPECIFICATION NO. CP_TSSPEC_017
17	5303	SHROUD MCB 78MM	SHROUD MINIATURE CIRCUIT BREAKER 78MM ITEM SPECIFICATION NO. CP_TSSPEC_017
18	1686	SHROUD MCB 104MM	SHROUD MINIATURE CIRCUIT BREAKER 104MM ITEM SPECIFICATION NO. CP_TSSPEC_017
19	540	POLE MOUNT DOME CB COVER	POLE MOUNT DOME MINIATURE CIRCUIT BREAKER COVER ITEM SPECIFICATION NO. CP_TSSPEC_017



**TITLE SPECIFICATION FOR MOULDED
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**SPECIFICATION FOR MOULDED CASE
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FOREWORD

Recommendations for corrections, additions or deletions should be addressed to the:

Technology Services General Manager

City Power Johannesburg (SOC) Ltd

P O Box 38766

Booyssens

2016

INTRODUCTION

City Power, in accordance with international practice, utilise moulded case circuit breakers for protection of electrical appliances, human beings and control of LV circuits from electrical shocks and faults. The primary function of circuit breakers is to protect an installation or appliance against sustained overloading and short circuit faults instead of fuses. It is therefore important to ensure that MCCB's comply with the required specifications and are of acceptable quality. The implication to suppliers is that City Power will only purchase moulded circuit breakers that meet SABS standards.

1 SCOPE

This specification covers City Power's requirements for moulded case circuit breakers in accordance with SANS 556 -1 and SANS/IEC 60947-2 and the main contacts of which are intended to be connected to circuits with rated voltages not exceeding 1000 V a.c. or 1500 V d.c.

2 NORMATIVE REFERENCES

The following documents contain provisions that, through reference in the text, constitute requirements of this specification. At the time of publication, the editions indicated were valid. All standards and specifications are subject to revision, and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

SANS 556 -1, - 2018, *Moulded case circuit breakers*

SANS/IEC 60947-1:2015, *Low Voltage Switchgear and Controlgear Part 1: General rules*

SANS/IEC 60947-2:2017, *Low Voltage Switchgear and Controlgear Part 2: Circuit-breakers*

3 DEFINITIONS AND ABBREVIATIONS

The definitions and abbreviations contained in SANS 556-1 and SANS/IEC 60947-1 shall apply.

4 REQUIREMENTS

4.1 General

- 4.1.1 All live parts shall be shielded against inadvertent contact by strong covers of insulating material.
- 4.1.2 The design of the circuit breaker shall not endanger the safety of City Power personnel.
- 4.1.3 The MCCB shall comply with SANS 556-1 or SANS/IEC 60947-2 and shall bear either mark of approval.
- 4.1.4 City Power often mount their circuit breakers as stand-alone devices, not as part of a distribution board. MCCB design shall take this factor into account.
- 4.1.5 Circuit breakers shall be suitable for use at an altitude of 1800m.
- 4.1.6 Circuit breakers shall be suitable for use at temperatures of between 0 and 70° C.

4.2 Physical Characteristics

4.2.1 Terminals

4.2.1.1 The terminals shall be of robust construction and when the circuit breaker is mounted the terminals shall be accessible from the front.

4.2.1.2 The connection shall not require the use of special tools. City Power generally use lugged and bolted connections.

4.2.2 Markings

4.2.2.1 Each circuit breaker shall be legibly and indelibly marked in accordance with SANS 556-1 and/or SANS/IEC 60947-2.

4.2.2.2 The toggle position shall be clearly indicated – on, off and trip.

4.2.2.3 Terminals shall be labelled "line" and "load", where this information is critical to the operation of the circuit breaker.

4.2.3 Physical size

The MCCB's shall be suitable for retrofitting on the City Power network. In order to give effect to this requirement they shall comply with the following approximate dimensions. The dimensions apply to the main body of the circuit breaker and the depth does not include the toggle.

SAP number	Physical Dimensions (approximate - HxWxD in mm)
954	160x110x100
5313	250x140x130
6273	250x140x130
7005	330x220x160
1291	350x 240x180
4721	250x140x130

4.3 Electrical Characteristics

4.3.1 Time delay characteristics

Time-delay circuit-breakers are required in order to allow for inrush currents and to prevent nuisance tripping.

4.3.2 D-Curves

4.3.2.1 The tenderer shall submit current-time characteristic curves for the MCCB.

4.3.2.2 A circuit-breaker having a non-adjustable time-delay release shall carry its rated current continuously without tripping, but shall release automatically, subject to the requirements of clause 4.7.4 of SANS/IEC 60947-2.

4.3.3 Fault trip indication

4.3.3.1 The circuit breaker shall default to a neutral position between the on and off position, when tripping due to overcurrent has occurred.

4.3.3.2 It shall not be possible to energise the circuit breaker by moving the toggle from the tripped position directly to the "ON" position.

4.3.4 Rated Service Short Circuit Breaking Capacity

All MCCBs shall have a rated service breaking capacity (Ics) and an ultimate breaking capacity (Icu) equal to or greater than the values stipulated for rated service breaking capacity (see point 4.3.8.2)

4.3.5 Thermal sensitivity

The MCCB rating shall be, as unaffected by ambient temperature change, as possible.

4.3.6 Energy limiting capability

Energy limiting capability is required, as opposed to zero point extinction. Graphs which show the sub-cycle interrupting capacity, as well as the joule energy let through characteristic curves, of the MCCB are required.

4.3.7 Test button

The MCCB shall be equipped with a clearly marked "push to trip" button, accessible from the front, to test operation.

**SPECIFICATION FOR MOULDED CASE
CIRCUIT BREAKERS**

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4.3.8 Current ratings

4.3.8.1 The standard MCCB's shall be triple pole, and shall be adjustable, with the exception of item 3.

4.3.8.2 Rated service breaking capacity and current ratings at 415V shall be as follows:

Item number	SAP Short Description	Required Breaking Capacity	Required Rating
1	MCCB 160 - 250A TP LV 30KA	30kA	160 to 250 A (adjustable)
2	MCCB 160 - 400A TP LV 35KA	35kA	160 to 400A (adjustable)
3	MCCB 300A TP LV 35KA	35kA	300A (fixed)
4	MCCB 600 - 1000A TP LV 40KA	40kA	600 to 1000A (adjustable)
5	MCCB 800 - 1600A TP LV 45KA	45kA	800 TO 1600A
6	MCCB 280 - 400A TP LV 35KA	35kA	280 to 400A (adjustable)

4.4 Accessories

4.4.1 Flash barriers

All MCCB's shall be supplied with interphase flash barriers of a suitable insulating material. This applies to both line and load side.

4.4.2 Arc chute covers

Where applicable MCCB's shall be supplied with arc chute covers of a suitable material and design. This applies to MCCB's requiring this type of device.

4.4.3 Sealing facilities

The MCCB shall have facilities for sealing to prevent tampering once it has been set to the desired current rating.

4.4.4 Mounting facilities

All bolts, nuts and washers for mounting shall be provided with the circuit breaker.

4.4.5 Instructions for use

All circuit breakers shall be accompanied by clear, legible, illustrated instructions for the mounting and setting of the circuit breaker. Photocopied documents are not acceptable.

4.5 Packaging and labeling

4.5.1 Packaging shall prevent damage or deterioration of the product during transport, handling and storage.

4.5.2 The box shall be labelled with the contract number, City Power sap number, supplier name, and basic circuit breaker details. Each box shall contain the circuit breaker as well as the equipment detailed in section 4.4.

4.6 Documentation

4.6.1 Full technical and descriptive details, relating to all the items offered in this enquiry, shall be submitted so the offer can be fully evaluated.

4.6.2 The information shall include:

- a) Company history.
- b) Business address.
- c) Contact person and details.
- d) Relevant current-time curves.
- e) Training details (see 6).
- f) Completed Annexure C.
- g) Copy of type test certificate.
- h) Catalogue detailing the specific items on offer.
- i) Documentation indicating energy limiting ability as specified in point 4.3.6.

5 TESTS

General

Tests shall be made to prove compliance with the requirements laid down in this standard, where applicable, and in the relevant product standard.

Tests are as follows:

5.1 Type tests

5.1.1 Circuit breakers shall be type tested as per SANS/IEC 60947-2 and/or SANS 556-1.

- a) Temperature-rise
- b) Tripping limits and characteristics
- c) Dielectric properties
- d) Operational performance capability
- e) Overload performance (where applicable)
- f) Short-circuit breaking capacities
- g) Short-time withstand current (where applicable)
- h) Performance of integrally fused circuit-breakers

i) Critical d.c. load current

5.1.2 Type test shall be made on representative samples of each particular equipment.

5.1.3 Type tests are intended to verify compliance of the design of a given equipment with this standard, where applicable, and the relevant product standard.

5.1.4 The type tests to which the equipment shall be submitted, the results to be obtained, and, if relevant, the test sequences and the number of samples, shall be specified in the relevant product standard.

5.2 Routine tests

5.2.1 Circuit breakers shall be routine tested as per SANS 60947-2 and SANS 556- 1.

a) mechanical operation

b) verification of the calibration of overcurrent releases

c) verification of the operation of undervoltage and shunt releases

d) additional tests for CBRs to Annex B

e) dielectric tests

f) verification of clearances

5.2.2 Routine tests shall be made on each individual piece of equipment manufactured to this standard, where applicable, and the relevant product standard;

5.2.3 The above tests may consist of test sequences, according to the requirements of the relevant product standard.

5.2.4 Where such test sequences are specified in a product standard, tests, the result of which are not influenced by preceding tests and have no significance for subsequent tests of a given test sequence may be omitted from that test sequence, and made on separate new samples, by agreement with the manufacturer.

5.2.5 The product standard shall specify such tests, where applicable.

5.2.6 The tests shall be carried out by the manufacturer, at his works or at any suitable laboratory of his/her choice.

5.2.7 Where appropriate, subject to specification in the relevant product standard, and to agreement between manufacturer and user, special tests may also be performed.

6 TRAINING

The supplier shall provide certified training to City Power staff on the correct installation and application of the MCCB.

7 QUALITY MANAGEMENT

A quality management plan shall be set up in order to assure the proper quality management of the moulded case circuit breakers during design, development, production, installation and servicing phases. Guidance on the requirements for a quality management plan may be found in the ISO 9001:2015. The details shall be subject to agreement between City Power and the Supplier.

8 ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to assure the proper environmental management of the moulded case circuit breakers throughout its entire life cycle (i.e. during design, development, production, installation, operation and maintenance, decommissioning and disposal phases). Guidance on the requirements for an environmental management system may be found in ISO 14001:2015 standards. The details shall be subject to agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ Policy

9 HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance of the moulded case circuit breakers during installation operation, maintenance, and decommissioning phases. Guidance on the requirements of a health and safety plan may be found in OHSAS 18001:2007 standards. This is to ensure that the asset conforms to standard operating procedures and City Power SHERQ Policy. The details shall be subject to agreement between City Power and the Supplier.

Annex A - Bibliography

none

Annex B - Revision information

DATE	REV. NO.	NOTES
Dec 2002	0	First issue
Sept 2004	1	4.1.4 - cb mounting details
		4.1.5 - altitude requirement
		4.2.1.2 - connection details
		4.2.3 - physical size details
		4.3.5 - ambient temperature influence
		4.3.6 - current limiting changed to energy limiting
		4.3.8.2 - info in table form, breaking capacity requirement increased
		4.3.8.3 - table shows current ratings required, 3 cb's not 1
		4.4.2 - arc chute cover requirement
		4.4.4 - mounting equipment required
		4.4.5 - instructions required
		4.6.2 - more prescriptive re documentation required following problems with tender
		Annexure C - more detailed and one for each of the 3 cb's

Nov 2007	2	All reference to SANS 159 changed to SANS 556- 1
		Introduction of item 3, sap 6273 – fixed rating 300A MCCB
		Introduction of item 5 – adjustable 800A to 1600A MCCB
		4.3.4 – lcs and lcu required to be equal to or greater than the rated service breaking capacity
		4.6.2, j – Documentation re energy limiting capability required
Nov 2011	3	Format changes
		4.1.6 Circuit breakers shall be suitable for use at temperatures of between 0 and 70° C.
		Inclusion of paragraph 7 – QUALITY ASSURANCE
		Inclusion of paragraph 8 – ENVIRONMENTAL MANAGEMENT
Oct 2018	4	General Editing
		Added clause 9 Health and Safety
		Added the new work group
March 2020	5	Added new work group
May 2021	6	General Editing
		Added new work group
August 2021	7	Added a new item

Annex C - Item 1 - MCCB 160 - 250A TP LV 30KA - SAP NO: 954

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Subclause of CP_TSSPEC_018	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3		Nominal voltage rating	V 415	
4	4.2.2	Marking requirements in compliance with SANS/IEC 60947-2	Yes	
5	4.2.3	Dimensions - HxWxD	mm 160 x 110 x 100	
6	4.3.8.3	Adjustable current ratings	A 160-250	
7	4.3.8.2	Rated short circuit breaking capacity at 415V	kA 30	
8	4.3.3	Fault trip indication	Yes	
9	4.3.4	Ics and Icu equal to or greater than 30kA	Yes	
10	4.3.6	Is the MCCB energy limiting?	Yes	
11	4.4.3	Sealing facility	Yes	
12	4.5.2	Accessories supplied with MCCB	Yes	
13		Maximum ambient temperature at which the MCCB is designed to operate	°C REQUIRED	
14		Catalogue to be provided	Yes	
15	5.1	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

Annex C - Item 1 - MCCB 160 - 250A TP LV 30KA - SAP NO: 954

Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Subclause of CP_TSSPEC_018	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MOULDED CASE
CIRCUIT BREAKERS**

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Annex C - Item 2 - MCCB 160 - 400A TP LV 35KA - SAP NO: 5313

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Subclause of CP_TSSPEC_018	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3		Nominal voltage rating	V 415	
4	4.2.2	Marking requirements in compliance with SANS/IEC 60947-2	Yes	
5	4.2.3	Dimensions - HxWxD	mm 250 x 140 x 130	
6	4.3.8.3	Adjustable current ratings	A 160-400	
7	4.3.8.2	Rated short circuit breaking capacity at 415V	kA 35	
8	4.3.3	Fault trip indication	Yes	
9	4.3.4	Ics and Icu equal to or greater than 35kA	Yes	
10	4.3.6	Is the MCCB energy limiting?	Yes	
11	4.4.3	Sealing facility	Yes	
12	4.5.2	Accessories supplied with MCCB	Yes	
13		Maximum ambient temperature at which the MCCB is designed to operate	°C REQUIRED	
14		Catalogue to be provided	Yes	
15	5.1	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters

