MU-JHU Care LTD
MU-JHU Research Collaboration
Makerere University, Kampala
Johns Hopkins University, Baltimore
P.O.Box 23491 Kampala, Uganda
Tel: (+256) 200 404 100/ (+256) 414 541 044

MU-JHU CARE LTD

P.O.BOX 23491, KAMPALA UGANDA

FACSIMILE COMMUNICATION

URGENT NORMAL ROUTINE

To:
Attention: Sales

From: Procurement Unit

Date: 11/2/2026

Re: **REQUEST FOR QUOTATION FOR PROVISION OF ELECTRICAL INSTALLATION - REMEDIAL WORKS BILLS OF QUANTITIES (PHASE 02)**

If you do not receive all pages, please contact us immediately. Thank you.

REQUEST FOR QUOTATION FOR PROVISION OF ELECTRICAL INSTALLATION - REMEDIAL WORKS FOR MU-JHU CARE LTD

Procurement Reference Number: MU-JHU -0043-2026-RFQ- PROVISION OF ELECTRICAL INSTALLATION - REMEDIAL WORKS BILLS OF QUANTITIES (PHASE 02)

1. **MU-JHU Care Ltd Invites** your quotation for the Provision of Electrical Installation - Remedial Works Bills of Quantities (Phase 02) described in Part 2: Statement of Requirements.
2. Bidding will be conducted in accordance with the **MU-JHU CARE LTD** procurement and Disposal procedures described in Part 1: Bidding Procedures.
3. Any resulting contract shall be subject to the terms and conditions detailed in Part 3: Contract.
4. The planned procurement schedule for this procurement (subject to changes) is as follows:

Activity	Date
a. Issue of Request for Quotations	*Wednesday February 11th 2026*

b. Bid closing date	Friday February 11th 2026
c. Evaluation process	February 23rd – 6th March 2026
d. Communication of best evaluated bidder notice	*March 9th ,2026*
e. Contract Signature	*March 13th ,2026*

5. Any queries should be addressed to The Procurement and Disposal Unit at the email address given below. E-Mail: procurement@mujhu.org

6. Please prepare and hand deliver your **sealed quotation** in accordance with the instruction in Part 1: Quotation Procedures or inform the undersigned if you will not be submitting a quotation.

Procurement and Disposal Unit
MU-JHU CARE Ltd, P.O.BOX 2349, Kampala Uganda, MU-JHU 1, First Floor, Procurement Office

PART 1: BIDDING PROCEDURES

Procurement Reference Number: MU-JHU -0043-2026-RFQ

Preparation of Bids: You are requested to quote for provision of electrical installation - remedial works bills of quantities (phase 02) for MU-JHU Care Ltd by completing, signing and returning:

1. the Bid Sheet in this Part;
2. Scope of work in part 2;
3. the BOQ and Compliance Sheet in Part 2;
4. the documents evidencing your eligibility, as listed below;

You are advised to carefully read the complete Request for Quotations document, including the Special Conditions of Contract in Part 3: Contract, before preparing your quotation. The standard forms in this RFQ may be retyped for completion but the Bidder is responsible for their accurate reproduction.

Where an electronic copy of the Request for Quotations document is issued, the paper or hard copy is the original version. In the event of any discrepancy between the two, the hard copy shall prevail.

Validity of Bids: The bid must remain valid for **60 days** i.e. Up to **April 20th, 2026**

Sealing and marking of Bids: Bids should be sealed in a single envelope, clearly marked with the Procurement Reference Number above, the Bidder's name and the name of the Procuring and Disposing Entity **(MU-JHU CARE Ltd)**. Envelopes should be sealed in such a manner that opening and resealing cannot be achieved undetected.

Submission of Bids: Bids should be submitted to the address below, no later than the date and time of the deadline below. Late quotations will be rejected.

