Request for Proposal

Request for Proposal (RFP) for the Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

RFP No. 3446/29/04/2021

Date of Issue	Monday, 12 April 2021	
Compulsory Briefing Session and Site Inspection	Date: Monday, 19 April 2021 Venue: CSIR, Meiring Naude Street, Building 26, Parking Area Time: 10H00	
Last date for submission of queries / clarifications	Thursday, 22 April 2021 at 16h30	
Enquiries and submission of proposals	Strategic Procurement Unit	E-mail: tender@csir.co.za
Closing Date and Time	Date: Thursday, 29 April 2021 Time: 16h30 ***(Late bids will not be accepted)***	
CSIR business hours	08h00 – 16h30	

PROCUREMENT DOCUMENT
(Based on NEC3 Engineering and Construction Short Contract)

Contents

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

T.1 Tendering procedures

TENDER NOTICE AND INVITATION TO TENDER

FOR:

'Installation of new Power Factor Correction system at the CSIR main 11 kV Substation'

CONTRACT/TENDER NO.: **3446/29/04/2021**

Council for Scientific and Industrial Research (CSIR) is inviting contractors to submit tenders for the **Installation of new Power Factor Correction system at the CSIR main 11 kV Substation.** The scope of work includes the decommissioning of the existing Power Factor Correction panels and installation of a new system in the main 11 kV Substation. The existing panels are obsolete and have reached the end of their service life. The new panels should employ the latest technology. It should also be expandable to allow for future load growth.

Tender documents will not be issued at the tender site inspection.

A tender briefing and site inspection meeting will be conducted at **CSIR** on **Monday 19 April 2021** Invited tenderers shall meet at **CSIR, Meiring Naude Street, Building 26, Parking Area**.

Tender Title & Reference No.: **3446/29/04/2021 - Installation of new Power Factor Correction system at the CSIR main 11 kV Substation.**

The closing date and time for the receipt of completed tender documents is **Thursday, 29 April 2021 at 16h30**

Tenders are to be submitted electronically to tender@csir.co.za

No late submissions will be considered.

Only e-mail submissions will be accepted.

The lowest or any tender will not necessarily be accepted and CSIR reserves the right to accept a tender as a whole or in part. Tenders must remain valid for a period of 90 (ninety) days after the closing date for the submission of tenders, during which period a tender may not be amended or withdrawn and may be accepted at any time by CSIR.

All enquiries regarding this tender MUST be in writing and must be directed to:
CSIR - Strategic Procurement Unit
E-mail: tender@csir.co.za
Subject: RFP reference number

T1.2 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 (January 2009) as published in Government Gazette No. 31823, Board Notice 12 of 2009 of 30 January 2009 (see 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 of data given below is cross-referenced to the clause in the Standard Conditions of Tender to which it mainly applies.

Clause number	Tender Data
F.1.1	The *Employer* is: Name**: Council for Scientific and Industrial Research (CSIR)** Address: **Meiring Naudé Road, Brummeria, Pretoria** Tel: **012 841 2911** E-mail: tender@csir.co.za
F.1.2	The tender documents issued by the *Employer* comprise the following documents: **THE TENDER** **Part T1: Tendering procedures** T1.1 - Tender notice and invitation to tender T1.2 - Tender data **Part T2: Returnable documents** T2.1 - List of returnable documents T2.2 - Returnable schedules **THE CONTRACT** **Part C1: Agreements and Contract data** C1.1 - Form of offer and acceptance C1.2 - Contract data C1.3 - Securities **Part C2: Pricing data** C2.1 - Pricing Assumptions C2.2 - Price List **Part C3: Scope of work** C3 - Scope of work **Part C4: Site information** C4 - Site information **APPENDICES**
F.1.4	The employer's agent is: Name: **Delta Built Environment Consultants (Pty) Ltd**
F.1.6	Option 2 of the proposal procedure using the two stage-system shall be applied.

F.2.1	Only those tenderers who are registered with the CIDB, or are capable of registering prior to the evaluation of submissions, in a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered, or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations, for a 4EP of higher class of construction work, are eligible to have their tenders evaluated. Joint ventures are eligible to submit tenders provided that: 1. Every member of the joint venture is registered with the CIDB; 2. The lead partner has a contractor grading designation in the 4EP or higher class of construction work; and 3. The combined contractor grading designation calculated in accordance with the Construction Industry Development Regulations is equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a 4EP or higher class of construction work or a value determined in accordance with Regulation 25 (1B) or 25(7A) of the Construction Industry Development Regulations.
F.2.7	The arrangements for a compulsory clarification meeting are as stated in the Tender Notice and Invitation to Tender. Tenderers must complete and sign the compulsory briefing session attendance certificate in the name of the tendering entity. Addenda will be issued to and tenders will be received only from those tendering entities appearing on the attendance list.
F.2.12	Alternative offers shall be considered.
F.2.13.3	Single copy of the document must be submitted.
F.2.13.5 F.2.15.1	The employer's details and address for delivery of tender offers are: **Procedure for submission of proposals** 1) All proposals must be submitted electronically to tender@csir.co.za 2) Respondents must use the RFP number as the subject reference number when submitting their bids. 3) The e-mail and file sizes should not exceed a total of 30MB per e-mail. 4) The naming/labeling syntax of files or documents must be short and simple 5) All documents submitted electronically via e-mail must be clear and visible. 6) All proposals, documents, and late submissions after the due date and time will not be evaluated. **NB: NO HARD COPIES OR PHYSICAL SUBMISSIONS WILL BE ACCEPTED**

F.2.13.9	**Only** e-mailed tender offers will be accepted. **Submission of proposals** 1) All proposals are to be submitted electronically to tender@csir.co.za. No late proposals will be accepted. 2) Responses submitted by companies must be signed by a person or persons duly authorised. 3) All e-mailed proposal submissions are to be clearly **subject-referenced with the RFP number.** Proposals must consist of two parts, each of which must be sent in two separate e-mails with the following subject: **PART 1:** Technical Proposal RFP No.: 3446/29/04/2021 **PART 2:** Pricing Proposal RFP No.: 3446/29/04/2021 4) The CSIR will award the contract to qualified tenderer(s)' whose proposal is determined to be the most advantageous to the CSIR, taking into consideration the technical (functional) solution, price, and B-BBEE. 5) Proposals submitted must be in the following file formats: • PDF
F.2.15	The closing time for submission of tender offers is as stated in the Tender Notice and Invitation to Tender.
F.2.16	The tender offer validity period is 90 days.
F.2.18	The tenderer shall, when requested by the Employer to do so, submit the names of all management and supervisory staff that will be employed to supervise the labour-intensive portion of the works together with satisfactory evidence that such staff members satisfy the eligibility requirements.
F.2.20	The tenderer is required to submit, with their tender, a letter of intent from an approved insurer undertaking to provide the performance bond to the format included in Part C1.3 of this procurement document.
F.2.23	The tenderer is required to submit with his tender: 1) A **valid** tax pin issued by the South African Revenue Services.
F.3.1.1	The Employer will respond to requests for clarification received up to five working days before the tender closing time.
F.3.4	Tenders will not be opened immediately after the closing time for tenders.

F.3.11.3

The procedure for the evaluation of responsive tenders is Method 2.

EVALUATION PROCESS

Evaluation of proposals

All proposals will be evaluated by an evaluation team for functionality, price and B-BBEE. Based on the results of the evaluation process and upon successful negotiations, the CSIR will approve the awarding of the contract to successful bidders.
A two-phase evaluation process will be followed.

- The first phase includes evaluation of **elimination** and **functionality criteria.**
- The second phase includes the evaluation of **price** and **B-BBEE** status.

Pricing Proposals will only be considered after functionality phase has been adjudicated and accepted. Only proposals that achieved the specified minimum qualification scores for functionality will be evaluated further using the preference points system.

Preference points system

The 80/20 preference point system will be used where 80 points will be dedicated to price and 20 points to B-BBEE status.

F.3.11.3

The technical criteria and maximum score in respect of each of the criteria are as follows:

Criteria	**Maximum number of points**
Approach Paper	25
Organisation and Staff	25
Experience and Qualifications of Staff	25
Tenderer's Experience	25
Maximum Possible Score for Technical (M_S)	**100**

The minimum number of evaluation points for technical is 70% and a sub-minimum of 50% for each individual criteria will be eliminated from further evaluation.

Each evaluation criteria will be assessed in terms of five scores 0, 3, 5, 7 or 10. The scores will be given according to the scoring table.

F.3.13	Tender offers will only be accepted if (Elimination Criteria): a) The tenderer submits a letter of intent from an approved insurer undertaking to provide the performance bond to the format included in Part C1.3 of this procurement document; b) The tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation, 4EP or higher class of construction work; c) The tenderer or any of its directors/shareholders 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; d) 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) The tenderer has completed the compulsory enterprise questionnaire and there are no conflicts of interest which may impact on the tenderer's ability to perform the contract in the best interests of the employer or potentially compromise the tender process and persons in the employ of the state are permitted to submit tenders or participate in the contract; g) The tenderer is registered and in good standing with the compensation fund or with a licensed compensation insurer; h) The employer is reasonably satisfied that the tenderer has, in terms of the Construction Regulations, 2014, issued in terms of the Occupational Health and Safety Act, 1993, the necessary competencies and resources to carry out the work safely; i) The tenderer submits the proposal on or before the deadline; j) The tenderer attends the compulsory briefing session; and k) The tenderer submits the proposal at the correct e-mail address.
F.3.17	The number of electronic copies of the signed contract to be provided by the employer is one.