Signature

Full name of company: _____

Annex C - Item 2 - MCCB 160 - 400A TP LV 30KA - SAP NO: 5313

Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Subclause of CP_TSSPEC_018	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

Annex C - Item 3 - MCCB 300A TP LV 35kA - SAP NO: 6273

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Subclause of CP_TSSPEC_018	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3		Nominal voltage rating	V 415	
4	4.2.2	Marking requirements in compliance with SANS/IEC 60947-2	Yes	
5	4.2.3	Dimensions - HxWxD	mm 250 x 140 x 130	
6	4.3.8.3	Fixed current rating	A 300	
7	4.3.8.2	Rated short circuit breaking capacity at 415V	kA 35	
8	4.3.3	Fault trip indication	Yes	
9	4.3.4	Ics and Icu equal to or greater than 35kA	Yes	
10	4.3.6	Is the MCCB energy limiting?	Yes	
11	4.4.3	Sealing facility	Yes	
12	4.5.2	Accessories supplied with MCCB	Yes	
13		Maximum ambient temperature at which the MCCB is designed to operate	°C REQUIRED	
14		Catalogue to be provided	Yes	
15	5.1	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

Annex C - Item 3 - MCCB 300A TP LV 35KA - SAP NO: 6273

Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Subclause of CP_TSSPEC_018	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

Annex C - Item 4 - MCCB 600 - 1000A TP LV 40KA - SAP NO: 7005

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Subclause of CP_TSSPEC_018	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3		Nominal voltage rating	V 415	
4	4.2.2	Marking requirements in compliance with SANS/IEC 60947-2	Yes	
5	4.2.3	Dimensions - HxWxD	mm 330 x 220 x 160	
6	4.3.8.3	Adjustable current ratings	A 600-1000	
7	4.3.8.2	Rated short circuit breaking capacity at 415V	KA 40	
8	4.3.3	Fault trip indication	Yes	
9	4.3.4	Ics and Icu equal to or greater than 40kA	Yes	
10	4.3.6	Is the MCCB energy limiting?	Yes	
11	4.4.3	Sealing facility	Yes	
12	4.5.2	Accessories supplied with MCCB	Yes	
13		Maximum ambient temperature at which the MCCB is designed to operate	°C REQUIRED	
14		Catalogue to be provided	Yes	
15	5.1	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters **Signature**

Full name of company: _____

Annex C - Item 4 - MCCB 600 - 1000A TP LV 40KA - SAP NO: 7005

Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Subclause of CP_TSSPEC_018	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

Annex C - Item 5 - MCCB 800 - 1600A TP LV 45KA - SAP NO: 1291

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Subclause of CP_TSSPEC_018	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3		Nominal voltage rating	V 415	
4	4.2.2	Marking requirements in compliance with SANS/IEC 60947-2	Yes	
5	4.2.3	Dimensions - HxWxD	mm 350 x 240 x 180	
6	4.3.8.3	Adjustable current ratings	A 600-1000	
7	4.3.8.2	Rated short circuit breaking capacity at 415V	kA 45	
8	4.3.3	Fault trip indication	Yes	
9	4.3.4	Ics and Icu equal to or greater than 45kA	Yes	
10	4.3.6	Is the MCCB energy limiting?	Yes	
11	4.4.3	Sealing facility	Yes	
12	4.5.2	Accessories supplied with MCCB	Yes	
13		Maximum ambient temperature at which the MCCB is designed to operate	°C REQUIRED	
14		Catalogue to be provided	Yes	
15	5.1	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____

Name in block letters Signature

Full name of company: _____

Annex C - Item 5 - MCCB 800 - 1600A TP LV 45KA - SAP NO: 1291

Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_018	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

Annex C - Item 6 - MCCB 280 - 400A TP LV 35KA - SAP NO: 4721

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered - Note: The use of ticks, crosses, asterisks, TBA, and the word "Noted" are not acceptable.

Item	Subclause of CP_TSSPEC_018	Description	Schedule A	Schedule B
1		Manufacturer's name	REQUIRED	
2		Product serial number	REQUIRED	
3		Nominal voltage rating	V 415 Yes	
4	4.2.2	Marking requirements in compliance with SANS/IEC 60947-2		
5	4.2.3	Dimensions - HxWxD	mm 250x140x130	
6	4.3.8.3	Adjustable current ratings	A 600-1000	
7	4.3.8.2	Rated short circuit breaking capacity at 415V	kA 45	
8	4.3.3	Fault trip indication	Yes	
9	4.3.4	Ics and Icu equal to or greater than 45kA	Yes	
10	4.3.6	Is the MCCB energy limiting?	Yes	
11	4.4.3	Sealing facility	Yes	
12	4.5.2	Accessories supplied with MCCB	Yes	
13		Maximum ambient temperature at which the MCCB is designed to operate	°C REQUIRED	
14		Catalogue to be provided	Yes	
15	5.1	Certified copy of type test to be provided	Yes	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

Annex C - Item 6 - MCCB 280 - 400A TP LV 35KA - SAP NO: 4721

Technical schedules A and B

Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.		
Item	Sub clause of CP_TSSPEC_018	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____

**SPECIFICATION FOR MOULDED CASE
CIRCUIT BREAKERS**

REFERENCE REV
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Annex D – Stock Items

Material Group: ELEC - MCCB

Item	SAP No.	SAP Short Description	SAP Long Description
1	954	MCCB 160 - 250A TP LV 30KA	MOULDED CASE CIRCUIT BREAKER 160 - 250A TRIPLE POLE LOW VOLTAGE 30KA ITEM SPECIFICATION NO. CP_TSSPEC_018
2	5313	MCCB 160 - 400A TP LV 35KA	MOULDED CASE CIRCUIT BREAKER 160 - 400A TRIPLE POLE LOW VOLTAGE 35KA ITEM SPECIFICATION NO. CP_TSSPEC_018
3	6273	MCCB 300A TP LV 35KA	MOULDED CASE CIRCUIT BREAKER 300A TRIPLE POLE LOW VOLTAGE 35KA ITEM SPECIFICATION NO. CP_TSSPEC_018
4	7005	MCCB 600 - 1000A TP LV 40KA	MOULDED CASE CIRCUIT BREAKER 600 - 1000A TRIPLE POLE LOW VOLTAGE 40KA ITEM SPECIFICATION NO. CP_TSSPEC_018
5	1291	MCCB 800 - 1600A TP LV 45KA	MOULDED CASE CIRCUIT BREAKER 800 - 1600A TRIPLE POLE LOW VOLTAGE 45KA ITEM SPECIFICATION NO. CP_TSSPEC_018
6	4721	MCCB 280 - 400A TP LV 35KA	MOULDED CASE CIRCUIT BREAKER 280 - 400A TRIPLE POLE LOW VOLTAGE 35KA ITEM SPECIFICATION NO. CP_TSSPEC_018



a world class African city



**TITLE SPECIFICATION FOR PROTECTION
RELAYS**

REFERENCE CP_TSSPEC_214 REV 4
DATE: JULY 2019
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FOREWORD

Recommendations for corrections, additions or deletions should be addressed to the:
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City Power Johannesburg (MOC) Ltd

P O Box 38766

BooySENS

2016

INTRODUCTION

The City Power Johannesburg electrical network is an amalgamation of five separate electrical utility networks. These five networks are Johannesburg, Roodepoort, Midrand, Randburg, and the South. Each network was historically developed in a unique manner respective to one another due to the different local municipal authorities responsible at the time. As a result there are many different protection scheme types as well as associated relays installed on these networks as detailed in this document. In order to control the burgeoning relay manufacturer types and models on the system, the number of relay models and manufacturers thereof need to be controlled and limited for a period of time.

1 SCOPE

City Power will utilize this specification to evaluate major protection equipment that is required on the network. Only the major protection equipment evaluated and passed under this specification shall be deemed as fit for use by City Power.

2 NORMATIVE REFERENCES

The following documents contain provisions that through reference in the text constitute requirements of this standard. At the time of publication the editions indicated were valid. All standards and specifications are subject to revision and parties to agreements based on this specification are encouraged to investigate the possibility of applying the most recent editions of the documents listed below.

IEC 61850-1: *Introduction and overview Part 1.*

IEC 61850-2: *Glossary: Part 2*

IEC 61850-3: *General Requirements Part 3*

IEC 61850-4: *Systems and Project Management Part 4*

IEC 61850-5: *Communication requirements for functions and device models Part 5*

IEC 61850-6: *Configuration description language for communication in electrical substations related to IEDs Part 6*

IEC 61850-7-1: *Basic communication structure for substation and feeder equipment. Principles and models Part 7-1*

IEC 61850-7-2: *Basic communication structure for substation and feeder equipment. Compatible logical node classes and data classes Part 7-2*

IEC 61850-8-1: *Specific Communication Service Mapping (SCSM). Mappings to MMS (ISO 9506-1 and ISO 9506-2) and to ISO/IEC 8802-3 Part 8-1*

IEC 61850-9-1: *Specific Communication Service Mapping (SCSM). Sampled values over serial unidirectional multi-drop point to point link Part 9-1*

IEC 61850-9-2: *Specific Communication Service Mapping (SCSM) Sampled values over ISO/IEC 8802-3 Part 9-2*

IEC 61850-10: *Conformance testing Part 10*

EN 50263 1999: *Electromagnetic Compatibility (EMC) : Electromagnetic Emissions*

EN 60255-26-2:2009 *Measuring relays and protection equipment - Part 26: Electromagnetic compatibility requirements*

IEC 61000-4-3 2010: *Electromagnetic compatibility (EMC) - Part 4-3: Testing and measurement techniques - Radiated, radio-frequency, electromagnetic field immunity test* IEC 61000-4-11 2017 *Electromagnetic compatibility (EMC) - Part 4-11: Testing and measurement techniques - Voltage dips, short interruptions and voltage variations immunity tests*

IEC 60255-11 1979: *Electromagnetic Compatibility Immunity: Power Supply Immunity*

IEC 61000-4-8 2009: *Electromagnetic compatibility (EMC) – Part 4-8: Testing and measurement techniques – Power frequency magnetic field immunity test*

IEC 61000-4-9 2016: *Electromagnetic compatibility (EMC) - Part 4-9: Testing and measurement techniques - Impulse magnetic field immunity test*

IEC 61000-4-2: 2008: *Electromagnetic compatibility (EMC) - Part 4-2: Testing and measurement techniques - Electrostatic discharge immunity test.*

IEC 60255-26:2013: *Measuring relays and protection equipment - Part 26: Electromagnetic compatibility requirements*

IEC 60068-2-1: 2007 : *Environmental testing - Test A: Cold*

IEC 60068-2-2 2007: *Environmental Environmental testing - Test B: Dry heat*

IEC 60255-21-1 1998: *Class 1*

IEC 60255-21-2: 1998: *Class 1*

IEC 60255-21-3 1993 : *Electrical relays: Vibration, shock, bump and seismic tests on measuring relays and protection equipment: Seismic tests*

IEC 60529: 2015: *Degrees of protection provided by enclosures (IP Code)*

IEC 60255-1 2009: *Measuring relays and protection equipment - Part 1: Common requirements*

EN TS 50-19: 2004: *Standard Numbering For Small Wiring: for Switchgear And Transformers Together With Their Associated Relay Panels)*

SANS ISO 9001 : *Quality Management*

OHSAS 18001 : *Occupational health and safety management systems*

3 DEFINITIONS

The definitions and abbreviations in the above documents (Normative Reference) shall apply to this specification.

OEM	Original Equipment Manufacturer. The manufacturer and source of the protection relay and not any intermediary, re-seller, modifier, or agent thereof.
IED	An intelligent electronic device. A protection relay that has an embedded microprocessor for protection and control functionality and is able to serially communicate to another device using a standard protocol.
SCADA	Supervisory control and data acquisition. The ability to receive and send information to and from a remote control Centre and a intelligent electronic device.
I/O	Relay inputs and outputs. The MAJOR PROTECTION EQUIPMENT's opto-isolated digital inputs and contact output relays used for protection, control and SCADA functionality.
BYCH	Bay Controller. Any MAJOR PROTECTION EQUIPMENT that has SCADA, automation and control functionality using integral I/O's and Boolean type programmable logic to execute such functionality.
Major Protection Equipment	Protection equipment that has significant strategic, functional and cost value e.g. protection relays, auxiliary tripping relays.
Supplier	An OEM or their official representatives based in South Africa

4 NOTE

Nothing in this specification shall lessen the obligations of the supplier. The supplier shall be fully responsible for the design and supply of electronic intelligent devices; and its satisfactory performance in service. Approval by City Power shall not relieve the supplier of the responsibility for the adequacy of the design.

5 SERVICE CONDITIONS

The requirements in this specification apply to equipment for use under the following conditions:

- 5.1 indoors;
- 5.2 at an altitude above sea level up to 1 800 m;
- 5.3 at maximum ambient air temperatures for design purposes:
 - a. minimum -10 °C and maximum 45 °C
 - b. daily average 30 °C
 - c. yearly average 25 °C
- 5.4 relative humidity: 30 % to 90 %;
- 5.5 maximum wind speed: 40m/s;
- 5.6 mean annual rain fall: 1065mm and
- 5.7 Maximum solar radiation: 21200 W/m

6 MAJOR PROTECTION EQUIPMENT: General hardware and software requirements

All IED digital inputs shall be of the opto-coupler type and must be rated to the station DC battery supply. The use of resistors to drop the voltage into the digital inputs shall not be accepted. All relays shall be of the flush mounting type.

The numeric relays shall utilise programmable scheme logic to configure the output relays, binary inputs, internal relay elements, timers and logic variables. Every digital input and output contact shall be able to be freely incorporated into the user configurable programmable logic.

Operating of an IED element shall be clearly and positively indicated on the relay by an indicating LCD display. Primary protection functions and important alarms shall at all times be indicated by a red LED.

The adjustable settings on all relays shall be easily accessible, from the relay LCD and a remote terminal. At no time shall the downloading of new settings to the relay compromise the relay protection functions.

All major protection equipment output contacts shall be rated to the station DC battery supply.

The nominal voltage transformer input is 110 Vac.

The burden of each voltage input shall not exceed 1VA at nominal input voltage.

The nominal current transformer input is 1 Amp and/or 5 Amp as specified.

The current inputs shall be continuously rated for 300% of nominal current inputs.

The burden of each current input shall not exceed 1VA at nominal input current.