Date of deadline: Friday February 20th 2026

Time of deadline: 5:30pm

Address:
Procurement and Disposal Unit
MU-JHU CARE Ltd, P.O.BOX 23491, Kampala Uganda, MU-JHU 1, First Floor, Procurement Office

Opening of Bids: **Bids will be opened internally after the closing time.**

Evaluation of Bids: The evaluation of Bids will use the Technical Compliance Selection methodology as detailed below:

1. Preliminary examination to determine eligibility (as defined below) and administrative compliance to this Request for Quotations on a pass/fail basis;
2. Detailed evaluation to determine commercial and technical responsiveness;
3. Financial comparison to determine the evaluated price of quotations and to determine the best evaluated bid.

Quotations failing any stage will be eliminated and not considered in subsequent stages.

Eligibility Criteria: You are required to meet the following criteria to be eligible to participate in public procurement:

1. have the legal capacity to enter into a contract;
2. not be insolvent, in receivership, bankrupt or being wound up or subject to legal proceedings for any of these circumstances;
3. not have had your business activities suspended;
4. have fulfilled your obligations to pay taxes and social security contributions;
5. have the nationality of an eligible country, as defined in the Special Conditions of Contract;
6. not to have a conflict of interest in relation to this procurement requirement; and
7. not to be subject to suspension by the Public Procurement and Disposal of Public Assets Authority (the Authority).

Documents Evidencing Eligibility: Bidders shall submit the following documents:

1. Certificate of Incorporation/Business Name Certificate or its equivalent
2. TAX Certificate/TAX Identification Number
3. VAT Certificate
4. Tax Compliance Certificate
5. National social security Fund (NSSF) Registration
6. Trading Certificate/License or its equivalent
7. List of all Directors with their telephone contacts and their postal address
8. Bank Accounts Information/ banking details
9. Audited Financial Statements for the last two years
10. CVs of Key Staff/Organogram
11. Company profile

Documents Evidencing of Experience and capacity in providing similar service/ works:
Bidders provide the following,

- Experience in offering the above service in Uganda, East Africa or international (List of current and previous contracts),
- Suitably qualified and experienced personnel (The lead engineer should be registered with engineers' registration board (ERB), Uganda Institute of professional Engineers (UIPE) with at least a bachelor's degree and ten years' experience in the same field, the Foreman should possess ERA wire man certificate class C
- Financial capacity to undertake the eventual contract with an average annual turnover of UGX. 1 billion
- Demonstrate experience in LV switchgear installation especially for power rooms exceeding more than UGX. 500M in the last 4 years.
- Demonstrate compliance to international and national quality assurance for works and products like ISO 9001 or equivalent
- Demonstrate certification to work on voltage levels up 415V with ERA Installations permit X
- Possession of relevant valid certification/licensing from national and international bodies
- Operational capacity to provide the scope of services and equipment
- QHSE policy, procedure and process in compliance with the Electricity, energy Standards and the international industry standards
- Provide technical data sheet for the proposed items to be used
- Manufacturer's shop drawings for the materials
- Demonstrate clear Methodology on how to deliver the work
- Demonstrate work programming.
- Any additional documents if available

Origin of Supplies: All supplies related to works shall have as their country of origin an eligible country, as defined in the Special Conditions of Contract.

Technical Criteria: The Specification and Compliance Sheet details the minimum specification of the works required. The works offered must meet this specification, but no credit will be given for exceeding the specification.

Currency: Quotations may be priced in Uganda Shillings or any other freely convertible currency. The currency of evaluation will be **Uganda Shillings**

Contract Price

a)The Lump Sum Price set forth shall be the all-inclusive payment to cover all the costs and expenses in connection with bidder's performance of the Agreement, including but not limited to labor, equipment, materials, facilities, insurance, taxes overheads, profit, transportation, and other miscellaneous expenses of whatsoever nature. No other payment shall be made by the MU-JHU CARE LTD.

b)The bidder shall not be entitled to any additional payment of any kind whatsoever whether under the Agreement or otherwise on the grounds that bidder did not or could not foresee any fact, matters, risks, circumstances, events, causes or actions which may affect or have affected the execution, cost and completion of the Work and the Agreement.