T.2 Returnable documents

List Number	Returnable Schedule
T2.2A	Record of Addenda
T2.2B	Compulsory Enterprise Questionnaire
T2.2C	Authority of JVs
T2.2D	Qualifications
T2.2E	Preferencing
T2.2F1	Approach Paper
T2.2F2	Organisation and Staffing
T2.2F3	Experience of Staff
T2.2F4	Tenderer's Experience
T2.2F6	Technical Information

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

R nder documents

W unications received from the Employer before the submission of this tender offer, amending the tender documents, have been taken into account in this tender offer:

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

Attach additional pages if more space is required.

Signed ..... Date .....

Name ..... Position .....

Tenderer .....

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

C uestionnaire

T urnished. In the case of a joint venture, separate enterprise questionnaires in r ompleted and submitted.

S : . . . . . .

Section 2: VAT registration number, if any: . . . . . .

Section 3: CIDB registration number, if any: . . . . . .

Section 4: Particulars of sole proprietors and partners in partnerships

Name*	Identity number*	Personal income tax number*

***** Complete only if sole proprietor or partnership and attach separate page if more than three partners.

Section 5: Particulars of companies and close corporations

Company registration number . . . . . .

Close corporation number . . . . . .

Tax reference number . . . . . .

Section 6: Record in the service of the state

Indicate, by marking the relevant boxes with a cross, if any sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently or has been within the last 12 months in the service of any of the following:

- ☐ a member of any municipal council
- ☐ a member of any provincial legislature
- ☐ a member of the National Assembly or the National Council of Province
- ☐ a member of the board of directors of any municipal entity
- ☐ an official of any municipality or municipal entity
- ☐ an employee of any provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999)
- ☐ a member of an accounting authority of any national or provincial public entity
- ☐ an employee of Parliament or a provincial legislature

If any of the above boxes are marked, disclose the following:

Name of sole proprietor, partner, director, manager, principal shareholder or stakeholder	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

*Insert separate page if necessary.

Section 7: Record of spouses, children and parents in the service of the state

Indicate by marking the relevant boxes with a cross, if any spouse, child or parent of a sole proprietor, partner in a partnership or director, manager, principal shareholder or stakeholder in a company or close corporation is currently or has within the last 12 months been in the service of any of the following:

- a member of any municipal council
- a member of any provincial legislature
- a member of the National Assembly or the National Council of Province
- a member of the board of directors of any municipal entity
- an official of any municipality or municipal entity
- an employee of any provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act 1 of 1999)
- a member of an accounting authority of any national or provincial public entity
- an employee of Parliament or a provincial legislature

Name of spouse, child or parent	Name of institution, public office, board or organ of state and position held	Status of service (tick appropriate column)	
		Current	Within last 12 months

*Insert separate page if necessary.

The undersigned, who warrants that he/she is duly authorised to do so on behalf of the enterprise:

i) Authorises the Employer to obtain a tax clearance certificate from the South African Revenue Services that my/our tax matters are in order;

ii) Confirms that the neither the name of the enterprise or the name of any partner, manager, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears on the Register of Tender Defaulters established in terms of the Prevention and Combating of Corrupt Activities Act of 2004;

iii) Confirms that no partner, member, director or other person, who wholly or partly exercises, or may exercise, control over the enterprise appears, has within the last five years been convicted of fraud or corruption;

iv) Confirms that I/we are not associated, linked or involved with any other tendering entities submitting tender offers and have no other relationship with any of the tenderers or those responsible for compiling the scope of work that could cause or be interpreted as a conflict of interest; and

v) Confirms that the contents of this questionnaire are within my personal knowledge and are, to the best of my belief, both true and correct.

Signed ..... Date .....

Name ..... Position .....

Enterprise name _____

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

Certificate of authority for joint ventures

This returnable schedule is to be completed by joint ventures.

We, the undersigned, are submitting this tender offer in joint venture and hereby authorise Mr/Ms . . . . . , authorised signatory of the company . . . . . ., acting in the capacity of lead partner, to sign all documents in connection with the tender offer and any contract resulting from it on our behalf.

NAME OF FIRM	ADDRESS	DULY AUTHORISED SIGNATORY
Lead partner . . . . . CIDB registration no.		Signature. . . . . Name. . . . . Designation . . . . .
CIDB registration no.		Signature. . . . . Name. . . . . Designation . . . . .
CIDB registration no.		Signature. . . . . Name. . . . . Designation . . . . .
CIDB registration no.		Signature. . . . . Name. . . . . Designation . . . . .

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

P nd qualifications

Th iations or qualifications they may wish to make to the tender documents in this re tenderer may state such deviations and qualifications in a covering letter to their tender and reference such letter in this schedule.

The tenderer's attention is drawn to Clause F.3.8 of the Standard Conditions of Tender referenced in the Tender Data regarding the employer's handling of material deviations and qualifications.

Tenderers must not include deviations or qualifications relating to the scope of work in this schedule where they are required to submit an approach paper.

Page	Clause or item	Proposal

Signed _____ Date _____

Name _____ Position _____

Tenderer _____

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

Preferencing schedule

1 Definitions

The following definitions shall apply to this schedule:

Black: is a generic term which means those who are Africans, Coloureds and Indians.
Disability: in respect of a person, a permanent impairment of a physical, intellectual or sensory function which results in restricted, or lack of, ability to perform an activity in the manner, or within the range, considered normal for a human being.
Disabled person: a person with a disability.
Equity ownership: the percentage of an enterprise or business owned by individuals or, in respect of a company, the percentage of the company's shares that are owned by individuals, who are actively involved in the management of an enterprise or business and exercise control over the enterprise, commensurate with their degree of ownership at the closing date of the tender.

Note: All claims for equity ownership will be considered according to the following criteria:

- Equity within private companies will be based on the percentage of equity ownership;
- Preference points will not be awarded to public companies and tertiary institutions;
- Equity claims for a trust will only be allowed in respect of those persons who are both trustees and beneficiaries and who are actively involved in the management of the trust (i.e. the arrangement through which the property of one person is made over or bequeathed to a trustee to administer such property for the benefit of another person); and
- A joint venture may, based on the percentage of the contract value managed or executed by their HDI, be entitled to equity ownership.

Historically disadvantaged individual (HDI): A South African citizen:
a) Who, due to the apartheid policy that had been in place, had no franchise in national elections prior to the introduction of the Constitution of the RSA, 1983 (Act 110 of 1983) or the Constitution of the RSA, 1993 (Act 200 of 1993) (the interim Constitution);
b) Who is a female; or
c) Who has a disability;
provided that a person who obtained South African citizenship on or after the coming to effect of the Interim Constitution is deemed not to be an HDI;
Joint venture (consortium): an association of persons for the purposes of combining their expertise, property, capital, efforts, skills and knowledge in an activity for the execution of a contract.
Management: means an activity inclusive of control and performed on a daily basis by any person who is a principal executive officer of the company, by whatever name that person may be designated, and whether or not that person is a director.
Priority population group (PPG): a member/ individual of a targeted group who is a South African citizen and who falls into a population group that had no franchise in national elections prior to the introduction of the 1984 constitution and tricameral parliamentary system.
Youth: all persons who between the ages of 18 and 35 at the time that tenders close.

2 Conditions associated with the granting of preferences
The tenderer who claims a preference, undertakes to:
1) Maintain an equity ownership of not less than that upon which the preference is based for the duration of the Contract or, in the case of a joint venture, ensure that the percentage of the contract value managed or executed by those persons is not less than that upon which the preference is based;
2) Accept the sanctions set out in Section 3 below should Conditions 1 or 2 be breached; and
3) Complete Sections 4 to 6 below as relevant.
Failure to fill in and/or sign this form shall be interpreted to mean that preference points are not claimed.

3 Sanctions relating to breaches of preferencing conditions

The sanctions for breaching the preferencing conditions are:

1) Termination of the Contract; or
2) A financial penalty payable to the Employer equal to 1.5 times the number of tender evaluation points awarded in respect of the preference claimed, multiplied by the contract price exclusive of VAT, divided by 100.

4 Tender preference claim in respect of HDIs and youth

Number of preference points for type of equity = NOP x R x EP / 100
where:
NOP = maximum tender evaluation points provided for HDI/youth equity ownership stated in the Tender Data
R = the percentage of the maximum tender evaluation points for the preference claimed in the second column of the tabulation in section 5 divided by 100
EP = the percentage of equity ownership by an HDI/youth within the business enterprise or, in the case of a joint venture, the percentage of the contract value managed or executed by their HDI/youth members.

I/we apply on behalf of my/our firm for a preference based on:
Non-joint ventures

	HDI				**Youth**
	No franchise in national elections (black persons)		**Women**	**Disabled person**	
	PPG (African)	**Coloured, Indian**			
Equity ownership percentage					
For office use only: Number of preference points awarded by employer					
	Total:				

Joint ventures

	HDI				**Youth**
	No franchise in national elections (black persons)		**Women**	**Disabled person**	
	PPG (African)	**Coloured, Indian**			
The percentage of the contract value managed or executed by their HDI members					
For office use only: Number of preference points awarded by employer					
	Total:				

5 Tender preferences claimed

I/we apply on behalf of my/our firm for the following preference(s) and by claiming a preference confirm that all claims for equity ownership are in respect of individuals who are actively involved in the management of the enterprise or business:

Category of preference	**Percentage of maximum tender evaluation points provided for in the Preferential Procurement Policy Framework Act (Act 5 of 2000)**	**Preference claimed for Category of Preference (Y=yes)**
HDI (PPG i.e. African) equity ownership	40	
HDI (Coloured and/or Indian) equity ownership	30	
HDI (women) equity ownership	15	
HDI (disabled person) equity ownership	5	
HDI youth equity ownership	10	

6 Declaration with respect to preferences claimed in respect of HDI and youth equity ownership
6.1 List all shareholders by name, identity number, citizenship, status, ownership, as relevant.