All major protection equipment shall perform extensive and continuous self-checking of hardware and software. A subsequent fault shall be indicated clearly on the face of the major protection equipment and the condition signaled immediately via an output contact

7 MAJOR PROTECTION EQUIPMENT: logic and setting Configurations

The major protection equipment shall have user programmable logic functionality as specified in order to execute the specified control and protection schemes. Every digital input and output contact shall be able to be freely incorporated into the user configurable programmable logic.

The MAJOR PROTECTION EQUIPMENT programmable logic configurations shall have a minimum number of timers, Boolean functions, latch's, local and remote bit elements as specified.

8 MAJOR PROTECTION EQUIPMENT: IED Communication ports

The IED's shall be supplied with communications ports. For a bay control type IED (See Section - Overview descriptions of the Major Protection Equipment: - BYCH), three communication ports are required; one port is required on the front face of the IED and two ports are required on the rear. The front port will be used for local engineering access and the rear ports for SCADA and remote engineering.

All other IED's require two communication ports; one port is required on the front face of the IED and one port is required on the rear. The front port will be used for local engineering access and the rear port for remote engineering.

It shall be possible change the settings, configure the logics and download fault records of any IED via the front face communication port using City Power,s laptops, notebooks or computers and the OEM's software.

The ports and the software shall be upgradeable to accommodate City Power,s expansion and needs.

For the BYCH, the first rear communication port shall communicate directly with the substation RTU using IEC61850. No intermediate protocol converter shall be allowed whether attached to the IED or remote to the IED.

The second rear communication port shall be utilised for an engineering channel from the substation to City Power - Protection offices (Reuven). It shall be possible to view and alter all relay settings and logic configurations remotely via the engineering channel. It shall also be possible to receive fault records remotely via the engineering channel. It shall be possible to link to the BYC engineering channel directly via a WAN connection and also via telephone modem.

9 MAJOR PROTECTION EQUIPMENT: DigSilent StationWare compatibility

All the IED type relays shall each be supplied with a settings file that can be used by DigSilent StationWare software for the import and export of the IED settings. The supplier shall be responsible to work with DigSilent in creating and providing the settings file. Only IED's supplied with a DigSilent StationWare settings file shall be considered for evaluation.

The contents of the DigSilent StationWare settings file must contain all(!) settings parameters with the following information: Name, Function/Chapter, Settings group, Range (also for enumeration types), Unit (e.g. 'A'), Description text, Type of parameter (integer, double, string, enum), Default value, Actual value.

10 DESCRIPTION OF THE MAJOR PROTECTION EQUIPMENT

10.1 BYCH - HV BAY CONTROLLER

The BYCH shall perform all high voltage level bay related functions such as local and remote control, command sequences, bay and station interlocking, data acquisition, data storage, event and alarm storage, outputs of commands and signal processing required for the different switchgear units of the bay.

The BYCH shall have an integral mimic, capable of controlling and displaying the status of plant devices per bay, and have a user-definable layout to suit the substation physical layout. The mimic shall only allow operation if the bay has been selected to local control.

The interlocking software RAM or on-board memory shall be backed-up via non-volatile memory and in the case of a supply failure, on return of supply, automatically resume their function. The software shall be re-programmable via the front port or the rear engineering access port in a straightforward manner. Disturbance records and events shall be stored in non-volatile memory in order to ensure that data cannot be erased by the removal of the supply to the device.

The BYCH's shall communicate directly on a "peer-to-peer" or one-on-one basis using a direct fibre-optic connection; fibre-optic switches shall be allowed between the BYCH's for the fibre-optic connection. The BYCH's shall be able to send discrete binary signals to one another over the fibre-optic communication channel. All inter bay interlocking and automation i.e. between BYCH's, shall be done using IEC61850 GOOSE messaging over the fibre-optic channels.

10.2 BYCM - MV BAY CONTROLLER

The BYCM shall perform all medium voltage level bay related automation and interlocking functions such as automatic “chop-over” control, pairing station “flip-flop” control, and local transformer parallel interlocking.

The interlocking software RAM or on-board memory shall be backed-up via non-volatile memory and in the case of a supply failure, on return of supply, automatically resume their function. The software shall be re-programmable via the front port or the rear engineering access port in a straightforward manner.

The BYCM's shall communicate directly on a “peer-to-peer” or one-on-one basis using a direct fibre-optic connection; fibre-optic switches shall be allowed between the BYCM's for the fibre-optic connection. The BYCM's shall be able to send discrete binary signals to one another over the fibre-optic communication channel. All inter bay interlocking and automation i.e. between BYCH's, shall be done using IEC61850 GOOSE messaging over the fibre-optic channels.

10.3 MAINI – MULTI PURPOSE INCOMER OVERCURRENT PROTECTION RELAY

An incomer is classified as a source of energy. A source may be a remote feeding station, a local transformer, a local generator etc. The MAINI IED shall protect the source from over loading and fault currents as well as the downstream equipment such as bus-bars and feeders. The IED shall monitor the tripping (opening) time of the CB to ensure that they do not exceed adjustable thresholds. The trip time shall be displayed on the IED LCD screen and an external alarm generated should an adjustable time threshold be exceeded. Each IED shall have a minimum number of protection elements shown below.

Element	Qty	Type	Curve	Range (xIn)	Time Delay/Time Multiplier
O/C	2	Directional	Definite Time	5-2000%	0-10000 ms
E/F	2	Directional	Definite Time	5-80%	0-10000 ms
O/C	1	Directional	IDMT (SI, VI, EI)	10-200%	0.05 – 1.0
E/F	1	Directional	IDMT (SI, VI, EI)	5-80%	0.05 – 1.0
O/C	2	Non Directional	Definite Time	5-2000%	0-10000 ms
E/F	2	Non Directional	Definite Time	5-80%	0.05 – 1.0
SE/F	1	Non Directional	Definite Time	0.5-30%	0-10000 ms
O/C	2	Non Directional	IDMT (SI, VI, EI)	10-200%	0.05 – 1.0
E/F	2	Non Directional	IDMT (SI, VI, EI)	5-80%	0.05 – 1.0
SE/F	1	Non Directional	IDMT (SI, VI, EI)	0.5-10%	0.05 – 1.0

Table 1: Summary of minimum protection element requirements per MAINI IED:

10.4 MAINF – MULTI PURPOSE BACKUP OVERCURRENT PROTECTION RELAY

The MAINF IED will protect the outgoing feeders of a substation from over loading and fault currents as well as any downstream equipment. Only non-directional protection is required and therefore the MAINF IED shall have the same non-directional protection elements as specified for the MAINI IED.

The IED shall monitor the tripping (opening) time of the CB to ensure that they do not exceed adjustable thresholds. The trip time shall be displayed on the IED LCD screen and an external alarm generated should an adjustable time threshold be exceeded.

10.5 PFCR - CAPACITOR BANK PROTECTION RELAY

The PFCR IED shall protect and control grounded and ungrounded single and double wye capacitor banks using both phase and neutral voltage differential protection. Phase current unbalance protection and neutral current unbalance shall also be provided to protect the capacitor banks. Compensation adjustment shall be provided to zero out small unbalances that are inherent in the bank as well as CT and VT errors. Control logic shall be provided for maintaining system V, VAR or PF (Power Factor) as well as the alarm and blocking of control operations. Over-current and voltage protection elements shall provide additional protection of the banks.

10.6 DIFFO - FIBRE OPTIC LINE DIFFERENTIAL RELAY

The DIFFO IED shall provide high speed, two-ended, phase segregated current differential protection of overhead lines and underground cables. The differential protection shall be current biased with two adjustable slopes. The IED shall also provide CT ratio correction, CT vector correction and inrush restraint to allow for CT mismatch and in-zone transformers. The IED's shall be connected using direct fibre (1300nm Single-Mode, 850nm Multi-Mode fibre) and multiplexed digital links (G.703, V.35, and X.21 interfaces). It shall be possible to send multiple discreet inter-trip signals over the protection communication channel. The IED shall have 1A and 5A CT inputs on one device to allow for CT mismatching.

10.7 DIFFPV – PILOT WIRE LINE BALANCED VOLTAGE DIFFERENTIAL RELAY

The DIFFPV relay shall provide two-ended current differential protection of overhead lines and underground cables. The relay's shall operate on a balanced voltage principle and be directly compatible with remote-end relay. The relay shall provide phase and earth fault protection on circuits and be very stable for through faults while providing suitable sensitivity for internal faults. The relays shall be of similar type and be linked to one another using a pair of copper pilot wires. The relays shall be suitable for pilot wires insulated to 4kV. The pilot wires shall be supervised and an alarm contact energized when an open or short circuit is detected.

10.8 DIFFPI – PILOT WIRE LINE CURRENT BALANCED DIFFERENTIAL RELAY

The DIFFPI relay shall provide two-ended current differential protection of overhead lines and underground cables. The relay's shall operate on a current balance principle and be directly compatible with remote end relays. The relay shall provide phase and earth fault protection on circuits and be very stable for through faults while providing suitable sensitivity for internal faults. The relays shall be of similar type and be linked to one another using a pair of copper pilot wires. The relays shall be suitable for pilot wires insulated to 5kV. The pilot wires shall be supervised and an alarm contact energized when an open or short circuit is detected.

10.9 DIFFT - TRANSFORMER DIFFERENTIAL AND RESTRICTED EARTH FAULT RELAY

A DIFFT IED is required to protect two winding and auto power transformers. The IED shall include low impedance REF protection for the transformer MV and HV windings. The differential current protection shall be phase segregated, biased and with two adjustable slopes. The IED shall also provide CT ratio correction, CT vector correction, and 2nd and 5th inrush restraint and blocking. A separate unrestrained differential element will provide fast clearance of high magnitude internal faults. The IED shall also cater for dc offset currents during transformer energisation. The REF elements shall function without the use of external stabilizing resistors or equipment of any kind. It shall be possible to apply REF to an auto transformer using internal programming logic only. The neutral phases shall have IDMT and definite time over-current protection elements. The IED shall provide a visual display on an integral LCD screen all the operating parameters (input current phasors, differential currents, bias currents, harmonics, and sequence currents).

10.10 DIFFZ - LINE DIFFERENTIAL AND DISTANCE RELAY

The DIFFZ IED shall provide high speed, two or three terminal, phase segregated current differential protection of overhead lines and underground cables. The IED's shall be connected using direct fibre (1300nm Single-Mode) and multiplexed digital links (G.703, V.35, IEEE C37.94 EIA-422 and X.21 interfaces). It shall be possible to send multiple

discreet inter-trip signals over the protection communication channel. The relay shall compare local and remote phase and sequence currents to provide fast operation and shall operate for unbalanced faults with currents below line charging current. Mismatched CTs shall be accommodated by relay settings. Distortion caused by CT saturation of one or both ends shall not cause a mal-operation. The IED shall also incorporate four zones of phase and ground mho distance and quadrilateral ground distance protection. Communications assisted distance schemes (e.g. Permissive Over-reach Trip) shall be provided. Two distance zones shall be settable for either forward or reverse direction. Both positive-sequence memory polarized and compensator-distance phase distance elements shall be available and the IED shall detect stable and unstable power swings. The IED shall have phase, residual ground, and negative sequence over-current elements with directional and non-directional control.

10.11 DIFFB – BUSBAR DIFFERENTIAL RELAY

A DIFFB IED is required to protect HV and EHV bus-bars. The protection shall be of the numerical low impedance type in a localised (central) or distributed configuration. Bus-zone protection IED's shall detect bus-bar faults quickly and selectively and thereby isolate the faulty zone only. The bus zone protection shall be capable of detecting three-phase, phase-to-phase and phase-to-earth faults, under all system conditions. The protection shall retain full stability in the event of a through fault. Each zone measuring unit shall use at least two independent criterions for its operation, e.g. current summation and phase angle comparison. A bus-zone protection IED shall be configurable with both main and check zone elements with automatic internal selection of current elements to the correct zones. Each of the bay measuring elements shall not be affected by line / transformer switching, heavy load transfer, power swings, unbalanced primary currents and voltage, voltage dependant current functions, external switching, sudden power reversal etc. The differential current protection function shall have adjustable bias and operating / restraint curves.

The bus-bar protection shall accept inputs from external breaker fail protection relays. Breaker failure protection shall be provided which shall monitor the feeder's phase currents by detectors in each phase. Each bay unit shall have integral CT circuit supervision, which shall detect CT circuit faults, flag these faults and prevent mal-operation during normal system operation. It shall not be necessary for the CT circuit supervision to await an over-current situation to detect a problem. The sensitivity of the IED shall be such that it shall not operate on load in the event of a bus zone protection CT or CT connection being faulty, i.e. open or short-circuited. Operation of current transformer supervision equipment must take the defective protection zone out of service. A low current transformer burden is required to allow the protection to be installed in series with other equipment on a common current transformer secondary circuit.

The bus zone IED shall not be affected by harmonic currents that as may be experienced in a multiple earthed power system or by a CT saturation. CT saturation shall not affect the performance of the bus-zone IED. CT saturation shall be detected within 2 ms of occurring and protection algorithms adjusted to compensate for the saturation. In the case of a distributed type bus-zone scheme, peripheral units shall be connected to the Central Unit via ruggedized Optic fibre Cable. Optical Fibre Connection interface for multimode glass fibre shall be of the type as per IEC 874-10, 850nm short-haul fibres, Min Length: 1000m. Central and Peripheral units shall be equipped with at least 12 LEDs of which at least 8 shall be user configurable. Graphical programmable user interface allowing user defined protection and control logic to be tailored to the specific application, shall be provided. Internal configurable CT ratio mismatching shall be provided.

10.12 ARCP - ARC PROTECTION RELAY

The main protection for metal-clad switchgear shall be arc protection utilizing both light and current to trip (i.e. a 2 out of 2 operation). This protection scheme shall be provided with individual light sensors in the bus-bar, cable box and circuit breaker compartments. A fault in a cable box shall only trip the single circuit breaker associated with that cable box. A fault in a circuit breaker compartment or bus-bar chamber shall only clear that section of the switchboard (zone) associated with the fault, i.e. all circuit breakers on the faulted zone

shall trip. Therefore the bus-bars and associated circuit breakers that are separated by bus section circuit breakers shall form separate zones that are cleared on a fault. Healthy bus-bar zones shall not be isolated. The arc protection system (arc and current) shall have continuous self-monitoring for internal hardware and software failure and a watchdog contact shall be provided for alarming any failure of the arc and current sensing equipment. The arc protection system shall have a master central unit with light and current sensing capability. The system shall be modular allowing for the addition of up to 4 zones.