Quotations in other currencies will be converted to this currency for evaluation purposes only, using the exchange rates published by the Bank of Uganda on the date of the submission deadline.

Best Evaluated Bid: The best evaluated bid shall be the most economic advantageous tender, which is eligible and substantially responsive to the commercial and technical requirements of MU-JHU CARE Ltd and shall be recommended for award of contract.

Formation of contract: Formation of a contract shall be by signing a contract/ Local Purchase Order

Right to Reject: MU-JHU CARE Ltd reserves the right to accept or reject any quotation or to cancel the bidding process and reject all bids at any time prior to contract signing.

Bid Submission Sheet

[Complete this form with all the requested details and submit it as the first page of your quotation, with the documents requested above attached. Ensure that your quotation is authorised in the signature block below. A signature and authorisation on this form will confirm that the terms and conditions of this RFQ prevail over any attachments. If your bid is not authorised, it may be rejected.]

Bid Addressed to	**MU-JHU CARE Ltd**
Date of Bid:	
Procurement Reference Number:	**MU-JHU -0043-2024-RFQ**
Subject of Procurement:	**PROVISION OF ELECTRICAL INSTALLATION - REMEDIAL WORKS BILLS OF QUANTITIES (PHASE 02)**

We offer to provide the works listed in the attached List of works and Price Schedule and Specification and Compliance Sheet, in accordance with the terms and conditions stated in your Request for Quotations referenced above.

We confirm that we are eligible to participate in public procurement and meet the eligibility criteria specified in Part 1: Bidding Procedures.

MU-JHU Care LTD
MU-JHU Research Collaboration
Makerere University, Kampala
Johns Hopkins University, Baltimore
P.O.Box 23491 Kampala, Uganda
Tel: (+256) 200 404 100/ (+256) 414 541 044

We, including any subcontractors or providers for any part of the contract resulting from this procurement process, are eligible to participate in public procurement.

We have signed and undertake to abide by the Code of Ethical Conduct for Bidders and Providers attached during the procurement process and the execution of any resulting contract

Our bid shall be valid until and including *[insert date, month and year]* and it shall remain binding upon us and may be accepted at any time before or on that date;

We confirm that the prices quoted in the List of Supplies and Price Schedule are fixed and firm for the duration of the validity period and will not be subject to revision or variation.

The delivery period offered is: _____ days/weeks/months from date of Purchase Order.

The warranty period offered for items supplied under this tender is _____weeks/months.

The defects liability period offered is _____ weeks/months

Bid Authorised by:

Signature: _____ Name: _____

Position: _____ Date: _____
Authorised for and on behalf of: *(DD/MM/YY)*

Company: _____

Address: _____

VENDOR CONFLICT OF INTEREST DECLARATION FORM

All vendors interested in conducting business with MU-JHU Care Ltd must complete and return the Vendor Conflict of Interest Disclosure Form in order to be eligible to be awarded a contract. Please note that all vendors are subject to comply with the MU-JHU Care Ltd conflict of interest policies as stated in the certification section below.

If a vendor (official/authroized representative) has a relationship with a MU-JHU Care Ltd official or employee, an immediate family member of a MU-JHU Care Ltd official or employee, the vendor shall disclose the information required below.