Name	ID Number	Date obtained South African citizenship	HDI status				Youth Yes/No	Percentage equity ownership or, in the case of a joint venture, the percentage of the contract to be managed or executed by targeted persons (%)
			No franchise in national elections (black persons)		Women	Disabled person		
			PPG (African)	Coloured, Indian	Yes/No	Yes/No		

6.1.2 How long has the entity been in existence?. . . . . .

6.1.3 Describe principal business activities:

. . . . . .
. . . . . .
. . . . . .

6.2 Declaration in respect of claim for preference in respect of disabled person

Complete the following with respect to claims for equity ownership relating to disabled persons:

Name	Describe what the permanent impairment is	Outline how the permanent impairment impacts on ability to perform an activity in the manner or within the ranges considered normal for a human being

The undersigned, who warrants that he/she is duly authorised to do so on behalf of the tenderer confirms that he/she understands the conditions under which such preferences are granted and confirms that the tenderer satisfies the conditions pertaining to the granting of tender preferences.

Signature : .....

Name : .....

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

Telephone : .....

Fax : .....

Date : .....

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

Tender Evaluation Criteria	Score description	Weighting (%)
1. Approach paper • The approach paper must respond to the scope of work and outline the proposed approach/methodology including: • Their understanding of the employer's requirements • Technical approach • Health and safety • Adopted methodology • Quality plan • Processes, procedures, resources • Risk management • The tenderer must attach his/her approach paper to this page. The approach paper should not be longer than eight pages.	**0 point** No submission **3 points** The technical approach and/or methodology is poor/is unlikely to satisfy project objectives or requirements. The tenderer has misunderstood certain aspects of the scope of work and does not deal with the critical aspects of the project. **5 points** The approach is generic and not tailored to address the specific project objectives and methodology. The approach does not adequately deal with the critical characteristics of the project. The quality plan, manner in which risk is to be managed, etc. is too generic. **7 points** The approach is specifically tailored to address the specific project objectives and methodology and is sufficiently flexible to accommodate changes that may occur during execution. The quality plan and approach to managing risk etc. is specifically tailored to the critical characteristics of the project. **10 points** Besides meeting the Good rating, the important issues are approached in an innovative and efficient way, indicating that the tenderer has outstanding knowledge of state-of-the-art approaches. The approach paper details ways to improve the project outcomes and the quality of the outputs.	**25**
2. Proposed organisation and staffing • The tenderer should propose the structure and composition of their team, i.e. the main disciplines involved, the key staff member/expert responsible for each discipline, the proposed technical and support staff, and site staff. • The roles and responsibilities of each key staff member/expert should be set out as job descriptions.	**0 point** No submission **3 points** The organisation chart is sketchy, the staffing plan is weak **5 points** The organisational chart is complete and detailed, the technical level and composition of the staffing arrangements are adequate.	**25**

• In the case of an association/joint venture/consortium, it should indicate how the duties and responsibilities are to be shared. The tenderer must attach his/her organisation and staffing proposals to this page**.**	**7 points** Besides meeting the Satisfactory rating, staff are well balanced, i.e. they show good co-ordination, complimentary skills, clear and defined duties and responsibilities, and the approach to satisfying local consultants. **10 points** Besides meeting the Good rating, the proposed team is well integrated, and several members have worked together extensively in the past.	
3. Experience of assigned Project Lead (Qualifications and Professional registrations) CV of the **Project Lead,** of not more than two pages should be attached to this schedule. The CV should be structured under the following headings: 1. Personal particulars: - Name; - Date and place of birth; - Place(s) of tertiary education and dates associated therewith; and - Professional awards. 2. Qualifications (degrees, diplomas, grades of membership of professional societies and professional registrations). 3. Skills. 4. Name of current employer and position in enterprise. 5. Overview of postgraduate/diploma experience (year, organisation and position). 6. Outline of recent assignments/experience that has a bearing on the scope of work.	**0 point** No submission **3 points** CV submitted with no valid Engineering Professional registration (ECSA) **5 points** CV Submitted of Engineering Technician • Adv. Cert (Eng.) • Adv. Cert (Eng. Prac) • N-Dip • Dip Eng. Tech • Dip Eng. • Registration with ECSA as Pr Techni Eng **7 points** Engineering Technologist • Adv. Dip Eng. • B-Tech (Eng.) • BEng Tech • Registration with ECSA as Pr Tech Eng **10 points** • Engineer – BSc (Eng.)/BEng • Registration with ECSA as Pr Eng	**25**
4. Tenderer's experience (list of references) • The experience of the tenderer or joint venture partners in the case of an unincorporated joint venture or consortium, as opposed to the key staff members/experts in similar projects or similar areas and conditions in relation to the scope of work carried out 2015 and 2021, will be evaluated. • Tenderers should very briefly describe his or her experience in this regard and attach this to this schedule. The tenderer will be penalised if the references are not contactable references. • The reference list must be submitted in this format:	**0 point** No submission ***or*** description of reference letters submitted, the work/service is not relevant to the project scope **3 points** 1 to 4 relevant reference letters submitted **5 points** 5 to 7 relevant reference letters submitted **7 points** 8 to 10 relevant reference letters submitted	**25**

	Employer, contact person and telephone number, where available	Description of work (service)	Value of work (i.e. the service provided) inclusive of VAT (rand)	Date completed	**10 points** More than 10 relevant reference letters submitted	
NB: The reference letters must correspond to the list						
					TOTAL	**100**

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

Technical information

Tenderers shall include the following documentation in their tender submission:

- Recommended switchgear type and rating to be used;
- Recommended cable to be used;
- Recommended protection relay and CT requirements;
- Reactor configuration;
- Mounting equipment specification including painting and galvanisation specifications used;
- Recommended surge arrestor requirements;
- Typical equipment dimensions and masses; and
- Packing method and procedures.

Signed ..... Date .....

Name ..... Position .....

Tenderer _____

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

C1.1 Form of Offer and Acceptance

Offer

The Employer, identified in the Acceptance signature block, has solicited offers to enter into a contract for the provision of works as described in Part 1 of the Contract Data.

The tenderer, identified in the Offer signature block, has examined the documents listed in the Tender Data and addenda thereto as listed in the Returnable Schedules, and by submitting this Offer has accepted the Conditions of Tender.

By the representative of the tenderer, deemed to be duly authorised, signing this part of this Form of Offer and Acceptance the tenderer offers to perform all of the obligations and liabilities of the *Contractor* under the contract including compliance with all its terms and conditions according to their true intent and meaning for an amount to be determined in accordance with the conditions of contract identified in the Contract Data.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VAT IS:

(in words) …….. ……Rand;

R……(in figures)

This Offer may be accepted by the *Employer* by signing the Acceptance part of this Form of Offer and Acceptance and returning one copy of this document including the Schedule of Deviations (if any) to the tenderer before the end of the period of validity stated in the Tender Data, or other period as agreed, whereupon the tenderer becomes the party named as the *Contractor* in the conditions of contract identified in the Contract Data.

Signature(s) .....

Name(s) .....

Capacity .....

For the tenderer: .....

(Insert name and address of organisation)

Name & signature of witness ..... Date .....

Acceptance

By signing this part of this Form of Offer and Acceptance, the Employer identified below accepts the tenderer's Offer. In consideration thereof, the Employer shall pay the Contractor the amount due in accordance with the *conditions of contract* identified in the Contract Data. Acceptance of the tenderer's Offer shall form an agreement between the Employer and the tenderer upon the terms and conditions contained in this agreement and in the contract that is the subject of this agreement.

The terms of the contract, are contained in:

Part C1	Agreements and Contract Data, (which includes this Form of Offer and Acceptance)
Part C2	Pricing Data
Part C3	Scope of Work
Part C4	Site Information

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

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto listed in the Returnable Schedules as well as any changes to the terms of the Offer agreed by the tenderer and the Employer during this process of offer and acceptance, are contained in the Schedule of Deviations attached to and forming part of this Form of Offer and Acceptance. No amendments to or deviations from said documents are valid unless contained in this Schedule.

The tenderer shall within two weeks of receiving a completed copy of this agreement, including the Schedule of Deviations (if any), contact the Employer's agent (whose details are given in the Contract Data) to arrange the delivery of any securities, bonds, guarantees, proof of insurance and any other documentation to be provided in terms of the *conditions of contract* identified in the Contract Data. Failure to fulfil any of these obligations in accordance with those terms shall constitute a repudiation of this agreement.

Notwithstanding anything contained herein, this agreement comes into effect on the date when the tenderer receives one fully completed original copy of this document, including the Schedule of Deviations (if any). Unless the tenderer (now *Contractor***)** within five working days of the date of such receipt notifies the Employer in writing of any reason why he cannot accept the contents of this agreement, this agreement shall constitute a binding contract between the Parties.

Signature(s)

Name(s) .....

Capacity .....

for the Employer .....

(Insert name and address of organisation)

Name & signature of witness

Date: . . . . . .

. . . . . .