10.13 AVR - TRANSFORMER AUTOMATIC VOLTAGE REGULATOR

A transformer automatic voltage regulator IED is required to control the MV output voltage i.e. secondary side voltage of a step-down power transformer. The regulator shall constantly compare the actual voltage value and a fixed or load-dependent set-point value and, depending on the deviation, determine the correcting action for the tap changer of the transformer. The regulator parameters shall be optimally adjusted to the dynamic time behaviour of the network voltage to allow for a high control quality at a low number of tap changer switching operations.

All regulators shall be able to control up to six transformers connected in parallel to one bus-bar without any additional devices. Parallel operation of transformers on one or several bus-bars shall be performed using Master-slave for identical transformers with equal tap change, $\Delta \sin \phi$ for identical transformers with equal or different tap-changes, $\Delta \sin \phi$ (S) for transformers with different powers and different or equal tap-changes, or freely switched in parallel using $\Delta \cos \phi$. The regulator shall monitor and record the transformer oil temperature directly via a PT 100 a mA transducer input.

The regulator shall trend, display and record the voltage that is to be regulated over time and the transformer oil temperature. The regulator shall have freely user programmable inputs and outputs. Every regulator shall constantly indicate which reactive current I sin ϕ is being used. The regulator shall have integral user operated controls for placing the device on Auto or Manual mode, and Local or Remote control. All important information (tap-change position, voltage, etc.) shall be displayed on a large backlit LCD screen.

A statistics function shall be provided on the regulator to record the total number of tap-changer switching operations and switching operations per tap. Inputs for tap-changer position shall include potentiometer, mA transducer, and BCD (binary coded decimal). Outputs for tap changer position shall include hard wired mA and BCD.

10.14 STBYEF - STANDBY EARTH FAULT RELAY

A STBYEF IED is required to provide backup earth fault protection for all source downstream equipment as well as provide earth fault backup protection to MV faults of a step down transformer. The IED shall reject harmonics caused by CT saturation. The STBYEF IED shall also be used for high impedance transformer REF applications by using external series stabilizing resistors and also non-linear resistors (Metrosils).

Element	Qty	Type	Curve	Range (X _{in})	Time Delay/Time Multiplier
E/F	2	Non Directional	Definite Time	5-80%	0.05 – 1.0
SE/F	1	Non Directional	Definite Time	0.5-30%	0-10000 ms
E/F	2	Non Directional	IDMT (SI, VI, EI)	5-80%	0.05 – 1.0
SE/F	1	Non Directional	IDMT (SI, VI, EI)	0.5-10%	0.05 – 1.0

Table 2: The IED with single element device with functionality.

10.15 LO1 & LO2 & MTR - LOCKOUT RELAY

A LO1 and LO2 lockout relay is required to reinforce the main tripping contact of protection IED's, to prevent the closure of primary devices as well as provide an operational flag indication. A MTR is used for inter-tripping in a local substation environment when dc source isolation is required. The lockout relay output contacts shall be mechanically latched and manually hand reset with a user signed operating flag. The relays shall have a high operating speed and be of the high burden type providing immunity to capacitance

discharge in the wiring. The relays shall have an instantaneous cut off contact to break the operating coil circuit once the relay mechanism has completely operated. The relays shall be of the electro-mechanical type.

10.16 Taux - TRIP AUXILIARY RELAY

A Taux relay is required to supplement or multiply the main tripping contact of protection IED's, as well as provide an operational flag indication. The relay is also used for inter-tripping in a local substation environment with dc source isolation. The relay output contacts shall be self-resetting and with the user signed operating flag manually hand reset. The relays shall have a high operating speed and be of the high burden type providing immunity to capacitance discharge in the wiring. The relays shall have an economizing element to reduce the operating coil burden once the relay mechanism has completely operated. The relays shall be of the electro-mechanical type.

10.17 ALA - ALARM ANNUNCIATOR

An alarm annunciator is required to supplement the visual alarms provided by the protection IED's via their respective LED's. The alarm annunciator shall be specifically designed for use in high voltage protection panels which normally operate with a battery supplied control voltage. The annunciator shall operate on a normally open contact which closes on fault. On receipt of a closing contact, an appropriate LED shall flash. The LED colour shall be user configurable between red and amber. On acceptance of the alarm, the LED shall go steady. The LED shall stay on until a reset button is pressed. Subsequent alarms shall be recognized, i.e. If there are existing alarms on the system, a new alarm will initiate a flashing LED without affecting existing alarms. The acceptance and reset pushbuttons shall be integral to the annunciator unit. Each alarm LED shall have an integral user configurable label.

10.18 INTSP & INTRP - INTERTRIP SEND AND RECEIVE PILOT WIRE RELAY

An INTSP and INTRP relay is required to send signals between remote stations for protection purposes. Inter-tripping over copper pilot wire using a DC signal is used. Induced AC voltages that could cause false tripping shall be filtered out to enhance this immunity while maintaining high sensitivity to DC voltages. A manually resettable mechanical flag indicator shall be provided on both the send & receive elements of the relay.

10.19 INTSF & INTRF - INTERTRIP SEND AND RECEIVE FIBRE OPTIC RELAY

An INTSF and INTRF relay is required to send signals between remote stations for protection purposes. Inter-tripping over fibre optic cables is used. The relays shall be connected using direct fibre (1300nm Single-Mode, 850nm Multi-Mode fibre) and multiplexed digital links (G.703, V.35, and X.21 interfaces). It shall be possible to send multiple discreet inter-trip signals over the protection communication channel. Each discreet inter-trip signal shall be clearly indicated on the relay via LED's. The Fibre optic channel shall be continuously monitored with an alarm output contact to increase scheme security.

10.20 MFST – MUTLI FUNCTION SCADA TRANSDUCER

A MFST is required to provide a local substation Remote Terminal Unit (RTU) with signals representing the operating parameters of the electrical network e.g. current, voltage, power, frequency, phase angle etc. The transducer is required to be multi-functional in order to save space within the protection panels. The transducer shall measure three phase unbalanced quantities. The transducer shall have DNP3 and IEC61870 communication protocol outputs to signal each analog type and range. The physical communication connection terminal shall be of the RS485 type. The transducers shall be pre-configured in the factory as per scheme requirements and further by a user programmable interface.

10.21 DIFFC – CIRCULATING CURRENT RELAY

A DIFFC shall be used to protect short lengths of cables/lines usually situated with a substation boundary where any remote current transformer cabling to the relay does not exceed 50m in length. The DIFFC relay shall be actually be a MAINF IED used in a high impedance circulating current differential application with external series stabilizing resistors and non-linear resistors (Metrosils).

10.22 DCVMR – DC VOLTAGE MONITORING RELAY

A DCVMR will be used to monitor the station DC supply. If the station DC drops below a critical threshold level, a trip to the circuit breaker will be issued to protect the primary plant. The relay shall be capable of monitoring an over-voltage or under-voltage condition with a subsequent trip output. The trip output shall be delayed to prevent spurious operations. Indication LED's shall be provided on the relay to show the supply voltage, over/under voltage, timing and active output states. The relay settings shall be tamper proof in the form of password protection or a clear sealable cover.

10.23 MAINFO - MULTI PURPOSE MAIN FEEDER RELAY

The MAINFO relay shall protect the incoming feeders of a substation from over loading and fault currents as well as any downstream equipment. Both directional and non-directional protection is required and therefore the MAINFO shall have the same protection elements as specified for the MAINI.

The IED shall also provide high speed, two-ended, phase segregated current differential protection of overhead lines and underground cables. The differential protection shall be current biased with two adjustable slopes. The IED shall also provide CT ratio correction. The IED's shall be connected using direct fibre (1300nm Single-Mode), or multiplexed digital links (G.703, V.35, and X.21 interfaces). It shall be possible to send multiple discreet inter-trip signals over the protection communication channel. The IED shall have 1A and 5A CT inputs on one device to allow for CT mismatching.

The IED shall monitor the tripping (opening) time of the CB to ensure that they do not exceed adjustable thresholds. The trip time shall be displayed on the IED LCD screen and an external alarm generated should an adjustable time threshold be exceeded.

10.24 RADIALF - RADIAL FEEDER OVER CURRENT RELAY

The RADIALF relay shall protect the outgoing feeders of a substation from over loading and fault currents as well as any downstream equipment. Only non-directional protection is required and therefore the RADIAL shall have the same non-directional protection elements as specified for the MAINI.

The relay shall monitor the tripping (opening) time of the CB to ensure that they do not exceed adjustable thresholds. The trip time shall be displayed on the IED LCD screen and an external alarm generated should an adjustable time threshold be exceeded

11 DOCUMENTATION

- 11.1 Technical product catalogue and two operating manuals shall be provided in hard and soft copies.
- 11.2 Full detailed dimensions drawings shall be provided.
- 11.3 A copy of all test reports shall be provided.
- 11.4 A copy of proposed maintenance schedules shall be provided in hard and soft copies.

12 MARKING AND LABELLING

- 12.1 The following information shall appear in legible and indelible marking on the outside of the IED's.
 - 12.1.1 The manufacturer's name or trademark;
 - 12.1.2 Serial number for tracking

12.1.3 Year of manufacturing

13 TRAINING

13.1 The suppliers shall provide comprehensive training courses on the configuration, installation, operation and maintenance of the antennas.

13.2 The suppliers shall provide technical support on system and equipment queries for the duration of the contract.

14 QUALITY MANAGEMENT

A quality management system shall be set up in order to assure quality of all devices during design, development, production and servicing. Guidance on the requirements for a quality management system may be found in the following standards: ISO 9001. The details shall be subject to agreement between the purchaser and supplier.

15 HEALTH AND SAFETY

A health and safety plan shall be set up in order to ensure proper management and compliance of the devices during installation, operation, maintenance, and decommissioning phases. Guidance on the requirements of a health and safety plan may be found in OHSAS 18001 standards. This is to ensure that the asset conforms to standard operating procedures and City Power SHERQ Policy. The details shall be subject to agreement between City Power and the Supplier..

16 ENVIRONMENTAL MANAGEMENT

An environmental management plan shall be set up in order to ensure the proper environmental management and compliance of the devices during their entire life cycle (i.e. during design, development, production, installation, operation and maintenance, decommissioning as well as disposal phases). Guidance on the requirements for an environmental management system may be found in ISO 14001 standards. The details shall be subject to agreement between City Power and the Supplier. This is to ensure that the asset created conforms to environmental standards and City Power SHERQ policy

ANNEXURE A - Bibliography

None

ANNEXURE B - Revision information

DATE	REV. NO.	NOTES
March 2014	0	First issue
March 2015	1	Second issue
May 2018	2	Third issue
Updated committee members		
Nominative reference; added ENA TS 50-19:2004		
Nominative reference; updated with IEC 60255-26:-2009		
Nominative reference; updated with IEC 61000-4-3 2010		
Nominative reference; updated with IEC 61000-4-8 2009		
Nominative reference; updated with IEC 61000-4-9 2016		
Nominative reference; updated with IEC 60255-26 2013		
Nominative reference; updated with IEC 61000-4-2: 2008		
Nominative reference; updated with IEC 60068-2-2 2007		
Nominative reference; updated with IEC 60255-21-3 1993		
Nominative reference; updated with IEC 60529: 2015		
Clause 10.7: replaced branding with end relay.		
Clause 10.8: replaced branding with end relay		
Clause 10.23: Added entire clause as a new item.		
Clause 10.24 :Added entire clause as a new item.		
Clause 11 :Added entire clause as a new item		
Clause 12 :Added entire clause as a new item.		
Clause 15 :Added entire clause as a new item.		
Annex C: Added new schedules for clauses 10.23, 10.24, as items 24 and 25		

ANNEXURE C - BYCH – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.1	DESCRIPTION TECHNICAL DETAIL FOR A HV BAY CONTROLLER MAJOR PROTECTION EQUIPMENT (BYCH).		
	Manufacturer	State	
	Type/Model	State	
	Minimum Functionality		
10.1.1	DigSilent StationWare settings file	State	
10.1.2	Graphical Man-Machine Interface (HMI) with mimic display	Yes	
10.1.3	HMI control of circuit breakers	>=2	
10.1.4	HMI control of 2 pole switching devices	>=10 devices	
10.1.5	SCADA control of circuit breakers and 2 pole devices	Yes	
10.1.6	Password protection	Yes	
10.1.7	Breaker Fail protection	Yes	
10.1.8	3 stage under frequency protection	State	
10.1.9	Breaker condition monitoring	State	
10.1.10	User programmable logic	Yes	
10.1.11	Fault waveform recording with a minimum of 4 records	Yes	
10.1.12	Sequential event recording with a minimum of 100 events	Yes	
10.1.13	Multi shot Auto Re-close	State	
10.1.14	Trip circuit supervision	Yes	
10.1.15	Synchronizing Check and Energisation Check (Dead Bus /Dead Line included)	State	
10.1.16	Integral Local/Remote selector switch	Yes	
10.1.17	Alarm annunciation on HMI and LED's	Yes	
10.1.18	Voltage and Current Measuring Functions	Yes	
10.1.19	3 phase maximum demand power, three phase real power, apparent power and power factor display on LCD.	Yes	
10.1.20	Internal hardware and Software Supervision	Yes	
10.1.21	Minimum Programmable Heavy Duty Tripping Output Relays	>=8	
	Minimum number of Binary Inputs	16 to 60	
	Minimum number of user programmable and configurable indication LED's	State	
10.1.22	User programmable logic	Yes	
10.1.23	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ ETHERNET/ RS232	State	
10.1.24	Front Local Data Communication Port RS232 / USB	State	
10.1.25	Internal clock synchronization	Yes	
10.1.26	Relay casing material	Steel or Aluminium	

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	Technical Details		
10.1.27	Number of Voltage Inputs	>=3	
10.1.28	Rated Voltage Input (Un)	110V	
10.1.29	Rated Voltage Withstand: Continuously	State	
10.1.30	Number of Current Inputs	>=4	
10.1.31	Rated Frequency (fn)	50Hz	
10.1.32	Rated Current (In)	1A or 5A	
10.1.33	Thermal Current Withstand: Continuous	State	
10.1.34	Thermal Current Withstand: Continuous rating	State	
10.1.35	Thermal Current Withstand: 1s	State	
10.1.36	Input Impedance: (In = 1A)	State	
10.1.37	Output Contact Rated Voltage	110V or 230V ac/dc	
10.1.38	Power/ Signal Contact Thermal Withstand capability: Continuous	State	
10.1.39	Power/ Signal Contact Thermal Withstand capability: 3s	State	
10.1.40	Power/ Signal Contact Thermal Withstand capability: 0.5s	State	
10.1.41	Power Contact Thermal Breaking capability: L/R = 40ms @ 110VDC	State	
10.1.42	Binary Input Voltage Range	30V or 110V dc	
10.1.43	Rated Auxiliary Supply Voltage	30V or 110V dc	
10.1.44	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
10.1.45	CTs terminals connection type	Ring or Flat	
10.1.46	Maximum relay dimensions in mm (width, height, depth)	300, 300, 300	
10.1.47	Maximum Power Consumption	State	
	Maximum Power Consumption (VA)	State	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