1. No MU-JHU official or employee of MU-JHU employee's immediate family member has an ownership interest in the vendors company or is deriving personal financial gain from this contract.
2. No retired or separated MU-JHU official or employee who has been retired and separated from MU-JHU for less than one (1) year has an ownership interest in the vendors company
3. No MU-JHU employee is contemporaneously employed or prospectively to be employed with the vendor
4. Vendor hereby declares it has not and will not provide gifts or hospitality of any value or any gratuities to any MUJHU employee or official to obtain or maintain a contract
5. Please note the exceptions below:

Conflict of Interest Disclosure*	
Name of MU-JHU employees, officials or immediate family members with whom there may be a potential conflict of interest	☐ Relationship to employee:
	☐ Interest in vendors company
	☐ Others (please describe in the box below)

*Disclosing a potential conflict of interest does not disqualify the vendors. In the event vendors did not disclose potential conflcit of interest that are detected by MU-JHU, the vendor will be prohibited from doing business with the organization

I certify that this Conflict of Interest Disclosure has been examined by me and that its contents are true and correct to my knowledge and belief and I have the authority to so certify on behalf of the vendor by my signature below:	
Vendor Name	Vendors Authorized Representative
Date	Signature

Part 2: Statement of Requirements

PROVISION OF CONSULTANCY SERVICES FOR ASSESSING THE ELECTRICAL CONNECTIONS, DISTRIBUTION, BACK UP SYSTEMS, STABILITY AND SAFETY PRECAUTIONS TO ENTIRE MU-JHU FACILITY TECHNICAL PERFORMANCE SPECIFICATION FOR ELECTRICAL

INSTALLATION MATERIALS, EQUIPMENT AND WORKS
TABLE OF CONTENTS

GENERAL

This section specifies the requirements for plant, equipment and materials forming part of the electrical works of the Contract, and shall apply except where otherwise specified.

Where the word 'Engineer' is used in these descriptions of Materials and Workmanship, it shall in all appropriate cases be used and construed as the 'Electrical Engineer'.

The whole of the electrical work is to be executed by suitably qualified and experienced operatives, and skilled tradesmen employed by the Contractor or by Sub-Contractor and are all to be specifically approved of by the Engineer. Proof of Class X or Class C or Class B or Class A ERA Wireman's license shall be submitted by the Contractor.

All workmanship shall be of good standard and in accordance with the acceptable practices and the relevant Codes of Practice.

Regulations

The Contract works must be carried out strictly in accordance with the following documents:-

i) The current version of the seventeenth edition of the 'Regulations for Electrical Installations' published by the Institution of Electrical Engineers, London (with local amendments, where applicable).

ii) Local Uganda laws and by-laws and Supply and Local Authority requirements.

iii) Relevant British Standard Specifications and Codes of Practice, published by the British Standards Institution (hereafter referred to as B.S. and C.P. respectively) as implemented in Uganda.

iv) The Specification.

v) Any working drawings produced by the Contractor and approved by the Engineer.

vi) The Engineer's instructions, drawings and details.

The Contractor shall undertake all modifications demanded by the authorities in order to comply with the regulations, and produce all certificates, if any, from the authorities without extra charge.

Quality of materials and manufacturing standards

Notwithstanding that suppliers may have been named or approved by the Engineer; it shall be the Contractor's responsibility to ensure that all materials and components are up to Specification in respect of manufacture, finish and performance.

Named manufacturers are those on which the design has been based and whose standards of products are approved and intended only as a guide to the contractor.

All materials shall be suitable for their intended use and shall comply with relevant Standards and be installed in accordance with Codes of Practice, manufacturer's recommendations and the Specification.

Materials and/or apparatus supplied by others for installation and/or connection by the Contractor shall be carefully examined on receipt. Should any defects be noted, the Contractor shall notify the Engineer immediately.

Unless otherwise specified, all materials including equipment, fittings, cables etc., shall be in new condition. Defective equipment or that damaged in course of installation or test shall be replaced or repaired to the approval of the Engineer. Should any replacement, be necessary, the Contractor shall bear the cost of substitution and of all associated builder's work and making good finishes.

All materials to be used shall be fixed or applied in accordance with the manufacturer's instructions.

Installation Requirements

It is necessary that all the Contractor's proposals and working drawings for and in connection with the electrical works shall be submitted early in the Contract period to facilitate co-ordination with others.

The Engineer reserves the right to call for samples of some or all materials and products to be used.