Schedule of Deviations

1 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

2 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

3 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

4 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

5 Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

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

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

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

Part C1.2 Contract Data

The Conditions of Contract are the NEC3 Engineering and Construction Short Contract (Third edition of June 2013) published by the Institution of Civil Engineers, copies of which may be obtained from Engineering Contract Strategies (telephone (27) 011 803 3008).

Each item of data given below is cross-referenced to the clause in the NEC3 Engineering and Construction Short Contract to which it mainly applies.

Part one - Data provided by the *Employer*

Clause	Statement	Data
1	**General**	
10.1	The *Employer* is **Council for Scientific and Industrial Research (CSIR)** Address: **PO Box 395, Pretoria 0001, South Africa** Tel No. : **012 841 2911** E-mail address: tender@csir.co.za	
11.2(2)	The *completion date* is 20 weeks after the starting date.	
11.2(11)	The *works* are the design, supply, installation and commissioning of the new Power Factor Correction panels as specified.	
11.2(12)	The *site* is the main 11 kV substation at the CSIR Campus in Pretoria	
11.2(13)	The Works Information is in the document called Part 3: Scope of Work.	
13.2	The *period for reply* is 2 weeks	
14.4	The *Employer's* representative is (Name): **Delta Built Environment Consultants**	
14.4	The *Employer's* representative is delegated to carry out all the actions of the *Employer* in this contract with the exception of those required by clauses 51.1, 81.1	
2	**The Contractor's main responsibilities** No data is required for this section of the *conditions of contract*.	
3	**Time**	
30.1	The *starting date* is 2 weeks after the Contractor receives one fully completed copy of this document, including the schedule of deviations (if any) as contained in the Form of Offer and Acceptance.	

4	**Testing and Defects**
40	The *defects date* is 52 weeks after Completion
41.3	The *defect correction period* is 2 weeks
5	**Payment**
50.1	The *assessment day* is on or before the 25th of each month.
50.5	The *delay damages* are 0.024%per day to a maximum of 10% of the contract value.
50.6	The retention is 5%
51.2	The interest rate on late payment is the prime lending rate of the Standard Bank
8	**Indemnity, Insurance and Liability**
80.1	The *Contractor* is not liable to the *Employer* for loss of or damage to the *Employer*'s property in excess of R1 Million for any one event
82.1	The minimum amount of cover for Insurance against the *Contractor's* liability for loss of or damage to property (except the *works*, Plant and Materials 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 is R10 Million
82.1	The minimum amount of cover for liability for death of or bodily injury to employees of the *Contractor* arising out of and in the course of their employment in connection with this contract for any one event of not less than R10 Million
9	**Termination and dispute resolution**
93.1	The *Adjudicator* is the person selected by the Parties in terms of the relevant Z Clause from the Panel of NEC Adjudicators set up by ICE-SA, a Joint Division of the Institution of Civil Engineers and the South African Institution of Civil Engineering (see www.ice-sa.org.za).
93.2(2)	The *adjudicator nominating body* is the Chairman of ICE-SA, a Joint Division of the Institution of Civil Engineers and the South African Institution of Civil Engineering (see www.ice-sa.org.za).
93.4	The *tribunal* is arbitration
93.4	The *arbitration procedure* is as set out in the Rules for the Conduct of Arbitrations Fifth Edition 2005 published by the Association of Arbitrators (Southern Africa)

Z 1. **Performance bond**

The *Contractor* gives the *Employer* a performance bond, provided by a bank or insurer for the amount stated in the Contract Data and in the form set out in the document 1.3 Performance Bond. A reason for not accepting the bank or insurer is that the commercial position is not strong enough to carry the bond. If the bond was not given by the date that the contract came into existence, it is given to the *Employer* within four weeks of the date that the contract came into existence.

The amount of the performance bond is **10%** percent of the total of Prices

The maximum guaranteed sum is equal to **10**% of the total of the Prices and reduces to the following diminishing amounts:

Guarantor's liability expressed as a percentage of the total of Prices	**Period of liability**
Maximum guaranteed sum of **6**%	From the date this demand bond comes into effect and until the date by when the Price for Work Done to Date has reached or exceeds **50**% of the total of Prices
Reducing to the guaranteed sum of **4** %	From the date by when the Price for Work Done to Date has reached or exceeds the amount stated above and until the date of Completion of the whole of the *works*
Reducing to the guaranteed sum of **2**%	From the day after the date of Completion of the whole of the *works* and until the date of issue of the last Defects Certificate.
Reducing to the guaranteed sum of **5**%	From the day after the date of issue of the last Defects Certificate and up to and including the day on which there are no amounts due by either Party to the other.

Z.... **Transfer of rights**

The *Employer* owns the *Contractor's* rights over material prepared for this contract by the *Contractor* except as stated otherwise in the Works Information. The *Contractor* obtains other rights for the *Employer* as stated in the Works Information and obtains from a subcontractor equivalent rights for the *Employer* over the material prepared by the subcontractor. The *Contractor* provides to the *Employer* the documents which transfer these rights to the *Employer*

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

Part C1.2 Contract Data

The *Contractor* is advised to read the NEC3 Engineering and Construction Short Contract (Third edition of June 2005) and the relevant Guidance Notes and Flow Charts, published by the Institution of Civil Engineers, in order to understand the implications of this Data which is required. Copies of these documents may be obtained from Engineering Contract Strategies (telephone (27) 011 803 3008).

Each item of data given below is cross-referenced to the clause in the NEC3 Engineering and Construction Short Contract to which it mainly applies.

Part two - Data provided by the *Contractor*

10.1	The *Contractor* is (Name): Address Tel No. Fax No. E-mail address
11.2(10)	The tendered total of the Prices is in the document C.1: Form of Offer and Acceptance
63.2	The percentage for overheads and profit added to the Defined Cost for people is . . . . . **%**
63.2	The percentage for overheads and profit added to other Defined Cost is . . . . . **%**
63.2	All prices shall be tendered in South African Rands. Prices for equipment sourced from outside South Africa shall be subject to linear adjustment through a Compensation Event for movement in exchange rates. The tenderer shall specify the underlying foreign currency elements which were used for these elements in the table below. **The day-rate of the South African Reserve Bank (SARB) will be selected** to determine the tenderer's final price on the day of appointment (purchase order date).

COMPONENT	% FOREIGN CONTENT	CURRENCY	ROE TO ZAR	DATE
~~Example: Capacitor Banks~~	~~100 %~~	~~USD~~	~~13.51~~	~~2017-08-11~~

C1.3 Securities: Performance bond

(to be reproduced exactly as shown below on the letterhead of the Surety)

{Insert name and registered address of the Contractor}

Date:

Dear Sirs,

Performance Bond for Contract No.

With reference to the above numbered contract made or to be made between

Council for Scientific and Industrial Research (CSIR) (the *Employer*) and

{Insert registered name and address of the *Contractor*} (the *Contractor*), for

The installation of a new Power Factor Correction system. (the *works*).

I/We the undersigned .....

on behalf of the Surety .....

of physical address .....

.....

and duly authorised thereto do hereby bind ourselves as Surety and co-principal debtors in solidum for the due and faithful performance of all the terms and conditions of the Contract by the *Contractor* and for all losses, damages and expenses that may be suffered or incurred by the *Employer* as a result of non-performance of the Contract by the *Contractor*, subject to the following conditions:

1. The terms *Employer*, *Contractor*, *works* and Defects Certificate have the meaning as assigned to them by the *conditions of contract* stated in the Contract Data for the aforesaid Contract.

2. We renounce all benefits from the legal exceptions "Benefit of Excussion and Division", "No value received" and all other exceptions which might or could be pleaded against the validity of this bond, with the meaning and effect of which exceptions we declare ourselves to be fully acquainted.

3. The *Employer* has the absolute right to arrange his affairs with the *Contractor* in any manner

which the *Employer* deems fit and without being advised thereof the Surety shall not have the right to claim his release on account of any conduct alleged to be prejudicial to the Surety. Without derogating from the foregoing compromise, extension of the construction period, indulgence, release or variation of the *Contractor's* obligation shall not affect the validity of this performance bond.

4. This bond will lapse on the earlier of

   - the date that the Surety receives a notice from the *Employer* stating that the last Defects Certificate has been issued, that all amounts due from the *Contractor* as certified in terms of the contract have been received by the *Employer* and that the *Contractor* has fulfilled all his obligations under the Contract, or

   - the date that the Surety issues a replacement Performance Bond for such lesser or higher amount as may be required by the *Employer*.

5. Always provided that this bond will not lapse in the event the Surety is notified by the *Employer*, (before the dates above), of the *Employer's* intention to institute claims and the particulars thereof, in which event this bond shall remain in force until all such claims are paid and settled.

6. The amount of the bond shall be payable to the *Employer* upon the *Employer's* demand and no later than 7 days following the submission to the Surety of a certificate signed by the *Employer* stating the amount of the *Employer's* losses, damages and expenses incurred as a result of the non-performance aforesaid. The signed certificate shall be deemed to be conclusive proof of the extent of the *Employer's* loss, damage and expense.

7. Our total liability hereunder shall not exceed the sum of:

   _____

   R _____

8. This Performance Bond is neither negotiable nor transferable and is governed by the laws of the Republic of South Africa, subject to the jurisdiction of the courts of the Republic of South Africa.

Signed at ..... on this ..... day of .....

Signature(s)	.....	.....
Name(s) (printed)	.....	.....
Position in Surety company	.....	.....
Signature of Witness(s)	.....	.....
Name(s) (printed)	.....	.....