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Name in block letters Signature

Full name of company: _____

ANNEXURE C - BYCM – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.2	TECHNICAL DETAIL FOR A MV BAY CONTROLLER MAJOR PROTECTION EQUIPMENT (BYCM).		
	Manufacturer	State	
	Type/Model	State	
	Minimum Functionality		
10.2.1	DigSilent StationWare settings file	State	
10.2.2	SCADA control of circuit breakers and 2 pole devices	Yes	
10.2.3	Password protection	Yes	
10.2.4	Breaker Fail protection	Yes	
10.2.5	3 stage under frequency protection	State	
10.2.6	Breaker condition monitoring	State	
10.2.7	User programmable logic	Yes	
10.2.8	Fault waveform recording with a minimum of 4 records	Yes	
10.2.9	Sequential event recording with a minimum of 100 events	Yes	
10.2.10	Multi shot Auto Re-close	State	
10.2.11	Trip circuit supervision	Yes	
10.2.12	Synchronizing Check and Energisation Check (Dead Bus /Dead Line included)	Yes	
10.2.13	Integral Local/Remote selector switch	Yes	
10.2.14	Alarm annunciation on HMI and LED's	Yes	
10.2.15	Voltage and Current Measuring Functions	Yes	
10.2.16	3 phase maximum demand power, three phase real power, apparent power and power factor display on LCD.	Yes	
10.2.17	Internal hardware and Software Supervision	Yes	
10.2.18	Minimum Programmable Heavy Duty Tripping Output Relays	>=8	
10.2.19	Minimum Programmable Signal Output Relays	10 to 15	
10.2.20	Minimum number of Binary Inputs	16 to 40	
10.2.21	Minimum number of user programmable and configurable indication LED's	State	
10.2.22	User programmable logic		
10.2.23	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ ETHERNET/ RS232		
10.2.24	Front Local Data Communication Port RS232 / USB		
10.2.25	Relay casing material	Steel or Aluminium	
	Technical Details		
10.2.26	Number of Voltage Inputs	>=4	
10.2.27	Rated Voltage Input (Un)	>=110V	
10.2.28	Rated Voltage Withstand. Continuously	>= Un	
10.2.29	Number of Current Inputs	>=4	

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ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.2.30	Rated Frequency (fn)	50Hz	
10.2.31	Rated Current (In)	>=1A	
10.2.32	Thermal Current Withstand: Continuous	State	
10.2.32	Thermal Current Withstand: 1s	State	
10.2.33	Input Impedance: (In = 1A)	State	
10.2.34	Output Contact Rated Voltage: 110/230V AC/DC	State	
10.2.36	Power/ Signal Contact Thermal Withstand capability: Continuous	State	
10.2.37	Power/ Signal Contact Thermal Withstand capability: 3s	State	
10.2.38	Power/ Signal Contact Thermal Withstand capability: 0.5s	State	
10.2.39	Power Contact Thermal Breaking capability: L/R = 40ms @ 110VDC	State	
	Binary Input Voltage Range	110 – 220 V dc	
10.2.40	Rated Auxiliary Supply Voltage	110 – 220 V dc	
10.2.41	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
10.2.42	CT and VT connection terminal type	Ring or Flat	
10.2.43	Maximum Power Consumption (VA)	State	
10.2.30			

Note: Ticks, Cross [√, X], Astrick [*], Word [Noted] or TBA [“To Be Advice”] will not be accepted.

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ANNEXURE C - MAINI – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.3	TECHNICAL DETAIL FOR A MULTI PURPOSE MAIN INCOMER OVER CURRENT RELAY (MAINI).		
	Manufacturer	State	
	Type/Model	State	
	Minimum Functionality		
10.3.1	DigSilent StationWare settings file	State	
10.3.2	Multiple element directional and non-directional over-current protection	Yes	
10.3.3	Multiple element directional and non-directional earth fault protection	Yes	
10.3.4	Sensitive earth fault protection Note: This functionality can be provided as a separate relay: if so then– see STBYEF relay and compete STBYEF technical schedule)	Yes	
10.3.5	LCD Display Interface	Yes	
10.3.6	Password protection	Yes	
10.3.7	Breaker Fail protection	Yes	
10.3.8	3 stage under frequency protection	State	
10.3.9	Breaker 1 st condition monitoring	State	
10.3.10	Internal trip timer (CB opening time) with alarm output (element or logics)	Yes	
10.3.11	Fault waveform recording with a minimum of 4 records	Yes	
10.3.12	Sequential event recording with a minimum of 100 events	Yes	
10.3.13	Multi shot Auto Re-close	State	
10.3.14	Trip circuit supervision	Yes	
10.3.15	Synchronizing Check and Energization Check (Dead Bus /Dead Line included)	State	
10.3.16	3 phase maximum demand power, three phase real power, apparent power and power factor display on LCD.	Yes	
10.3.17	Internal hardware and Software Supervision	Yes	
10.3.18	Minimum Programmable Heavy Duty Tripping Output Relays	>=2	
10.3.19	Minimum Programmable Signal Output	>=4	
10.3.20	Minimum Number of Binary Inputs	>=6	
10.3.21	Minimum number of user programmable and configurable indication LED's	State	

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ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.3.22	User programmable logic	Yes	
10.3.23	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ETHERNET/RS232	State	
10.3.24	Front Local Data Communication Port RS232 / USB	State	
10.3.25	Internal clock synchronization	Yes	
10.3.26	Relay casing material	Steel or Aluminium	
10.3.27	Technical Details		
10.3.28	Number of Voltage Inputs	>=3	
10.3.29	Rated Voltage Input (Un)	110V	
10.3.30	Rated Voltage Withstand: Continuously	State	
10.3.31	Number of Current Inputs	>=4	
10.3.32	Rated Frequency (fn)	50Hz	
10.3.33	Rated Current (In)	1A or 5A	
10.3.34	Thermal Current Withstand: Continuous	State	
10.3.35	Thermal Current Withstand: Continuous rating	State	
10.3.36	Thermal Current Withstand: 1s	State	
10.3.37	Input Impedance: (In = 1A)	State	
10.3.38	Output Contact Rated Voltage	110V or 230V ac/dc	
10.3.24	Power/ Signal Contact Thermal Withstand capability: Continuous	State	
10.3.25	Power/ Signal Contact Thermal Withstand capability: 3s	State	
10.3.26	Power/ Signal Contact Thermal Withstand capability: 0.5s	State	
10.3.27	Power Contact Thermal Breaking capability: L/R = 40ms @ 110VDC	State	
10.3.28	Binary Input Voltage Range	30V or 110V dc	
10.3.29	Rated Auxiliary Supply Voltage	30V or 110V dc	
10.3.30	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
10.3.31	CTs terminals connection type	Ring or Flat	
10.3.32	Maximum relay dimensions in mm (width, height, depth)	300, 300, 300	
10.3.33	Maximum Power Consumption	State	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

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ANNEXURE C - MAINF – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.4	TECHNICAL DETAIL FOR A MULTI PURPOSE MAIN FEEDER OVER CURRENT RELAY (MAINF).		
	Manufacturer	State	
	Type/Model	State	
	Minimum Functionality		
10.4.1	DigSilent StationWare settings file	State	
10.4.2	Multiple element over-current protection	Yes	
10.4.3	Multiple element earth fault protection	Yes	
10.4.4	Sensitive earth fault protection Note: This functionality can be provided as a separate relay. If so then – see STBYEF relay and complete STBYEF technical schedule)	Yes	
10.4.5	LCD Display Interface	Yes	
10.4.6	Password protection	Yes	
10.4.7	Breaker Fail protection	Yes	
10.4.8	3 stage under frequency protection	State	
10.4.9	Breaker 1st condition monitoring	State	
10.4.10	Internal trip timer (CB opening time) with alarm output (element or logics)	Yes	
10.4.11	Fault waveform recording with a minimum of 4 records	Yes	
10.4.12	Sequential event recording with a minimum of 100 events	Yes	
10.4.13	Multi shot Auto Re-close	State	
10.4.14	Trip circuit supervision	Yes	
10.4.15	3 phase current display on LCD.	Yes	
10.4.16	Internal hardware and Software Supervision	Yes	
10.4.17	Minimum Programmable Heavy Duty Tripping Output Relays	>=2	
10.4.18	Minimum Programmable Signal Output Relays	>=4	
10.4.19	Minimum Number of Binary Inputs	>=6	
10.4.20	Minimum number of user programmable and configurable indication LED's	State	
10.4.21	User programmable logic	Yes	
10.4.22	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ETHERNET/RS232	State	
10.4.23	Front Local Data Communication Port RS232 / USB	State	
10.4.24	Relay casing material	Steel or Aluminium	

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ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	Technical Details		
10.4.25	Number of Current Inputs	>=4	
10.4.26	Rated Frequency (fn)	50Hz	
10.4.27	Rated Current (In)	1A or 5A	
10.4.28	Thermal Current Withstand: Continuous	State	
10.4.29	Thermal Current Withstand: Continuous rating	State	
10.4.30	Thermal Current Withstand: 1s	State	
10.4.31	Input Impedance: (In = 1A)	State	
10.4.32	Output Contact Rated Voltage	110/230V AC/DC	
10.4.33	Power/ Signal Contact Thermal Withstand capability: Continuous	State	
10.4.34	Power/ Signal Contact Thermal Withstand capability: 3s	State	
10.4.35	Power/ Signal Contact Thermal Withstand capability: 0.5s	State	
10.4.36	Power Contact Thermal Breaking capability: L/R = 40ms @ 110VDC	State	
10.4.37	Binary Input Voltage Range	30V or 110 V or 220V dc	
10.4.38	Rated Auxiliary Supply Voltage	30V or 110 or 220V dc	
10.4.39	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
10.4.40	CTs terminals connection type	Ring or Flat	
10.4.41	Maximum relay dimensions in mm (width, height, depth)	300, 300, 300	
10.4.42	Maximum Power Consumption	State	
	Setting	1 or 0	

Note: Ticks, Cross [v, X], Astrick [*], Word [Noted] or TBA [“To Be Advice”] will not be accepted.

Tender Number: _____

Tenderer's Authorised Signatory: _____ Name in block letters Signature

Full name of company: _____

ANNEXURE C - PFCR – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.5	TECHNICAL DETAIL FOR A CAPACITOR BANK PROTECTION RELAY (PFCR).		
	Manufacturer	State	
	Type/Model	State	
	Minimum Functionality		
10.5.1	DigSilent StationWare settings file	Yes	
10.5.2	3 Stage - 3 Phase Over current Protection	Yes	
10.5.3	Ground over current protection	Yes	
10.5.4	Phase over current Protection	Yes	
10.5.5	Phase current unbalance	Yes	
10.5.6	Neutral current unbalance	Yes	
10.5.7	Power elements real and reactive	Yes	
10.5.8	Over/under voltage Protection	Yes	
10.5.9	Over/under Frequency Protection	Yes	
10.5.10	Voltage Differential Protection	Yes	
10.5.11	Current Unbalance Protection	Yes	
10.5.12	Automatic Capacitor Bank Control (Voltage, VAR, PF, etc.)	Yes	
10.5.13	Voltage and Current Measuring Functions	Yes	
10.5.14	Internal hardware and Software Supervision	Yes	
10.5.15	Password protection	2 levels	
10.5.16	Breaker Fail protection	Yes	
10.5.17	Minimum Programmable Heavy Duty Output Relays	4	
10.5.18	Minimum Programmable Signal Output Relays	10	
	Minimum Number of Binary Inputs	6	
10.5.19	User programmable logic	Yes	
10.5.20	Minimum number of user programmable and configurable indication LED's	6	
10.5.21	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ ETHERNET/ RS232	Yes	
10.5.22	Front Local Data Communication Port RS232 / USB	Yes	
10.5.23	Internal clock synchronization - demodulated IRLG-B (non BNC external connector)	IRLG-B122	
10.5.24		Steel or Aluminium	
	Relay casing material		
	Technical Details		
10.5.25	Number of Voltage Inputs	6	
10.5.26	Rated Voltage (Un)	100V / 110V	
10.5.27	Rated Voltage Withstand: Continuously	2 x Un	

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.5.28	Number of Current Inputs	4	
10.5.29	Rated Frequency (fn)	50Hz	
10.5.30	Rated Current (In)	1A	
10.5.31	Rated Current of Fifth Element (In)	0.2A/1A	
10.5.32	Thermal Current Withstand: Continuous	4 x In	
10.5.33	Thermal Current Withstand: Continuous for In = 0.2A	7.5 x In	
10.5.34	Thermal Current Withstand: 1s	100 x In	
10.5.35	Input Impedance: (In = 1A)	< 1 VA	
10.5.36	Output Contact Rated Voltage	250V AC/DC	
10.5.37	Power/ Signal Contact Thermal Withstand capability: Continuous	5A	
10.5.38	Power/ Signal Contact Thermal Withstand capability: 0.5s	30A/10A	
10.5.39	Binary Input Voltage Range	110/220 V dc	
10.5.40	Rated Auxiliary Supply Voltage	110 – 220 V dc	
10.5.41	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
10.5.42	Fault waveform recording with a minimum of 4 records	Yes	
10.5.43	Sequential event recording with a minimum of 100 time tagged events	Yes	
10.5.44	All terminals connection type	Ring	
10.5.45	Maximum Power Consumption	State	

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ANNEXURE C DIFFO- TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.6	TECHNICAL DETAIL FOR A FIBER OPTIC LINE DIFFERENTIAL RELAY (DIFFO).		
	Manufacturer	State	
	Type/Model	State	
	Minimum Functionality		
10.6.1	DigSilent StationWare settings file	State	
10.6.2	Phase segregated current differential protection over fibre	Yes	
10.6.3	Internal CT mismatch correction	Yes	
10.6.4	Internal CT vector compensation	Yes	
10.6.5	Internal inrush current detection	Yes	
10.6.6	LCD Display Interface	Yes	
10.6.7	Password protection	State	
10.6.8	Breaker Fail protection	Yes	
10.6.9	Fault waveform recording with a minimum of 4 records	Yes	
10.6.10	Sequential event recording with a minimum of 100 events	Yes	
10.6.12	3 phase current display on LCD.	Yes	
10.6.13	Internal hardware and Software Supervision	Yes	
10.6.14	Minimum Programmable Heavy Duty Tripping Output Relays	>=2	
10.6.15	Minimum Programmable Signal Output Relays	>=4	
10.6.16	Minimum Number of Binary Inputs	>=6	
10.6.17	Minimum number of user programmable and configurable indication LED's	State	
10.6.18	User programmable logic	Yes	
10.6.19	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ ETHERNET/ RS232	State	
10.6.20	Front Local Data Communication Port RS232 / USB	State	
10.6.21	Internal clock synchronization	Yes	
10.6.22		Steel or Aluminium	
	Relay casing material		
10.6.23	Technical Details		
10.6.24	Number of Current Inputs	>=4	
10.6.25	Rated Frequency (fn)	50Hz	
10.2.26	Thermal Current Withstand: Continuous	State	
10.3.27	Thermal Current Withstand: 1s	State	
10.3.28	Input Impedance: (In = 1A)	State	
10.3.29	Output Contact Rated Voltage	110V or 230V ac/dc	

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.3.30	Power/ Signal Contact Thermal Withstand capability: Continuous	State	
10.3.31	Power/ Signal Contact Thermal Withstand capability: 3s	State	
10.3.32	Power/ Signal Contact Thermal Withstand capability: 0.5s	State	
10.3.33	Power Contact Thermal Breaking capability: L/R = 40ms @ 110VDC	State	
10.3.34	Binary Input Voltage Range	30V or 110Vdc	
10.3.35	Rated Auxiliary Supply Voltage	30V or 110Vdc	
10.3.36	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
10.3.37	CTs terminals connection type	Ring or Flat	
10.3.38	Maximum relay dimensions in mm (width, height, depth)	300, 300, 300	
10.3.39	Maximum Power Consumption	State	
10.3.38	Maximum Power Consumption	State	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA [“To Be Advice”] will not be accepted.