The contractor shall obtain such samples as required and submit them within 14 days and any costs incurred will be presumed to have been allowed for in the tender.

The Contract works shall be of construction, manufacture and finish as to render them suitable for operating throughout their expected life and maintain design conditions. The Contractor shall be deemed to guarantee satisfactory performance of all quoted for items and fixing and operational accessories.

Standards

The Works shall be constructed and tested in conformity with the standards indicated in these specifications. Wherever reference is made in the contract to specific standards and codes to be met by the materials, plant, and other supplies to be furnished, and work performed or tested, the provisions of the latest current edition or revision of the relevant standards and codes in effect shall apply, unless otherwise expressly stated in the contract. Where such standards are national or relate to a particular country or region, other authoritative standards which ensure a substantially equal or higher performance than the standards and codes specified shall be accepted subject to the Engineer's prior review and written approval. The alternative standards and codes proposed shall be translated by the Contractor into the English language prior to submission for approval. Differences between the standards specified and the proposed alternative standards must be fully described in writing by the Contractor and submitted to the Engineer at least 15 days prior to the date when the Contractor desires the Engineer's approval. In the event the Engineer determines that such proposed deviations do not ensure substantially equal performance, the Contractor shall comply with the standards specified in the document.

For convenience and for reference purposes, certain equipment, articles, materials, or processes are designated in the specifications by brand name, trade name or catalogue name and number. Such designation shall be deemed, to be followed by the words "or approved alternative" whether such words are shown or not. The Contractor may offer other equipment, articles, materials, or processes which have similar characteristics and which provide performance at substantially equivalent or better than those specified, which will be accepted, subject to the Engineer's prior review and written approval. The burden of providing evidence as to comparative quality and suitability of alternatives

shall be upon the Contractor and such evidence must be submitted to the Engineer at least 15 days prior to the date when the Contractor desires approval. No such alternative shall be used without prior written approval by the Engineer."

Record Drawings

The Contractor shall mark accurately on one set of drawings the conduit or trunking laid during the progress of the work. This information must be made available on site for inspection by the Engineer whenever the Engineer asks for it.

At the completion of the contract, the contractor shall supply the Engineer with two soft copies, one set of transparent originals and two complete sets of prints showing the complete installation. The drawings shall include the location of all apparatus, conduit and cable routes and a schematic of mains distribution.

Where portions of the Works are to be concealed, draft copies of "As Installed" drawings shall be supplied to the Engineer before the work is concealed in order to facilitate checking and approval.

The Contractor shall maintain on site a set of drawings for the purposes of progressive marking up of alterations and variations. These drawings which shall form the basis for the Record drawings shall be available for inspection by the Engineer from time to time.

A Certificate of Practical Completion will not be issued by the Engineer if the Contractor fails to undertake the above procedure for the preparation of the Record drawings.
Issue of the Certificate of Completion or Making Good of Defects, the Contractor shall issue a final set of Record drawings taking into account any changes which occurred in the Defects Liability Period.

Contract Drawings

The drawings forming part of this specification are to be read in conjunction with this Specification to enable the Contractor to prepare a tender.

These drawings are not intended to be used as working drawings unless they are released for that purpose.

Working Drawings

The Contractor shall prepare working drawings as may be necessary. They shall be submitted to the Engineer for approval before the execution of the works.

Working drawings to be prepared by the Contractor shall be detailed as below but not restricted only to these:-

a) General arrangement drawings showing plant, HV and MV switchboards, distribution boards, consumer units, fittings, switches, switch sockets, etc.

b) Layout drawings of concealed and surface conduit, ducts, trunking, etc.

c) Any other drawings that are not called for in the Specification.

Two copies of all working drawings shall be submitted to the Engineer for approval. Thereafter, the Contractor shall submit copies of approved working drawings for distribution to all parties concerned.

The Contractor shall not be relieved of any of his obligations under the Contract from correcting any errors on site or elsewhere subsequently found in the approved working drawings and no extra financial claims shall be entertained.