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

C1.4 Occupational Health and Safety Agreement

OCCUPATIONAL HEALTH AND SAFETY AGREEMENT BETWEEN EMPLOYER AND CONTRACTOR

AGREEMENT MADE AND ENTERED INTO BETWEEN

……
(HEREINAFTER CALLED THE EMPLOYER)
And

……..
(Contractor/Mandatory/Company/CC Name)

IN TERMS OF SECTION 37(2) OF THE OCCUPATIONAL HEALTH AND SAFETY ACT, ACT No. 85 OF 1993 AS AMENDED.

I,…….representing……,as an employer in its own right, do hereby undertake to ensure, as far as is reasonably practicable, that all work will be performed, and all equipment, machinery or plant used in such a manner as to comply with the provisions of the Occupational Health and Safety Act (OHSA) and the Regulations promulgated there under.

I furthermore confirm that I am/we are registered with the Compensation Commissioner and that all registration and assessment monies due to the Compensation Commissioner have been fully paid or that I/we are insured with an approved licensed compensation insurer.

COID ACT Registration Number: ……..

OR Compensation Insurer: …… Policy No.: ……

I undertake to appoint, where required, suitable competent persons, in writing, in terms of the requirements of OHSA and the Regulations and to charge him/them with the duty of ensuring that the provisions of OHSA and Regulations as well as the Council's Special Conditions of Contract, Wayleave, Lock-Out and Work Permit Procedures are adhered to as far as reasonably practicable.

I further undertake to ensure that any subcontractors employed by me will enter into an occupational health and safety agreement separately, and that such subcontractors comply with the conditions set.

I hereby declare that I have read and understand the appended Occupational Health and Safety Conditions and undertake to comply therewith at all times.

I hereby also undertake to comply with the Occupational Health and Safety Specification and Plan.

Signed at …… on the ……... day of ……. 20……..

……. ……..
Witness Mandatory

Signed at …… on the ……... day of ……. 20……..

……. ……..
Witness for and on behalf of the Employer

OCCUPATIONAL HEALTH AND SAFETY CONDITIONS

The Chief Executive Officer of the Contractor shall assume the responsibility in terms of Section 16(1) of the Occupational Health and Safety Act (as amended). Should the Contractor assign any duty in terms of Section 16(2), a copy of such assignment shall immediately be provided to the representative of the Employer as defined in the Contract.

All work performed on the Employer's premises shall be performed under the supervision of the construction supervisor who understands the hazards associated with any work that the Contractor performs on the site in terms of Construction Regulations 2014.

The Contractor shall appoint a Competent Person who shall be trained on any occupational health and safety aspect pertaining to them or to the work that is to be performed.

The Contractor shall ensure that they familiarises themself with the requirements of the Occupational Health and Safety Act and that they, their employees, and any subcontractors, comply with them.

Discipline in the interests of occupational health and safety shall be strictly enforced.

Personal protective equipment shall be issued by the Contractor as required and shall be worn at all times where necessary.

Written safe work procedures and appropriate precautionary measures shall be available and enforced, and all employees shall be made conversant with the contents of these practices.

No substandard equipment/machinery/articles or substances shall be used on the site.

All incidents referred to in terms of Section 24 of the Occupational Health and Safety Act shall be reported by the Contractor to the Department of Labour and the Employer.

The Employer hereby obtains an interest in the issue of any formal inquiry conducted in terms of Section 32 of the Occupational Health and Safety Act and into any incident involving a Contractor and/or his employees and/or his subcontractor/s.

No use shall be made of any of the Employer's machinery/plant/equipment/substance/personal protective equipment or any other article without prior arrangement and written approval.

No alcohol or any other intoxicating substance shall be allowed on the site. Any person suspected of being under the influence of alcohol or any other intoxicating substance shall not be permitted access to, or allowed to remain on, the site.

Prior to commencement of any work, verified copies of all documents mentioned in the agreement must be presented to the Employer.

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

C2: Pricing Data

C2.1 Pricing assumptions

C.2.1.1 The *Contractor* is paid an amount in accordance with the Price List equal to the lump sums of items which they have completed, and an amount calculated by multiplying the quantity completed by the rate.

C.2.1.2 The contract is a lump sum form of contract where the works are listed and priced in the Price List. At each assessment date work carried out since the previous assessment date is identified from the items in the Price List and totalled to give the Price for Work Done to Date. Any change in final total of work done and the quantity stated for an item in the Price List is a compensation event (see Clause 60.1(13)).

C.2.1.3 Instructions to do work or how it is to be done are not included in the Price List but in the Works Information (see Clauses 11.2(11) and 20.1). The Price List is only a pricing document.

C.2.1.4 As the *Contractor* has an obligation to correct Defects (clause 41.1) and there is no compensation event for this, the lump sum Prices and rates must also include for the correction of Defects.

C.2.1.5 If the *Contractor* has decided not to identify or to price a particular item of work, it will be assumed that *Contractor* has included the cost to the *Contractor* of doing the work within the other Prices or rates. There is no adjustment to the Price if the amount of work within that item later turns out to be different to that which the *Contractor* estimated at time of tender. The only basis for a change to the Prices is as a result of a compensation event (See Clause 60.1.) The Prices tendered by the *Contractor* in the Price List are inclusive of everything necessary and incidental to Provide the Works in accordance with the Works Information, as it was at the time of tender, as well as correct any Defects.

C.2.1.6 The *Contractor* does not have to allow in his Prices for matters that may arise as a result of a compensation event. (See Clause 60)

C.2.1.7 Items which are not adjusted if the quantity of work in the items changes are priced in the Price column only; the columns for the Unit, Quantity and Rate are left blank. Where the price for an item is adjusted if the quantity in the work changes all the columns are completed so that the Price in the final column equals the rate multiplied by the Quantity

C.2.1.8 The *Contractor* is required to identify the items that are to be priced in the Price List.

C.2.1.9 The amounts in the Price List exclude VAT

C.2.1,2 Method related charges provided by the Contractor

C.2.1.2.1 A Contractor may decide to cover the costs of works relating to his intended method of executing the work, the costs of which are not to be considered as being proportional to the quantities of the other items and for which he has not allowed in the rates for the other items. Such items shall be fully described so as to precisely define the extent of the work covered and the resources to be used and shall distinguish between time related and fixed charges.

C.2.1.2.2 The units for fixed charges are “sum” and the units for time related charges are “months.” The time related charges are fixed for the duration of the contract and are paid in monthly instalments.

C.2.1.2.3 A method charge is not subject to any adjustment.

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

C2. 2 Price List

All items should be priced, based on the technical specification and scope of work as described in section C3 of this document.

Item no.	Description	Unit	Quantity	Rate (Rand)	Price (Rand)
1.1	Project mobilisation and overheads	Sum	1		
1.2	Detail design and design approvals	Sum	1		
1.3	Factory Acceptance Testing	Sum	1		
1.4	Safety file	Sum	1		
1.5	Switchgear, including protection and metering	Sum	1		
1.6	Control gear, including software and all auxiliary equipment	Sum	1		
1.7	Cable work	Sum	1		
1.8	Capacitor banks	Sum	1		
1.9	Delivery and offloading	Sum	1		
1.10	Civil works	Sum	1		
1.11	Installation	Sum	1		
1.12	Site Acceptance Testing and Commissioning	Sum	1		
1.13	Handover documentation pack	Sum	1		
1.14	End-user training	Sum	1		
1.15	1-year operations & maintenance during warranty	Sum	1		
	Any other items required for a successful installation				
1.16					
1.17					
1.18					
1.19					
1.20					
				Total of Prices in Price List (excluding VAT)	
				VAT @ 15%	
				Total of Prices carried forward to the form of Offer and Acceptance (including VAT)	

The following recommended spare parts to be priced separately. The price is indicative and shall not be carried to the form of Offer and Acceptance.

Item no.	Description	Unit	Quantity	Rate (Rand)	Price (Rand)
	Tenderer to list recommended spare parts below:				
Total: spare parts (excluding VAT) – not carried to the form of Offer and Acceptance					

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

C3: Scope of work

This section defines the Works Information.

1) Description of the works
2) Drawings
3) General specifications
4) Performance specifications
5) Constraints
6) Programme requirements
7) Services provided by the Employer

In the event of a discrepancy between these specifications, the drawings and/or the bill of quantities, the discrepancy shall be resolved by the Engineer in accordance with the contract before the execution of the work under the relevant item.

Any reference to the Employer shall also imply a reference to the Employer's representative. Any reference to the Engineer is a reference to the Employer's representative.

The Contractor shall be responsible for the design of the works.

1 DESCRIPTION OF THE WORKS

1.1 BACKGROUND

The CSIR Pretoria Campus has existing PFC panels that are obsolete and require replacement. Improving the power factor of the CSIR's network reduces the strain on the electrical infrastructure and the cost of electricity.

1.2 EMPLOYER'S OBJECTIVES

The CSIR wishes to improve the reliability and performance of the power factor correction system by appointing a specialist contractor to successfully design, install and commission new power factor correction equipment.

1.3 DESCRIPTION OF WORKS

This contract requires a competent and experienced contractor for the design, supply, installation and commissioning of new power factor correction (PFC) equipment at the CSIR's main intake substation. The scope of this contract includes the planning, design, supply, installation, testing and commissioning of the following:

- Decommissioning, demolishing, removal and disposal of the existing panels.
- Two (2) PFC panels with six (6) switchable capacitor banks to deliver 3.5 MVAR compensation when combined.
- A single control panel and all associated equipment for the PFC panels.
- All cable work and interfacing between the existing 11 kV switchboard and the new PFC panels.