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ANNEXURE C - DIFFPV – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.7	TECHNICAL DETAIL FOR A PILOT WIRE LINE BALANCED VOLTAGE DIFFERENTIAL RELAY (DIFFPV).		
	Manufacturer	State	
	Type/Model	State	
	Minimum Functionality		
10.7.1	Current differential protection over copper wire pair	Yes	
10.7.2	Balanced voltage operating principle	Yes	
10.7.3	Compatible with remote end relays.	Yes	
10.7.4	Minimum Heavy Duty Tripping Output Relays	2	
10.7.5	Trip operation flag	Yes	
10.7.6	Relay casing material	Steel or Aluminium	
	Technical Details		
10.7.7	Operating time at 10 x In	< 100ms	
10.7.8	Number of Current Inputs	4	
10.7.9	Rated Frequency (fn)	50Hz	
10.7.10	Rated Current (In)	1A or 5A	
10.7.11	Thermal Current Withstand: Continuous	1.3 x In	
10.7.12	Thermal Current Withstand: 0.5s	30 x In	
10.7.13	Input Impedance: (In = 1A)	< 1VA	
10.7.14	50 Hz insulation level	4kV	
10.7.15	Output Contact Rated Voltage	250V AC/DC	
10.7.16	Power Contact Thermal Withstand capability: Continuous	6A	
10.7.17	All terminals connection type	Ring	
10.7.28	Maximum relay dimensions in mm (width, height, depth)	160, 200, 250	

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ANNEXURE C - PWSRV – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.7B	TECHNICAL DETAIL FOR A PILOT WIRE SUPERVISION RELAY (PWSRV) FOR THE LINE BALANCED VOLTAGE DIFFERENTIAL RELAY (DIFFPV).		
	Manufacturer	State	
	Type/Model	State	
	Minimum Functionality		
	Supervision of ac circuit copper wire pair (pilot circuit) interconnecting protective relays	Yes	
7B.1	Pilot circuit insulation	5kV	
	DC injection method	Yes	
	Compatible with remote end relay	Yes	
	Minimum Alarm Output Relays	2	
	Alarm flag for pilot short-circuit	Yes	
	Alarm flag for pilot open-circuit	Yes	
	Alarm and indication of power supply failure	Yes	
	Relay casing material	Steel or Aluminium	
	Technical Details		
	AC supervision voltage Vn	110V or 220V	
7B.2	DC auxiliary voltage	32/110V	
	Rated Frequency (fn)	50Hz	
	Range of pilot loop resistance	0 to 10kΩ	
	Allowable continuous ac pilot current	50mA	
	Allowable short time ac pilot current	1500mA	
	Output Contact Rated Voltage	250V AC/DC	
	Output Contact Continuous rating	5A AC/DC	
	Output Contact Break rating	25W, L/R = 0.04s	
	All terminals connection type	Ring	
	AC power consumption	State	
	DC power consumption	State	
	Maximum relay dimensions in mm (width, height, depth)	160, 200, 250	

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ANNEXURE C - DIFFPI – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	TECHNICAL DETAIL FOR A PILOT WIRE LINE BALANCED CURRENT DIFFERENTIAL RELAY (DIFFPI).		
	Manufacturer	State	
8A	Type/Model	State	
	Minimum Functionality		
	Current differential protection over copper wire pair	Yes	
8A.1	Balanced voltage operating principle	Yes	
	Compatible with remote end relay	Yes	
	Minimum Heavy Duty Tripping Output Relays	2	
	Relay casing material	Steel or Aluminium	
ITEM	Technical Details		
	Operating time at 10 x In	< 100ms	
8A.2	Number of Current Inputs	4	
	Rated Frequency (fn)	50Hz	
	Rated Current (In)	1A or 5A	
	Thermal Current Withstand: Continuous	1.3 x In	
	Thermal Current Withstand: 0.5s	30 x In	
	Input Impedance: (In = 1A)	< 1VA	
	50 Hz insulation level	5kV	
	Output Contact Rated Voltage	250V AC/DC	
	Power Contact Thermal Withstand capability: Continuous	6A	
	All terminals connection type	Ring	
	Maximum relay dimensions in mm (width, height, depth)	160, 200, 250	

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ANNEXURE C - PWSRI – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	TECHNICAL DETAIL FOR A PILOT WIRE SUPERVISION RELAY (PWSRI) FOR THE LINE BALANCED CURRENT DIFFERENTIAL RELAY (DIFFPI).		
	Manufacturer	State	
8B	Type/Model	State	
	Minimum Functionality		
	Supervision of ac circuit copper wire pair (pilot circuit) interconnecting protective relays	Yes	
8B.1	Pilot circuit insulation	5kV	
	DC injection method	Yes	
	Compatible with remote end relay	Yes	
	Minimum Alarm Output Relays	2	
	Alarm flag for pilot short-circuit	Yes	
	Alarm flag for pilot open-circuit	Yes	
	Alarm and indication of power supply failure	Yes	
	Relay casing material	Steel or Aluminium	
	Technical Details		
	AC supervision voltage Vn	110V or 220V	
8B.2	DC auxiliary voltage	32 or 110V	
	Rated Frequency (fn)	50Hz	
	Range of pilot loop resistance	0 to 10kΩ	
	Allowable continuous ac pilot current	50mA	
	Allowable short time ac pilot current	1500mA	
	Output Contact Rated Voltage	250V AC/DC	
	Output Contact Continuous rating	5A AC/DC	
	All terminals connection type	Ring	
ITEM	AC power consumption	State	
	DC power consumption	State	
	Maximum relay dimensions in mm (width, height, depth)	160, 200, 250	

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ANNEXURE C - DIFFT – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	TECHNICAL DETAIL FOR A TRANSFORMER DIFFERENTIAL RELAY (DIFFT).		
9	Manufacturer	State	
10.4	Type	State	
	Minimum Functionality		
	DigSilent StationWare settings file	State	
	Integrated Two Winding Differential restrained and unrestrained protection	Yes	
10.4.1	Restricted Earth Fault Functions suitable for star (Y) and auto-transformers	Yes	
10.4.2	Under voltage protection	Yes	
10.4.3	Over/under frequency protection	Yes	
10.4.4	Neutral over current protection	Yes	
10.4.5	Second Harmonic Restraint for Transformer Inrush	Yes	
10.4.6	Fifth Harmonic Restraint with Adjustable Deactivation Level	Yes	
10.4.7	Internal CT Ratio Correction and Vector Group Matching	Yes	
10.4.8	Phase Current and Angle Display to Confirm Vector Group matching	Yes	
10.4.9	Fault recording with a minimum of 4 waveform records	Yes	
10.4.10	Sequential event recording with a minimum of 100 time tagged events	Yes	
10.4.11	Over-fluxing Protection V/F	State	
10.4.12	User configurable Indication LEDs	State	
10.4.13	Voltage and Current Measuring Functions	Yes	
10.4.14	Internal hardware and Software Supervision	Yes	
10.4.15	Minimum Programmable Heavy Duty Output Relays	>=4	
10.4.16	Minimum Programmable Signal Output Relays	>=5	
10.4.17	Minimum Number of Binary Inputs	>=14	
10.4.18	User programmable logic	Yes	
10.4.19	Minimum Number of Indication LED's	State	
10.4.20			
10.4.21	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ ETHERNET/ RS232	State	
10.4.22	Relay casing material	Steel or Aluminium	
10.4.23	Internal hardware and Software Supervision	Yes	

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ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.4.24	Technical Details		
10.4.25	Password protection	Yes	
	Breaker Fail protection	Yes	
10.4.26	Number of Voltage Inputs	>=4	
10.4.27	Rated Voltage (Un)	110V	
10.4.28	Rated Voltage Withstand: Continuously	State	
10.4.29	Number of phase current Inputs	>=6	
10.4.30	Number of neutral current Inputs	>=2	
10.4.31	Rated Frequency (fn)	50Hz	
10.4.32	Rated Current of phase elements (In)	1A or 5A	
10.4.33	Rated Current of Neutral Elements (In)	1A or 5A	
10.4.34	Thermal Current Withstand: Continuous	State	
10.4.35	Thermal Current Withstand: Continuous rating	State	
10.4.36	Thermal Current Withstand: 1s	State	
10.4.37	Input Impedance: (In = 1A)	State	
10.4.38	Output Contact Rated Voltage	110V or 230V ac/dc	
10.4.39	Power/ Signal Contact Thermal Withstand capability: Continuous	State	
10.4.40	Power/ Signal Contact Thermal Withstand capability: 0.5s	State	
10.4.41	Binary Input Voltage Range	110V or 220 V dc	
10.4.42	Rated Auxiliary Supply Voltage	110V or 220 V dc	
10.4.43	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
10.4.44	CT's terminals connection type	Ring or Flat	
10.4.45	Maximum Power Consumption	State	
10.4.47	Internal clock synchronization - demodulated IIRIG-B (non BNC external connector)	IIRIG-B122	
	MAXIMUM Power Consumption	STATE	

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ANNEXURE C - DIFFZ – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	TECHNICAL DETAIL FOR A LINE IMPEDANCE AND DIFFERENTIAL RELAY (DIFFZ).		
	Manufacturer	State	
10	Type	State	
	Minimum Functionality		
	DigSilent StationWare settings file	Yes	
10.1	Phase Segregated Differential protection	Yes	
	Single Mode 1300nm fibre optic connections	Yes	
	4 Zone Phase Fault Impedance Protection	Yes	
	4 Zone Earth Fault Impedance Protection	Yes	
	Switch onto Fault Protection	Yes	
	Phase and neutral over current protection	Yes	
	Fault location	Yes	
ITEM	Phase and neutral Negative Sequence current protection	Yes	
	Sensitive earth fault protection	Yes	
	Inter-trip Commands Across Communication Channel	Yes	
	Communications assisted distance schemes	Yes	
	Fuse Fail Supervision	Yes	
	Primary Service Value Display	Yes	
	CT saturation detection	Yes	
	Internal CT Ratio Correction	Yes	
	Phase Current and Angle Display	Yes	
	Circuit Breaker Fail Protection	Yes	
	Fault recording with a minimum of 4 waveform records	Yes	
	Sequential event recording with a minimum of 100 events	Yes	
	Internal Hardware and Software Supervision	Yes	
	Minimum Programmable Heavy Duty Tripping Output Relays	4	
	Minimum Programmable Signal Output Relays	10	
	Minimum Number of Binary Inputs	5	
	Minimum Number of Indication LED's	6	
	Maximum Relay Trip Operating Time	≤ 20 ms	
	User programmable logic	Yes	
	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ ETHERNET/ RS232	Yes	

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ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	Front Local Data Communication Port RS232 / USB	Yes	
	Internal clock synchronization - demodulated IIRIG-B (non BNC external connector)	IIRIG-B122	
	Relay casing material	Steel or Aluminium	
	Technical Details		
	Rated Current (In)	1A	
10.2	Phase impedance protection characteristic	Mho	
	Ground impedance protection characteristic	Mho and Quadrilateral	
	Phase and Neutral over current protection curves	IEC SI, VI, EI	
	Thermal Current Withstand: Continuous	3 A	
	Thermal Current Withstand: 10s	25 A	
	Thermal Current Withstand: 1s	100 A	
	CT Input Impedance: (In = 1A)	< 1 VA	
	Output Contact Rated Voltage	250V ac/dc	
	Power/ Signal Contact Thermal Withstand capability: Continuous	5A	
	Power/ Signal Contact Thermal Withstand capability: 1s	50 A	
	Power Contact Thermal Breaking capability: L/R = 40ms @ 110VDC	0.3 A or 30 W	
	Binary Input Voltage Range	110 – 220 V dc	
	Rated Auxiliary Supply Voltage	110 – 220 V dc	
	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
	All terminals connection type	Ring	
	Maximum Power Consumption	State	
	Rated Current (In)	1A	

Note: Ticks, Cross [V, X], Astrick [T], Word [Noted] or TBA [“To Be Advice”] will not be accepted.