Co-ordination of Engineering Services

All aspects of the Engineering Services installation require detailed coordination to avoid any possible clash or conflict with other trades and disciplines.

The Contractor shall undertake such co-ordination in relation to his Co-ordination and Installation drawings and builder's work information and no extra claim will be allowed due to conflict of works or installations.

The Contractor shall initiate all co-ordination meetings that are necessary and all surveys that are necessary.

Labels

All switchgear, switch fuses, distribution boards, etc., shall be clearly labelled with Black and White background engraved labels to indicate the name, purpose and position of the gear. All circuits in distribution boards shall be clearly identified in respect of the number and location of the miniature circuit breakers. The chart shall be securely fixed inside the cover of the distribution boards.

Instruction of Employer's Staff

The Contractor shall be responsible for arranging a Scheme for Instruction and Training of the Employer's Personnel in relation to the Engineering Services.

Draft proposals of the Scheme content shall be submitted to the Engineer for his approval in writing not less than six months before the anticipated date of Practical Completion. Thereafter the proposals will be finalized and a time table shall be provided for the Scheme.

The Contractor is to include for the provision of attendance by himself and by specialist personnel to assist in the training to suit the requirement of the Engineer.

Operating and Maintenance Instruction Manuals

Operating and maintenance manuals shall be provided by the Contractor as detailed in the Specification and Bills of Quantities and as stated below.
A draft copy of the operating and maintenance instruction manuals contained in a temporary loose leaf binder shall be issued prior to the testing and commissioning period for approval of content, layout and form. Once so approved, a draft copy shall be handed over prior to the issue of the Certificate of Practical Completion. This copy shall contain all testing and commissioning data results, actual control setting points and the like in draft form.

Within 28 days of the date of Practical Completion, 2 copies of the final document shall be handed over which shall include all testing and commissioning results and final plant

duties and control settings, etc. in an approved form.

Approval/Checking Procedures

All Contractors' Drawings and manufacturer's details shall be approved by the Engineer prior to any orders being placed by the Contractor. The final details including all technical aspects and calculations where applicable shall be submitted in a clear, definable and easily read format with the specified technical details, notes and performance data clearly shown in English language.

All correspondence related to the approvals procedure shall be directed to the Engineer through the office of the Architect.

Unless stated otherwise elsewhere the Contractor shall allow 28 working days from the date of receipt by the Architect of the request for Approval of all data and manufacturers details submitted.

Equipment Guarantees

Plant and equipment guarantees shall commence at the date of Practical Completion and run for a minimum of 12 months after this date. Any costs associated with this requirement shall be met by the Contractor.

Plant and Equipment Performance Testing

Major plant and equipment shall be tested at the manufacturer's works or in a recognized and approved testing facility to demonstrate performance compliance with the stated and specified duties. Performance testing shall demonstrate but not limited to the following:-

* Full, Partial and Minimum load
* Response to load change
* Efficiency
* Noise levels

The tests shall be conducted to simulate design conditions and all ancillary plant and equipment needed to support the tests together with all instrumentation shall be provided by the Contractor and included in the tender.

Upon successful completion of the performance tests the plant and equipment shall be thoroughly cleaned and returned to its as new condition and correctly packaged for delivery to site.

Full test certificate records of the tests shall be issued in duplicate to the Engineer. These tests are in addition to works tests stated elsewhere in the Specification.

Full test certificate records of the tests shall be issued in duplicate to the Engineer. These tests are in addition to works tests stated elsewhere in the Specification.

The Employer authorized representative and the supervising Consultant shall witness all factory tests included in this contract in addition to the routine factory tests on the equipment. The Contractor is to include all costs for the Engineers and Employer's representative to witness the tests where applicable.

The Contractor shall notify the Engineer four weeks in advance of such tests so that arrangements can be made to have the tests witnessed. The activities to be completed at the visit shall be programmed for approval.