- All cable work and interfacing between the existing alarm panels and the new PFC panels.
- Any required switchgear, protection and alarm interfaces.
- Minor civil works to the substation.
- Remedial substation work to restore any damage caused by the installation.
- A carefully planned and managed change-over procedure to ensure minimal disruption of electricity supply to the CSIR campus.
- Provision of all design and handover documentation for review and approval by the Employer or the Employer's representative.

This shall be done in accordance with the general and performance specifications provided in this Works Information document.

1.4 PHASING OF THE WORKS

The works shall be phased at the discretion of the Employer.

1.5 EXTENT OF THE WORKS

The works are limited to the CSIR's main intake substation.

The Contractor is responsible for the surveying, planning, design, supply of all materials and labour, manufacture, delivery to site, offloading, construction, erection, installation, factory acceptance testing (FAT), site acceptance testing (SAT), commissioning, performance testing, provision of samples, preparation of all detail design drawings, shop drawings, as-built record drawings, maintenance manuals, instructions for the works and end-user training, in accordance with the general requirements and performance requirements as detailed in this document.

The following items comprise the extent of the works for this project:

- Detailed design of all temporary and permanent equipment required for the successful commissioning of a new power factor correction system, based on the reference design, reference drawings and performance specifications provided in this document.
- Submission of design documents and samples to the Employer for approval prior to commencement of equipment procurement.
- Procurement of all equipment required for a successful, fit-for-purpose installation.
- Transportation of all equipment to site.
- Establishment of the contractor's office and laydown area (if required).
- All signage as may be required in terms of the OHS Act.
- Installation of all equipment as per scope of works and specifications.
- Programming of all control systems.
- Commissioning of all equipment and systems.
- Preparation of factory and site acceptance test procedures for submission to the Employer for approval prior to commencement of acceptance tests.
- Conducting factory and site acceptance tests, to be witnessed by the Employer.
- Submission of documentation to the Employer as prescribed in these specifications.
- Training of the Employer's staff on the operation and maintenance of all equipment and systems supplied under this contract.
- Delivery of spares and special test equipment.

- Modifications to the existing substation if required for a safe working installation.
- Finishing the site (removal of all hoarding and unused installation material).

1.6 DOCUMENTATION TO BE PROVIDED

Documentation requirements are listed under the General Specifications section of this Works Information document.

1.7 MAINTENANCE GUARANTEE

All equipment supplied and work done as part of this contract shall be maintained and guaranteed for a period of one (1) year from the date of practical completion.

The Contractor is responsible for all material and labour during this period.

2 DRAWINGS

Reference drawings are included in **APPENDIX A – Drawings**.

3 GENERAL SPECIFICATIONS

3.1 NATIONAL AND INTERNATIONAL STANDARDS

The whole of the installation shall comply with the latest edition of the following South African standards:

- Occupational Health and Safety Act, 1993 (Act No 85 of 1993) and the regulations promulgated in terms of the Act.
- SANS 1019: Standard voltages, currents and insulation levels for electricity supply
- SANS 60044-1: Instrument transformers Part 1: Current Transformers
- SANS 60044-6: Instrument transformers Part 6: Requirements for protective current transformers for transient performance
- SANS 60529: Degrees of protection provided by enclosures (IP Code)
- SANS 1339: Electric cables - Cross-linked polyethylene (XLPE) insulated cables for rated voltages 3,8/6,6 kV to 19/33 kV
- IEC 60099-(1-7): Surge Arrestors
- IEC 60137: Insulated bushings for alternating voltages above 1000 V
- IEC 60289: Reactors
- IEC 60871-1: Shunt capacitors for AC power systems having a rated voltage above 1000 V – Part 1: General performance, testing and rating
- IEC 60871-4: Shunt capacitors for AC power systems having a rated voltage above 1000 V – Part 4: Internal fuses
- IEEE Standard 18
- SANS 10142-1: The wiring of premises Part 1: Low-voltage installations with the latest amendments, issued by the South African Bureau of Standards.
- SANS 10142-2: Medium-voltage installations above 1 kV AC not exceeding 22 kV AC and up to and including 3 MVA installed capacity
- SANS 62305-1: Protection against lightning Part 1: General principles
- The National Grid Code
- The relevant SANS, NRS, BS and IEC and ISO supporting specifications referred to in the standard specifications.
- City of Tshwane bylaws
- All other standards that apply to this installation

3.2 APPROVALS

Datasheets and shop drawings of all key equipment must be submitted to the Employer for formal, written approval before it may be procured by the contractor. This includes:

- Switchgear
- Protection relays
- CTs
- Capacitor banks

- Fuses
- Reactors
- Surge arrestors
- Control panels, including control transformers, etc.
- MV, LV and control and auxiliary cables

3.3 MATERIALS AND HANDLING

All materials must be new, complete, in good condition, and unused. Materials are to be visually inspected for damage on site and before use.

Additionally, all installations must conform to the vendors' instructions, best-practices and standards for the product(s) used.

Cable must not be pulled under excessive load, and all cable must be free of kinks, snags, and twists during and after installation. Wherever possible cable should be placed in pathways rather than pulled under tension.

Cable must not be installed in areas exposed to direct sunlight or temperatures that might exceed the manufacturer's specifications.

3.4 USE OF REASONABLE SKILL AND CARE

In executing this project, the Contractor shall exercise all the reasonable skill, care and diligence to be expected of an appropriately qualified and competent contractor experienced in carrying out equivalent installations for projects of a similar size, scope, complexity, value and purpose to the Development.

3.5 OWNERSHIP OF RECOVERED MATERIALS

No materials recovered during the execution of the contract shall be removed from the site without written authorisation from the employer, and the contractor shall be liable for the replacement value of any recovered materials removed without such approval.

All materials recovered during the construction operations shall be delivered to the employer at designated areas, which will be within the development's boundaries.

3.6 DAMAGE AND PROTECTION OF THE WORKS

The Contractor shall take all precautions necessary for the protection of life, equipment and property in connection with the works during installation.

The Contractor shall be held completely responsible for any damage of equipment during transport and installation, as well as any damage to the building and shall repair any such damage at his own expense. Where equipment cannot be repaired to an 'as new' condition, it will be completely replaced at the expense of the Contractor.

Equipment delivered to site shall be stored in a well-protected area where it cannot be damaged by either the weather or other trades. Equipment deliveries shall be arranged with the Engineer two (2) weeks before the expected date of delivery.

3.7 SPACE REQUIREMENTS AND ACCESS

Tenderers shall ensure that the equipment offered by them can be installed in the available space as shown on the drawings and confirmed during the site inspection. Should it be found at a later stage that the equipment offered does not fit, all costs arising from the rectification of this problem shall be for the Contractors' account.

The equipment shall be installed in such a manner that complete access is provided for operating and maintenance purposes.

The Contractors shall also ensure that the equipment offered by them will pass through available building openings. Large equipment shall be made up in sections and each section shall be small enough for access

through doors and other building openings. All additional costs involved for the modification of equipment or to change the manufacturer of equipment in order to allow access shall be for the account of the Contractor.

3.8 COMMISSIONING AND HANDOVER

3.8.1 GENERAL

The Contractor shall submit a commissioning programme and all FAT and SAT testing procedures to the Engineer at least two (2) weeks prior to the commencement of commissioning.

The installation shall be commissioned in accordance with the relevant codes and recognised commissioning procedures approved by the Engineer.

The Contractor shall supply the necessary field-testing instruments.

Certified test results shall be provided to the Engineer.

On completion of the installation before commissioning, all equipment shall be inspected and individually tested as per detailed QCP.

The results of all checks and measurements shall be recorded in writing during the commissioning period. Commissioning records shall be handed over to the Engineer prior to the first acceptance of the works. The commissioning records shall also be included in the operation manuals.

3.8.2 SPECIFIC TESTING REQUIREMENTS

An addition to the routine tests as described in IEC 60871-1, the following tests shall also be performed:

- PFC installation performance and output tests
- Primary injection testing of CT's
- Functional testing of protection devices
- Functional testing of control system
- Earth tests

3.8.3 ACCEPTANCE TEST CRITERIA

Acceptance test procedures are to be prepared by the contractor and must be approved by the engineer before any acceptance tests are conducted.

3.8.4 AVAILABILITY

Availability of the system shall be **99.95 %.**

3.8.5 SYSTEM UP-TIME

Downtime caused by external power failures, incorrect usage of the equipment, preventative maintenance, routine maintenance, etc. shall not be part of the equation to calculate system up time. However, downtime caused by system failure and unresponsiveness will form part of the equation.

3.8.6 CONFIDENCE TRIALS

These trials shall last for a minimum period of five calendar days starting on the day that the system is in full operational use. A day is defined as 24 hours. Confidence trials shall be completed once the following accumulative system up time has been measured by the contractor over a period of five consecutive days and is proven to the engineer:

- Power Factor Correction equipment: 99.95%

3.8.7 DRAWINGS AND DOCUMENTATION

3.8.7.1 Design documentation

The successful contractor will be required to provide the documentation listed below within four (4) weeks of appointment.

The dimensions and positions of equipment shown on the Engineer's drawings are schematic and for tender purposes only. The drawings are not suitable for manufacturing purposes. The responsibility for dimensional and layout accuracy remains with the Contractor.

All designs must be signed off by a professional engineer who is registered with the Engineering Council of South Africa (ECSA).