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ANNEXURE C - DIFFB – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	TECHNICAL DETAIL FOR A BUSBAR DIFFERENTIAL RELAY (DIFFB).		
	Manufacturer	State	
12	Type	State	
	Minimum Functionality		
	DigSilent StationWare settings file	Yes	
12.1	Low impedance (Numerical) type	Yes	
	3 Phase segregated differential protection	Yes	
	Stub bus (end zone) protection	Yes	
	Phase current and angle comparison	Yes	
	Selective zone tripping	Yes	
	Automatic zone selection	Yes	
	Breaker failure protection	Yes	
	Minimum tripping time	≤ 20 ms	
	Number of Zones	4 main + 1 check zone	
	Number of Circuit Breakers in a Zone	1 to 19	
	Current Transformer Supervision	Yes	
	CT saturation detection	Yes	
	Internal CT Ratio Correction	Yes	
	Phase Current and Angle Display	Yes	
	Circuit Breaker Fail Protection	Yes	
	Fault recording with a minimum of 4 waveform records	Yes	
	Sequential event recording with a minimum of 100 events	Yes	
	Internal Hardware and Software Supervision	Yes	
	Heavy Duty Trip Output Relays	3 per circuit breaker	
	Programmable Signal Output Relays	10	
	Binary Inputs	Specify	
	User programmable logic	Yes	
	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ ETHERNET/ RS232	Yes	
	Front Local Data Communication Port RS232 / USB	Yes	
	Internal clock synchronization - demodulated IIRIG-B (non BNC external connector)	IIRIG-B122	
	Relay casing material	Steel or	

	Aluminium	
	m	
Technical Details		
	Rated Current (In)	1A
12.2	Thermal Current Withstand: Continuous	3 A
	Thermal Current Withstand: 10s	25 A
	Thermal Current Withstand: 1s	100 A
	DESCRIPTION	SCHEDULE A SCHEDULE B
	CT Input Impedance: (In = 1A)	< 1 V/A
ITEM	Output Contact Rated Voltage	250V ac/dc
	Power/ Signal Contact Thermal Withstand capability:	5A
	Continuous	
	Power/ Signal Contact Thermal Withstand capability:	50 A
	1s	
	Power Contact Thermal Breaking capability: L/R = 40ms @ 110VDC	0.3 A or 30 W
	Binary Input Voltage Range	110 – 220 V dc
	Rated Auxiliary Supply Voltage	110 – 220 V dc
	Rated Auxiliary Supply Voltage Operation Range	80% - 120%
	All terminals connection type	Ring
	Maximum Power Consumption	State

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ANNEXURE C - ARCP – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	TECHNICAL DETAIL FOR AN ARC PROTECTION RELAY (ARCP).		
	Manufacturer	State	
13	Type	State	
	Minimum Functionality		
	Operation on simultaneous current and light	Yes	
13.1	Master unit current sensing with information sent over communication channel to slave units	Yes	
	Individual metal-clad switchgear cable chamber tripping	Yes	
	3-phase current measurement or 2-phase and earth-fault current measurement	Yes	
	Continuous self-supervision of sensor loop, operating voltages and cabling between central units and extension units		
	Circuit Breaker Fail Protection	Yes	
	Internal Hardware and Software Supervision	Yes	
	Minimum Heavy Duty Tripping Output Relays per zone	3	
	Maximum Trip Operating Time	≤ 10 ms	
	Relay casing material	Steel or Aluminium	
	Technical Details		
	Number of Current Inputs	3	
13.2	Rated Frequency (fn)	50Hz	
	Rated Current (In)	1A and 5A	
	Thermal Current Withstand: 1s	60 x In	
	Input Impedance: (In = 1A)	< 1VA	
	Output Contact Rated Voltage	250V ac/dc	
	Trip Contact Thermal Withstand capability: 3s	15A	
	Rated Auxiliary Supply Voltage	110V dc	
	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
	CT terminals connection type	Ring	
	Maximum Power Consumption	State	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted] or TBA [“To Be Advice”] will not be accepted.

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ANNEXURE C - AVR – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.5	TECHNICAL DETAIL FOR A TRANSFORMER AUTOMATIC VOLTAGE REGULATOR (AVR).		
	Manufacturer	State	
	Type	State	
	Minimum Functionality		
10.5.1	DigSilent StationWare settings file	State	
10.5.2	Three Phase Over-current and Under-voltage Blocking	Yes	
10.5.3	Line Voltage Drop Compensation	Yes	
10.5.4	Tap Position Indication	Yes	
10.5.5	Transformer Paralleling Control.	State	
10.5.6	Ohm, BCD, mA tap-changer inputs	Yes	
10.5.7	Local and remote Tap Change Control	Yes	
10.5.8	Definite and Inverse Time Voltage Control Characteristic	State	
10.5.9	External Blocking Input	State	
10.5.10	User programmable logic	State	
10.5.11	Minimum Number of Indication LED's	State	
10.5.12	Minimum Programmable Signal Output Relays	State	
10.5.13	Minimum Number of Binary Inputs	>=6	
10.5.14	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ ETHERNET/ RS232	State	
10.5.15	Front Local Data Communication Port RS232 / USB	State	
10.5.16	Internal clock synchronization -	State	
10.5.17	Relay casing material	Steel or Aluminium	
10.5.18	Internal hardware and Software Supervision	Yes	
	Technical Details		
10.5.19	Selectable Voltage Input (Un)	110V	
10.5.20	Continuous Voltage Withstand	State	
10.5.21	Rated Frequency (fn)	50Hz	
10.5.22	Rated Current (In)	1A or 5A	
10.5.23	Thermal Current Withstand: Continuous	State	
10.5.24	Thermal Current Withstand: 10s	State	

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.5.25	Thermal Current Withstand: 1s	State	
10.5.26	Input Impedance: (In = 1A)	State	
10.5.27	Output Contact Rated Voltage	110V or 230V ac/dc	
10.5.28	Control/ Signal Contact Thermal Withstand capability: Continuous	State	
10.5.29	Control/ Signal Contact Thermal Withstand Capability: 3s	State	
10.5.30	Control/ Signal Contact Thermal Withstand Capability: 0.5s	State	
10.5.31	Binary Input Voltage Range	110V or 220V dc	
10.5.32	Rated Auxiliary Supply Voltage	110V or 220V dc	
10.5.33	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
10.5.34	Maximum Power Consumption	State	

Note: Ticks, Cross [\' , X], Astrick [\'], Word [Noted] or TBA [\'To Be Advice\'] will not be accepted.

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ANNEXURE C - STBYEF – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.6	TECHNICAL DETAIL FOR STRANDBY EARTH FAULT RELAY (STBYEF).		
	Manufacturer	State	
	Type	State	
	Minimum Functionality		
10.6.1	DigSilent StationWare settings file	State	
10.6.2	EF and SEF over current protection	Yes	
10.6.3	Internal hardware and Software Supervision	Yes	
10.6.4	Minimum Programmable Heavy Duty Output Relays	>=2	
10.6.5	Minimum Programmable Signal Output Relays	>=2	
10.6.6	Minimum Number of Binary Inputs	>=2	
10.6.7	User programmable logic	State	
10.6.8	Minimum Number of Indication LED's	State	
10.6.9	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ ETHERNET/ RS232	State	
10.6.10	Front Local Data Communication Port RS232 / USB	State	
10.6.11	Internal clock synchronization	State	
10.6.12	Relay casing material	Steel or Aluminium	
10.6.13	Internal hardware and Software Supervision	Yes	
	Technical Details		
10.6.14	Password protection	State	
10.6.15	Breaker Fail protection	State	
10.6.16	Rated Current (In)	1A or 5A	
10.6.17	Rated Current of SEF Element (In)	0.2A or 1A	
10.6.18	Thermal Current Withstand: Continuous	State	
10.6.19	Thermal Current Withstand: Continuous for SEF input	State	
10.6.20	Thermal Current Withstand: 1s	State	
10.6.21	Input Impedance: (In = 1A)	State	
10.6.22	Output Contact Rated Voltage	110/230V ac/dc	
10.6.23	Power/ Signal Contact Thermal Withstand capability: Continuous	State	

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.6.24	Power/ Signal Contact Thermal Withstand capability: 0.5s	State	
10.6.25	Binary Input Voltage Range	30V or 110 or 220V dc	
10.6.26	Rated Auxiliary Supply Voltage	30V or 110 or 220V dc	
10.6.27	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
10.6.28	Fault recording with a minimum of 4 waveform records	Yes	
10.6.29	Sequential event recording with a minimum of 100 time tagged events	Yes	
10.6.30	CTs terminals connection type	Ring or Flat	
10.6.31	Maximum Power Consumption	State	

Note: Ticks, Cross [V, X], Astrick [*], Word [Noted] or TBA [“To Be Advice”] will not be accepted.

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ANNEXURE C – LO1 & LO2 & MTR – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.7	TECHNICAL DETAIL FOR A LOCKOUT AND MASTER TRIP (LO1 & LO2 & MTR) ELECTROMECHANICAL RELAY		
	Manufacturer	State	
	Type	State	
	Minimum Functionality		
10.7.1	Mechanically Latched contacts	Yes	
10.7.2	Flagged Indication	Yes	
10.7.3	Hand Reset contacts	Yes	
10.7.4	Number of Power Normally open Contacts	>=3	
10.7.5	Number of Power Normally closed Contacts	>=3	
10.7.6	Instantaneous coil break contact	Yes	
	Technical Details		
10.7.7	Maximum Operation time	State	
10.7.8	Rated Supply Voltage	30V or 110V or 220V dc	
10.7.9	Rated Supply Voltage Operation Range	80% - 120%	
10.7.10	Output Contact Rated Voltage	110V or 230V ac/dc	
10.7.11	Contact dc current continuous capability	State	
10.7.12	Contact dc current 3 second capability	State	
10.7.13	Contact dc current Breaking capability: resistive/inductive	State	
10.7.14	Capacitive discharge immunity	State	
10.7.15	CT's terminals connection type	Ring or Flat	
10.7.16	Maximum Power Consumption	State	
10.7.17	Maximum relay dimensions in mm (width, height, depth)	300, 300, 300	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

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ANNEXURE C – TAUX – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements
Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
17	TECHNICAL DETAIL FOR A TRIP AUXILIARY RELAY (TAUX).		
	Manufacturer	State	
	Type	State	
17.1	Minimum Functionality		
	Flagged Indication hand reset	Yes	
	Self - Reset contacts	Yes	
	Number of Power Normally open Contacts	10/20	
	High burden	Yes	
17.2	Technical Details		
	Maximum Operation time	<15ms	
	Rated Supply Voltage	32/110/220V dc	
	Rated Supply Voltage Operation Range	80% - 120%	
	Output Contact Rated Voltage	300V ac/dc	
	Contact dc current continuous capability	1250W	
	Contact dc current 3 second capability	7500W	
	Contact dc current Breaking capability: resistive/inductive	100W/50W	
	Capacitive discharge immunity	10µF @ rated voltage	
	All terminals connection type	Ring	
	Maximum relay dimensions in mm (width, height, depth)	220, 200, 250	
	Maximum Power Consumption	State	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

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ANNEXURE C – ALA – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
18	TECHNICAL DETAIL FOR AN ALARM ANNUNCIATOR (ALA).		
	Manufacturer	State	
	Type	State	
18.1	Minimum Functionality		
	Programmable NO / NC Alarm channel activation	Yes	
	Integral user configurable alarm labels	Yes	
18.2	Technical Details		
	Minimum Number of Alarm Inputs	8	
	Minimum Number of Alarm LED's	8	
	Binary Input Voltage Range	110/220V dc ±20%	
	Rated Supply Voltage	110/220V dc	
	Rated Supply Voltage Operation Range	80% - 120%	
	Maximum unit dimensions in mm (width, height, depth)	150x200x180	
	All terminal connection type	Ring	
	Maximum Power Consumption	State	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA [“To Be Advice”] will not be accepted.

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ANNEXURE C – INTSP and INTRP – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
19	TECHNICAL DETAIL FOR AN INTERTRIP SEND AND RECEIVE PILOT WIRE RELAY (INTSP and INTRP).		
	Manufacturer	State	
	Type	State	
19.1	Minimum Functionality		
	Insulation rating	15kV RMS	
	Impulse rating	1.2/50 5kV	
	AC immunity of receive element	300V @ 50Hz	
	Operate time at nominal DC voltage	<30ms	
	Hand reset operation flag annunciation	Yes	
	Minimum Heavy Duty Tripping Output contacts (self-reset)	4	
	Relay casing material	Steel or Aluminium	
19.2	Technical Details		
	Rated Frequency (fn)	50Hz	
	Output Contact Rated Voltage	250V ac/dc	
	Contact Thermal Withstand capability: Continuous	12A	
	Contact Thermal Withstand capability: 0.5s	30A	
	Contact Thermal Breaking capability: L/R = 40ms @ 125VDC	0.4A	
	Binary Input Voltage Range	110V DC±20%	
	Rated Auxiliary Supply Voltage	110V dc	
	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
	All terminal connection type	Ring	
	Maximum Power Consumption	State	
	Maximum relay dimensions in mm (width, height, depth)	120,180,300	

Note: Ticks, Cross [✓, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

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ANNEXURE C – INTSF and INTRF – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
20	TECHNICAL DETAIL FOR AN INTERTRIP SEND AND RECEIVE FIBRE OPTIC RELAY (INTSF and INTRF).		
	Manufacturer	State	
	Type	State	
20.1	Minimum Functionality		
	Signal transfer time with direct fibre connection	<20ms	
	Hand reset operation flag annunciation	Yes	
	Minimum no. of independent communication channels	8	
	Minimum Heavy Duty Tripping Output contacts per channel (self-reset)	1	
	Minimum binary inputs per channel	1	
	Hardware Self-diagnosis and alarm	Yes	
	Communication channel self-diagnosis and alarm	Yes	
ITEM	DESCRIPTION	Steel or Aluminium	SCHEDULE B
20.2	Technical Details		
	LED's for each input and output activation	Yes	
	Output Contact Rated Voltage	250V ac/dc	
	Contact current continuous capability	6A	
	Contact current making capability	30A	
	Contact current Breaking capability: L/R = 40ms @ 125VDC	0.3A	
	Binary Input Voltage Range	110/220 V dc	
	Rated Auxiliary Supply Voltage	110 - 220 V dc	
	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
	All terminal connection type	Ring	
	Maximum Power Consumption	State	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

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ANNEXURE C – MFST – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
21	TECHNICAL DETAIL FOR A MULTI FUNCTION SCADA TRANSDUCER (MFST).		
	Manufacturer	State	
	Type	State	
21.1	Minimum Functionality		
	Measurement selection single phase	V, I, F, P, Q, S, , Tan ϕ , Cos ϕ	
	Measurement selection 3 phase, three/four wire unbalanced	V1 V2 V3, U12 U23 U31, I1 I2 I3, F, P1 P2 P3 Pt, Q1 Q2 Q3 Qt, S1 S2 S3 St, Tan ϕ , Cos(ϕ 1 ϕ 2 ϕ 3 ϕ t), ϕ 1 ϕ 2 ϕ 3 ϕ t, ϕ (U12/U23, U23/U31, U31/U12), ϕ (V1/V2, V2/V3, V3/V1)	
	Accuracy Class	0.5	
	Analog outputs	1 to 4	
	Current Inputs	1A and 5A	
	Voltage Inputs	100 to 480 V (ph-ph) or 100/ $\sqrt{3}$ to 480/ $\sqrt{3}$ V (ph-N)	
	Operating Frequency	50Hz	
	Mounting	Plate mounted with screws	
	Data Communication port for engineering access RS485/ETHERNET	Yes	
21.2	Technical Details		
	Analogue outputs (Io = output current)		
	Analog output range	± 1 mA, ± 5 mA, ± 20 mA, ± 1 V, ± 10 V selectable	
	Acceptable resistive load	15V/Io	
ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	Acceptable capacitive load	0.1microfarad	
	Overrun	1.2xIo	
	Peak to peak residual wave	+/-0.2% of Io	
	Programmable response time and accuracy (as per IEC60688)	100ms (class 0.5)	
	Transfer curve (selectable)	Linear (2 slope)	