Method statements

- General method statement for the works
- Change-over procedure clearly indicating measures that will be taken to reduce power interruptions during the installation, commissioning and change-over of the new system

Design drawings

- Dimensioned equipment layout, general arrangements, wireways, sleeves and cable routes
- Internal general assembly
- Earthing connections
- Wiring schematics
- Single line diagrams
- Loop drawings and hook-up drawings
- Total mass of the assembly

Shop drawings

- All key PFC equipment

Schedules

- Cable schedules (electrical and control)
- Termination schedules
- I/O lists

Test procedures

- Factory acceptance test procedures
- Site acceptance test procedures for all equipment

3.8.7.2 Handover documentation

Upon completion of the project, the contractor shall hand over the following documentation (one electronic copy, three paper copies).

- Set of installation drawings
- Equipment documentation
- Schedule of apparatus and equipment complete with serial numbers;

- Datasheets
- User manuals
- Acceptance test procedure (for approval)
- Insulation test results for every cable
- Protection setting sheets
- Test reports
- Commissioning data of all equipment in tabulated form
- Warranty/guarantee certificates
- Operation and maintenance manuals, including:
    - Spares lists
    - Scheduled and unscheduled maintenance tasks
    - Maintenance procedures and instructions
    - Comprehensive literature of the different components of the installation
    - Start-up and shutdown procedures
    - Prescriptions for routine tests, which shall be performed by the user together with the time when such tests shall be performed
    - Detailed daily, weekly, monthly, quarterly, bi-annual or annual preventative maintenance procedures (where applicable)
    - List of spare parts for all equipment
- Training documentation, including training aids and course notes
- Software:
    - Full source code for any customized software written for this project (if applicable)
    - Full system backups, including configuration settings, for equipment capable of generating such backups
    - Software installation files and discs
- Licence keys or dongles
- Final certificates of completion:
    - SANS 10142-1 Certificate of compliance
    - SANS 10142-2 Safety report
    - Test certificates as prescribed by IEC 60871
    - Any other test certificates that may be required by other applicable standards

The operation manuals shall be sturdily bound in a strong hard cover. Material in the manual shall be clear, legible and well-arranged, and shall be provided with an index:

The operations and maintenance manuals shall be available one week before first handover/practical completion of the installation and no handover shall be considered without these manuals.

3.8.7.3 Drawings

All drawings shall be issued to the Employer electronically and also in hard copy. As a minimum, the contractor shall hand over the following drawings for approval:

- As-built drawings
    - Layout plans
    - Wireways
    - Schematics
    - Hook-up drawings
    - Loop diagrams
    - Termination Schedules
    - I/O Lists
    - Cable schedules
    - Panel layouts
    - Shop drawings
- Documentation drawings for maintenance manuals.

Drawings shall be prepared specifically for this contract using CAD software and shall not be marked-up drawings.

3.8.7.4 Equipment

- Keys for all enclosures and cabinets.
- Recommended spare parts.

3.8.8 OPERATING AND MAINTENANCE MANUALS

These manuals shall provide sufficient information for the operation of the system and shall include the following as a minimum:

- Description of all parts and operations
- Description of all software and control functions
- Emergency and/or alternate procedures in the case of power failures, etc.
- Fault finding.

Maintenance manuals shall have all the information to ensure that the system will be properly maintained. It shall be comprehensive to the extent that a technician can service the system. Fault diagnostics shall also be included so that faults can be traced, and components are exchanged with a minimum of difficulty. Sections covering the following aspects shall be included as a minimum:

- Troubleshooting and fault finding
- A list of all components and non-standard tools required
- A recommended list of spare components that must be kept in stock as well as minimum spare stock levels.

3.8.9 SPARE PARTS

The Employer will determine the final list of spare parts to be supplied for each site in consultation with the Contractor and Engineer. These spare parts will be held at each of the sites and used during the defect liability period.

In addition, the Contractor shall stock spare parts for the duration of the defect liability period to ensure a 48-hour turnaround time to replenish any client spare parts used during the defect liability period. A detailed list of spare parts as well as prices must accompany the Tender submission proprietary equipment and components to be flagged accordingly. This parts list must be upgraded to form part of the final documentation and must then include a full inventory of replacement parts, parts descriptions, identification, quantities, name of suppliers and part numbers. Please note that spare parts required for commissioning and testing purposes shall not be a measurable item.

Spare parts to be priced separately.

3.8.10 CIVIL WORKS

The Contractor shall allow for minor civil works to the existing substation. This may include alterations for explosion venting, changes to trenches and possible ventilation requirements. The extent of the works will be determined by the Contractor, and approved by the Engineer, during the tender briefing and site inspection.

3.8.11 TRAINING

As a minimum, the Contractor shall provide a 2-day short course to 3 delegates from the Employer. The training shall include the following:

- Basic operation and maintenance on all equipment;
- Basic operation and use of software, including configurational changes; and
- Complete switching and isolation procedures.

4 PERFORMANCE SPECIFICATIONS

4.1 GENERAL

This specification covers the minimum general engineering requirements, as well as the design, manufacture, testing and delivery of the PFC panels, and shall be read in conjunction with the relevant data sheets and applicable standards.

The equipment shall be altitude rated for continuous full load operation at the CSIR. The equipment shall be designed for use in a maximum ambient temperature of 40 °C and a minimum of -6 °C.

4.2 RATING OF EQUIPMENT

The Contractor shall supply the sizes and rating of all the equipment offered to the Engineer for approval prior to purchasing or ordering such equipment.

All equipment offered shall operate well within the manufacturer's ratings and equipment to be operated beyond these limits will not be considered.

4.3 POWER FACTOR CORRECTION EQUIPMENT

Filtering of harmonics can be considered based on the measured data provided. Recommendations will be considered by the Engineer.

4.3.1 EXISTING INFRASTRUCTURE

The PFC panels tie to the 11 kV bus, fed from 2 panels. Panel 1B, **currently in use**, includes the following compensation banks:

- 750 kVAR (**out of service**)
- 750 kVAR

- 450 kVAR

Panel 2B, **currently out of service**, includes the following compensation banks:

- 750 kVAR
- 450 kVAR
- 450 kVAR

The 11 kV substation where the PFC panels will be installed has no HVAC system. The equipment shall be suitable for installation in this environment.

The new PFC panels shall replace the existing installation.

110 V DC is available in the substation for control purposes.

4.3.2 ELECTRICAL DESIGN

The proposed design for the new PFC panels is tabulated below.

A total compensation of 3.5 MVAR, split over six (6) switchable banks, is required.

A single controller shall control all six (6) banks, switching the capacitor banks in and out of service as required.

The Contractor can propose an alternative configuration to reduce cost or optimise the design.

Table 0-1: PFC configuration (proposed)

PANEL	STEP	COMPENSATION (KVAR)	TOTAL COMPENSATION (KVAR)
1B	1	1 000	1 000
	2	500	1 500
	3	500	2 000
2B	4	500	2 500
	5	500	3 000
	6	500	3 500

4.3.3 SYSTEM COMPONENTS

The PFC panels shall include at a minimum the following components.

Table 0-2: PFC system components

EQUIPMENT	SUBCOMPONENTS
Switchgear	Contactors
	Protection Relays
	Earth Switch
	CTs
	Control Panel
	Selector Switches
Capacitor Banks	Capacitors
	Connections
	Fuses

EQUIPMENT	SUBCOMPONENTS
	Reactors
	Discharge Resistors
	Surge Arrestors
Cabling	MV Cables
	Control Cables
	Auxiliary Cables

The effect of switching transients shall be considered.

Future expansion to the PFC system shall be allowed for in the design and construction of the new panels.

Equipment ratings shall have adequate design margins to ensure reliable operation under the required conditions. As a minimum, the capacitors and reactors will be rated for nominal 50 Hz with the following voltage and current tolerances.

Table 0-3: Design criteria

PARAMETER	CAPACITORS		REACTORS
Voltage	Continuous	107%	110%
	12 hours every 24 hours	110%	
	30 minutes every 24 hours	115%	
	5 minutes every 24 hours	120%	
	1 minute every 24 hours	130%	
Current	130%		110%

The general electrical requirements are tabulated below.

Table 0-4: Basic electrical requirements

PARAMETER	RATING	UNIT
Voltage	11	kV
Auxiliary Voltage	230	V
Control Voltage	110	V DC
Maximum Output	3.5	MVAR
Frequency	50	Hz
Installation Condition	Indoor	-
Altitude (above sea level)	1 400	m
Insulation Level	28/75	kV BIL
Short Circuit Current	15	kA
Bank Configuration	Multi-Step	-

The Contractor shall design, manufacture, supply, install and commission a complete system. All cable work, electrical components, control gear and software shall form part of the contract.

4.4 SWITCHGEAR

4.4.1 FEEDERS

The PFC panels shall be supplied from the existing 11 kV switchboard. The feeder panels have the following ratings:

Table 0-5: Switchgear rating

PARAMETER	1B	2B
Voltage	11 kV	11 kV
Current	400 A	400 A
Frequency	50 Hz	50 Hz
Fault level (I_{SC} @ 3 sec)	13.1 kA	13.1 kA

The new PFC installation shall include dedicated switchgear and control gear to ease the interface between the existing and new equipment.

Switchgear shall be able to withstand inrush currents and overvoltage during capacitor switching operation. A category LSC2B shall apply to all switchgear.

The switchgear shall conform to all applicable standards.

4.4.2 EQUIPMENT CABINETS

The equipment cabinets shall meet the following requirements:

- Be of sound construction and uniform appearance;
- Cabinets and cover plates shall be rigidly supported;
- All sheet steel shall be powder coated; and
- Be protected against entry of vermin, dust and insects.