Current Input (In = Nominal Current)		
Rated value	0 to 10A max	
Max measured current on primary	25000A	
Acceptable overload	50xIn for 1 sec	
Burden	<0.15VA	
Voltage Input		
Rated value	57.7Vac to 480Vac for 3 phase 57.7Vac to 276Vac for single phase	
Frequency	42.5 57.5 Hz	
Max measured voltage on primary	650 kV (ph-ph)	
Acceptable overloads	520Vac continuous, 800Vac for 10 sec for 3 phase 300Vac continuous, 460Vac for 10 sec for single phase	
Burden	<0.2A	
Input impedance	400kohm	
Auxiliary power supply		
Rated Auxiliary Supply Voltage Operation Range	20 to 50 V dc and 80 to 265 V dc	
All terminal connection type	Mobile stirrup clamp with connection screw	
Maximum relay dimensions in mm (width, height, depth)	120,90,125	
Maximum Power Consumption	State	

Note: Ticks, Cross [V, X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

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ANNEXURE C – DIFFC – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
22	TECHNICAL DETAIL FOR A CIRCULATING CURRENT RELAY (DIFFC).		
	Manufacturer	State	
	Type/Model	State	
22.1	Minimum Functionality		
	DigSilent StationWare settings file	Yes	
	Multiple element over-current protection	Yes	
	Multiple element earth fault protection	Yes	
	Sensitive earth fault protection	Yes	
	Breaker Fail protection	Yes	
	3 stage under frequency protection	Yes	
	Breaker 1 st condition monitoring	Yes	
	Internal trip timer (CB opening time) with alarm output	Yes	
	Fault waveform recording with a minimum of 4 records	Yes	
	Sequential event recording with a minimum of 100 events	Yes	
	Multi shot Auto Re-close	Yes	
	Trip circuit supervision	2 circuits	
	3 phase current display on LCD.	Yes	
	Internal hardware and Software Supervision	Yes	
	Minimum Programmable Heavy Duty Tripping Output Relays	2	
	Minimum Programmable Signal Output Relays	6	
	Minimum Number of Binary Inputs	6	
	Minimum number of user programmable and configurable indication LED's	6	
	User programmable logic	Yes	
	Rear Data Communication ports for remote engineering access and DNP3.0 and IEC60870, RS485/ ETHERNET/ RS232	Yes	
	Front Local Data Communication Port RS232 / USB	Yes	
	Internal clock synchronization - demodulated IRI(G-B (non BNC external connector)	IRIG-B122	
	Relay casing material	Steel or Aluminium	
22.2	Technical Details		
	Number of Current Inputs	4	
	Rated Frequency (fn)	50Hz	
	Rated Current (In)	Dual 1A or 5A	
	Thermal Current Withstand: Continuous	4 x In	

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ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
	Thermal Current Withstand: Continuous for $I_n = 0.2A$	7.5 x I_n	
	Thermal Current Withstand: 1s	100 x I_n	
	Input Impedance: ($I_n = 1A$)	< 1VA	
	Output Contact Rated Voltage	250V AC/DC	
	Power/ Signal Contact Thermal Withstand capability: Continuous	5A	
	Power/ Signal Contact Thermal Withstand capability: 3s	15A/8A	
	Power/ Signal Contact Thermal Withstand capability: 0.5s	30A/10A	
	Power Contact Thermal Breaking capability: L/R = 40ms @ 110VDC	0.2 A or 30 W	
	Binary Input Voltage Range	30 – 110 V dc	
	Rated Auxiliary Supply Voltage	30 – 110 V dc	
	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
	All terminals connection type	Ring	
	Maximum relay dimensions in mm (width, height, depth)	150, 270, 250	
	Maximum Power Consumption	State	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

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ANNEXURE C – TAUX – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
23	TECHNICAL DETAIL FOR A DC VOLTAGE MONITORING RELAY (DCVMR)		
	Manufacturer	State	
	Type/Model	State	
23.1	Minimum Functionality		
	Monitoring function	Under-voltage monitoring	
	Operating principle	Output contact relays energize if the measured value falls below the adjusted threshold value and the timer times-out.	
23.2	Technical Details		
	Measuring inputs pulse rating $t < 1$ s	600 V	
	Measuring inputs continuous rating	300 V	
	Threshold pickup setting value	Adjustable within the selected measuring range.	
	Accuracy within the control supply voltage tolerance.	$\leq 1\%$	
	Contact outputs*	2 x change over	
	Contact output rating*	250 V DC	
	Contact output current rating *	6 A continuous 30 A make 100 A for 1 s	
	Contact output break capacity *	250 V, 0.2 A, L/R = 40ms	
	Rated control supply voltage	24-240V AC/DC	
	Rated control supply voltage tolerance	-15...+10 %	
	Connection Type	Screw Terminals	
	Selectable measuring ranges	Yes	
	Measuring range A	20-60 V DC	
	Measuring range B	60-250 V DC	
	Mounting.	DIN rail (IEC 60715)	
	Operating delay time	1 to 30 s adjustable	
	Ambient operating temperature	-20...+60 °C	
	Transient overvoltage protection	Yes	
	Rated frequency	50 Hz	
	Wire connection size with ferrule	1 x 1.5 mm ² flexible wire	
	Settings tamper protection	Password or	

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		sealable clear cover	
	Status indication LED's	3	
	Product Standard:	IEC 60255-6	
	a.Low Voltage Directive	2006/95/EC	
	b. EMC Directive	2004/108/EC	
	c.RoHS Directive	2002/95/EC	
	Vibration (sinusoidal) (IEC 60255-21-1)	class 2	
	Shock (IEC 60255-21-2)	class 2	
	Interference immunity	IEC 61000-6-2	
	Interference immunity to electrostatic discharge.	IEC 61000-4-2, Level 3	
	Interference immunity to radiated, radio-frequency, electromagnetic field.	IEC 61000-4-3, Level 3	
	Interference immunity to electrical fast transient / burst.	IEC 61000-4-4, Level 3	
	Interference immunity to surge.	IEC 61000-4-5, Level 3	
	Interference immunity to conducted disturbances, induced by radio-frequency fields.	IEC 61000-4-6, Level 3	
	Rated insulation voltage (IEC 60947-1, IEC 60255-5) supply / measuring circuit / outputs.	600 V	
	Rated insulation voltage (IEC 60947-1, IEC 60255-5) supply / outputs.	250 V	
	Rated impulse withstand voltage Uimp (IEC 60947-1, IEC 60255-5) supply / measuring circuit / outputs.	6 kV 1.2/50 µs	
	Rated impulse withstand voltage (IEC 60947-1, IEC 60255-5) supply / outputs.	4 kV 1.2/50 µs	
	Pollution degree (IEC 60255-5).	3	
	Overvoltage category (VDE 0110, IEC 664, IEC/EN 60255-5).	III	
	Interference emission.	IEC 61000-6-3	
	Interference emission high-frequency radiated.	IEC 22, Class B	
	Interference emission high-frequency conducted.	IEC 22	
	Maximum Power Consumption	State	

* If the DCVMR output contacts cannot meet the minimum requirements, then an auxiliary relay may be supplied to meet the specification.

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

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ANNEXURE C – MAINFO – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.23	TECHNICAL DETAIL FOR A MULTI PURPOSE MAIN FEEDER RELAY (MAINFO).		
	Manufacturer	State	
	Type/Model	State	
	Minimum Functionality		
10.23.1	DigSilent StationWare settings file	State	
10.23.2	Phase Segregated Differential protection	Yes	
10.23.3	Single Mode 1300nm fibre optic connections	Yes	
10.23.4	Inter-trip Commands Across Communication Channel	Yes	
10.23.5	Internal CT Ratio Correction	Yes	
10.23.6	Multiple element directional and non-directional over-current protection	Yes	
10.23.7	Multiple element directional and non-directional earth fault protection	Yes	
10.23.8	Sensitive earth fault protection Note: This functionality can be provided as a separate relay: if so then—see STBYEF relay and compete STBYEF technical schedule)	Yes	
10.23.9	LCD Display Interface	Yes	
10.23.10	Password protection	Yes	
10.23.11	Breaker Fail protection	Yes	
10.23.12	Internal trip timer (CB opening time) with alarm output (Element or Logics)	Yes	
10.23.13	Fault waveform recording with a minimum of 4 records	Yes	
10.23.14	Sequential event recording with a minimum of 100 events	Yes	
10.23.15	Trip circuit supervision	Yes	
10.23.16	3 phase maximum demand power, three phase real power, apparent power and power factor display on LCD.	Yes	
10.23.17	Internal hardware and Software Supervision	Yes	
10.23.18	Minimum Programmable Heavy Duty Tripping Output Relays	>=2	
10.23.19	Minimum Programmable Signal Output	>=4	
10.23.20	Minimum Number of Binary Inputs	>=6	
10.23.21	Minimum number of user programmable and configurable indication LED's	State	
10.23.22	User programmable logic	Yes	
10.23.23	Rear Data Communication ports for remote engineering access and DNP3.0 over RS485/ ETHERNET/ RS232	State	
10.23.24	Front Local Data Communication Port RS232 / USB	State	
10.23.25	Internal clock synchronization	Yes	
10.23.26	Relay casing material	Steel or Aluminium	
	Technical Details		
10.23.27	Number of Voltage Inputs	(three)	
10.23.28	Rated Voltage Input (Un)	110V	

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ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.23.29	Rated Voltage Withstand: Continuously	State	
10.23.30	Number of Current Inputs	>=4	
10.23.31	Rated Frequency (fn)	50Hz	
10.23.32	Rated Current (In)	1A or 5A	
10.23.33	Thermal Current Withstand: Continuous	State	
10.23.34	Thermal Current Withstand: Continuous for In = 0.2A	State	
10.23.35	Thermal Current Withstand: 1s	State	
10.23.36	Input Impedance: (In = 1A)	State	
10.23.37	Output Contact Rated Voltage	110V or 230V ac/dc	
	Power/ Signal Contact Thermal Withstand capability:	State	
	Continuous	State	
	Power/ Signal Contact Thermal Withstand capability: 3s	State	
	Power/ Signal Contact Thermal Withstand capability: 0.5s	State	
	Power Contact Thermal Breaking capability: L/R = 40ms @ 110VDC	State	
	Binary Input Voltage Range	30V or 110V dc	
	Rated Auxiliary Supply Voltage	30V or 110V dc	
	Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
	CTs terminals connection type	Ring or Flat	
	Maximum relay dimensions in mm (width, height, depth)	300, 300, 300	
	Maximum Power Consumption	State	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

Tender Number: _____

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ANNEXURE C – RADIALF – TECHNICAL SCHEDULES

Schedule A: Purchaser's specific requirements

Schedule B: Guarantees and technical particulars of equipment offered

ITEM	DESCRIPTION	SCHEDULE A	SCHEDULE B
10.24	TECHNICAL DETAIL FOR A RADIAL FEEDER RELAY (RADIALF).		
	Manufacturer	State	
	Type/Model	State	
	Minimum Functionality		
	DigSilent StationWare settings file	State	
	Multiple element over-current protection	Yes	
	Multiple element earth fault protection	Yes	
	Sensitive earth fault protection Note: This functionality can be provided as a separate relay: if so then – see STBYEF relay and compete STBYEF technical schedule)	Yes	
	LCD Display Interface	Yes	
	Password protection	Yes	
	Breaker Fail protection	Yes	
	Internal trip timer (CB opening time) with alarm output (element or logics)	Yes	
	Fault waveform recording with a minimum of 4 records	Yes	
	Sequential event recording with a minimum of 100 events	Yes	
	Trip circuit supervision	Yes	
	3 phase current display on LCD.	Yes	
	Internal hardware and Software Supervision	Yes	
	Minimum Programmable Heavy Duty Tripping Output Relays	>=2	
	Minimum Programmable Signal Output Relays	>=4	
	Minimum Number of Binary Inputs	>=6	
	number of user programmable and Nonfigurable indication LED's	State	
	User programmable logic	Yes	
	Rear Data Communication ports for remote engineering access and DNP3.0 over RS485/ ETHERNET/ RS232	State	
	Front Local Data Communication Port RS232 / USB	State	
	Internal clock synchronization	Yes	

DESCRIPTION	SCHEDULE A	SCHEDULE B
Relay casing material	Steel or Aluminium	
Technical Details		
Number of Current Inputs	>=4	
Rated Frequency (fn)	50Hz	
Rated Current (In)	1A or 5A	
Thermal Current Withstand: Continuous	State	
Thermal Current Withstand: Continuous rating	State	
Thermal Current Withstand: 1s	State	
Input Impedance: (In = 1A)	State	
Output Contact Rated Voltage	110V or 230V ac/dc	
Power/ Signal Contact Thermal Withstand capability: Continuous	State	
Power/ Signal Contact Thermal Withstand capability: 3s	State	
Power/ Signal Contact Thermal Withstand capability: 0.5s	State	
Power Contact Thermal Breaking capability: L/R = 40ms @ 110VDC	State	
Binary Input Voltage Range	30V or 110V dc	
Rated Auxiliary Supply Voltage	30V or 110V dc	
Rated Auxiliary Supply Voltage Operation Range	80% - 120%	
CTs terminals connection type	Ring or Flat	
Maximum relay dimensions in mm (width, height, depth)	300, 300, 300	
Maximum Power Consumption	State	

Note: Ticks, Cross [X], Astrick [*], Word [Noted] or TBA ["To Be Advice"] will not be accepted.

Tender Number: _____

Tenderer's Authorised Signatory: _____ Name in block letters Signature

Full name of company: _____

Items – PROTECTION EQUIPMENT
Deviation schedule

Any deviations offered to this specification shall be listed below with reasons for deviation. In addition, evidence shall be provided that the proposed deviation will at least be more cost-effective than that specified by City Power.

Item	Sub clause of CP_TSSPEC_214	Proposed deviation

Tender Number: _____

Tenderer's Authorised Signatory: _____
Name in block letters Signature

Full name of company: _____