The arrangement of equipment in the cabinets shall be submitted to the Engineer for approval prior to manufacture.

Components generating heat shall be adequately spaced from other components. All components shall be adequately supported and secured.

4.4.3 PROTECTION AND CONTROL

4.4.3.1 Protection

The new PFC installation shall have the following protection as a minimum:

- Sustained and transient overcurrent;
- Sustained and transient overvoltage;
- Harmonic overloading;
- Unbalance;
- Instantaneous earth fault;
- Overload and thermal protection; and
- Loss of supply.

Electronic components shall be suitably protected against transients due to capacitor switching. Protection relays shall have N/O contacts wired to terminals for remote alarm purposes.

4.4.3.2 Control

A manual/auto selector switch shall be installed allowing for the selection of the operating mode.

Provisions shall be made for contactor and circuit breaker status signals to the PFC controller.

Provisions shall be made for the PFC control signals from the PFC controller

The switchgear panel will serve as an interface between the PFC panel and all other external equipment.

4.4.3.3 Interlocking

A complete and fully functional interlocking scheme shall be supplied to allow for safe operation and maintenance of the PFC panel. The proposed interlock system shall adhere to the standards specified in IEC EN 62271- 200.

The scheme shall be designed to prevent access to the PFC equipment if the main feeder breaker is closed, or the capacitor banks are not discharged and earthed. The following minimum requirements applies:

- The switching device must be in the open position before it can be withdrawn;
- The switching device can only be operated in the positive service or test position; and
- The switching device cannot be closed unless the auxiliary control circuits required to open the switch are connected.

4.4.3.4 Indication

The Contractor shall ensure that all isolators, earth switches and contactors have sufficient auxiliary contacts to allow for the design of a proper scheme with regard to interlocking, control and indication.

The following indications are required:

- Current indication per bank;
- Mimic diagram, indicating the status of the PFC switches;
- Earth switch position indication, and
- Alarm conditions.

4.5 CAPACITOR BANKS

4.5.1 CAPACITORS

All capacitors shall be manufactured and tested in accordance with IEC 6087-1.

Banks shall be made up of series and parallel groups to meet the ratings as specified. Bank neutrals are to be unearthed and the banks should be of double star configuration with neutral unbalance current protection.

The rated voltage of the capacitor banks shall take into account the following:

- Maximum 50 Hz system voltage;
- Voltage rise due to tuning reactors;
- Harmonic voltages added on an arithmetic basis, and
- Any additional voltage allowances required by the contractor or manufacturer for reason of tolerance variation, element failure, etc.

Series parallel sections shall be selected such that the loss of one will not result in a voltage rise of more than 10% on the remaining cans in the same section.

Capacitors shall be non-PCB fluid type.

Capacitors shall be rated to sustain 130% of rated continuous current.

The contractor shall produce a design which allows for voltage rise due to the reactor, as well as possible voltage fluctuations and harmonic absorption.

The installation shall have the following ratings:

Table 0-6: Data sheet

PARAMETER	RATING	UNIT
General Electrical		
Voltage	11	kV
Fault level (I_{SC})	15	kA
Frequency	50	Hz
Maximum Output	3.5	MVAR
Installation Conditions	Indoor	-
Altitude (above sea level)	1 400	m
Insulation Level	28/75	kV BIL
Bank Configuration	Multi-Step	-
Capacitors		
Dielectric	Polypropylene film	
Impregnant	PCB-free	
Electrode	Aluminium foil/sheet	
Bushings	Ceramic	
Discharge Resistors		
Location	Internal	
Discharge Time	≤ 10	minutes
Residual Voltage	≤ 75	V
Insulators		
Material	Porcelain	
Insulation Level	11	kV

4.5.2 ADDITIONAL COMPONENTS

4.5.2.1 Fuses

Only internally fused designs will be accepted.

Fuses shall be rated to withstand the inrush current of the capacitor banks at energisation.

Fuses shall be coordinated with the unbalance protection to ensure correct protection operation.

Internal fuses shall not be capable of releasing energy that could cause case rupturing. The unit shall be provided with suitable protective coatings.

4.5.2.2 Current Transformers

The CT's shall comply to the following specification, based on their application.

Table 0-7: CT Specifications

APPLICATION	CLASS	BURDEN
Protection	5P20	15 VA
Metering	CL 0.5	15 VA

4.5.2.3 Capacitor Discharge Resistors

Discharging resistors shall be provided. Lowering the voltage to at least 75 V after 10 minutes.

The discharge resistors shall be internally mounted.

4.5.2.4 Filters/Reactors

Reactors shall be manufactured and tested in accordance with IEC 60289.

Each capacitor bank shall be fitted with a series reactor per phase to limit the inrush current.

The reactors shall be connected to the incoming side of the capacitor banks.

The reactors shall be encapsulated in resin and have an air/iron core construction.

The windings shall be robust and able to withstand electromagnetic forces due to inrush and fault currents.

The contractor/manufacturer shall ensure proper electrical and magnetic clearances.

4.5.2.5 Surge Arrestors

Surge arresters shall comply to IEC 60099.

Duly rated surge arrestors shall be provided and applied to the line side of the reactor.

All arresters shall have composite housing to limit damage to reactors and capacitors in the event of failure.

The surge arresters shall be rated for the climatic and site conditions.

4.5.2.6 Connections

Copper bars/cable shall be used to interconnect capacitor units and sections. The copper bars/cable shall be insulated to prevent flashovers and corrosion.

4.5.2.7 Cabling

Cable entries into panels and cubicles shall be via bottom entry. Provision shall be made for spare capacity in each cable.

The panels shall be provided with a rigid gland plate for all cables. Glands shall be provided for all cables.

All cabling shall be neatly run and fitted. The contractor shall provide and install all trays, supporting brackets, clamps and other fixings necessary for the support of cables supplied under the contract.

The Contractor shall supply and install glands, grommets and connectors at all cable entries to the equipment

The Contractor shall supply, install, terminate and test all cabling necessary to interface the new equipment with the existing installations.

All cables shall be locally sourced from SABS approved manufacturers.

5 CONSTRAINTS

Power interruptions should be kept to an absolute minimum during the installation, commissioning and change-over of the system. The contractor shall provide a change-over method statement upon appointment, for approval by the Employer.

The cost of any additional equipment or special precautions required to minimise or eliminate power interruptions shall be included in the contractor's total price, either as a separate item in the list of prices or included as part of other items in the list of prices.

6 PROGRAMME REQUIREMENTS

The installation should be commissioned within 20 weeks from the date of appointment.

A programme for the entire works shall be submitted to the Employer for acceptance. If the Employer does not accept such programme, it shall be revised and amended until it is accepted by the Employer.

7 SERVICES PROVIDED BY THE EMPLOYER

The Employer shall provide basic, unclean 230 V utility power through a 16 A single phase socket outlet inside the substation building for temporary works. Should the contractor require clean power or 400 V 3-phase power, the contractor will be required to provide this power themselves.

The Employer shall not provide ablution facilities or potable water, unless agreed otherwise in writing.

The Employer shall not provide any other services not specifically listed above.

Council for Scientific and Industrial Research

Tender No. 3446/29/04/2021

Installation of new Power Factor Correction system at the CSIR main 11 kV Substation

C4: Site information

The location of the project is in the 11 kV substation at the CSIR Campus in Pretoria.

GPS coordinates: 25°44'52.6"S 28°16'57.8"E

Figure 1: Site Location

The works will be done within the existing 11 kV substation. The substation is an older building with no HVAC. All protection is done with electromechanical relays and no IEDs are currently used.

A basic layout of the substation is provided in in drawing P20018-TN-02-ELE-003 (see appendices). This drawing is only for tender purposes and proper measurements of the substation and available space is the responsibility of the contractor.

APPENDICES

CONTENTS

APPENDIX A – Drawings

The following reference drawings prepared by the Employer are applicable to the contract and are issued as part of this document.

DRAWING NUMBER	REV	DRAWING DESCRIPTION
P20018-TN-02-LOD-001	A	LIST OF DRAWINGS
P20018-TN-02-ELE-001	A	SINGLE LINE DIAGRAM: EXISTING INSTALLATION
P20018-TN-02-ELE-002	A	SINGLE LINE DIAGRAM: PROPOSED INSTALLATION
P20018-TN-02-ELE-003	A	SUBSTATION LAYOUT

APPENDIX B – Power quality measurements

FILE NAME	DESCRIPTION
CSIR_21_02_2020*	FPQ File: MEASURED DATA (Power)
CSIR_24_02_2020*	FPQ File: MEASURED DATA (Power)
CSIR_27_02_2020*	FPQ File: MEASURED DATA - PFC DISCONNECTED (Power)
CSIR_28_02_2020*	FPQ File: MEASURED DATA (Harmonics)
CSIR_02_03_2020*	FPQ File: MEASURED DATA (Power)
CSIR_05_03_2020*	FPQ File: MEASURED DATA (Harmonics)
P20018_DES_ELE_DATA	XLSX File: COMBINED MEASURED DATA
P20018_ DES_ELE_GRAPHS	PDF file: POWER QUALITY MEASUREMENTS - GRAPHS

*NOTE: The software used to view the recorded data is Power Log Classic Version 4.4

Most of the measurements reflects date with the existing PFC panels engaged. In CSIR_27_02_2020, the PFC Panels were disconnected between 18:10 and 08:05.