A signed works test document will be submitted to the Engineer on completion of tests before delivery of equipment to site.

SCOPE OF WORK

The works to be executed under Electrical Installation include the supply on site, storage, installation, keeping clean, protecting, connection, testing and making improvements where necessary, energizing, commissioning to the satisfaction of the Engineer and handing over to the Client in serviceable condition the complete installation as herein specified and measured in the Contract Bills of Quantities or as may be directed by the Engineer during the course of the works, and shall include all the necessary materials and equipment which although not expressly specified, are necessary for completing the installation. The rates given in the Bills of Quantities for the Electrical Installation shall include all related Builders' works and materials that are necessary to complete the electrical installation.

The Electrical Installation comprises the following:-

a) Decommissioning works for the existing power supply equipment in the power room

b) Modification civil works to the power room in preparation for the new switchgear

c) Distribution Boards complete Instrumentation and accessories.

d) All main and sub-main distribution cables.

e) Earthing.

POWER SUPPLY

Mains Distribution

From the Main Low Voltage Distribution Panels, all power distribution shall be by armored cables laid in uPVC ducts installed underground and through electrical ducts to the sub-main distribution boards on each floor or cable trays.

Liaison with UMEME Ltd

There is an existing source of Medium Voltage (11kV) supply connection near the site, the property of UMEME Ltd.

The Contractor shall be responsible for making a formal application to UMEME Ltd for supply of power to the project site and all necessary liaisons with UMEME Ltd to obtain necessary approval. The Contractor shall make payment of any contribution that may be required by UMEME Ltd for obtaining MV power supply to the project complex.

Fault Levels

The following prospective symmetrical fault levels are to be assumed for initial design considerations;

33 kV UMEME overhead and/or underground Supply line 1000 MVA rms

11 kV UMEME overhead and/or underground Supply line 200 MVA rms

415 Volt bus-bars (secondary terminals of LV supply transformers) 30MVA rms

It shall be the responsibility of the Contractor to ascertain the true fault levels and obtain necessary approval from UMEME Ltd.

Over current and Earth Protection

The over current and earth fault protection shall comprise an integral system. The characteristics of the relays and other protection devices shall be selected so that acceptable discrimination is obtainable from the source (UMEME high voltage supply) to the various switch boards.
The Contractor shall show to the satisfaction of the Engineer that the system proposed shall provide an entirely satisfactory installation for the operation of the installation and the safety of the personnel working there.

The Engineer shall approve the proposal upon submission by the Contractor of curves illustrating the time/current characteristics and discrimination of all protective elements.

Relays shall be suitable for use with current transformers having a 1A secondary output. They shall be of the electromagnetic type and shall be contained in dust protected cases to IP 50 and fully tropicalized.

Transformers (where applicable)

Control Transformers

Control transformers shall be liberally rated and conform to BS 3535. The windings shall be fully tropicalized and one pole of the secondary winding shall be connected to earth via a test link.

Current Transformers

Current transformers when used for operation of meters, relays or instruments shall comply with BS 3938. They shall be rated for 1A output and shall comply with UMEME Ltd

specification for metering current transformers.

Polarity of primary and secondary windings shall be clearly indicated in accordance with BS 158. One pole of the secondary windings shall be connected to earth via a test link. Separate current transformers shall be used for metering and for protection purposes.

Voltage Transformers

Voltage transformers shall comply with BS 3941 Class 1 and be either mineral oil filled or encapsulated and shall be complete with HRC fuses on both the primary and secondary side. They shall comply with UMEME Ltd Specification for metering voltage transformers.

Power Transformers

Power transformers shall comply with BS 171 and shall be connected delta/star in accordance with vector group Dyn 11. They shall be double wound on a core of cold rolled, grain oriented sheet steel.

They shall be ground mounted pattern, suitable for indoor use, cast resign dry type transformer, natural air cooled. The power transformers shall be suitable for use in the tropical climatic conditions.

The following fittings are required for all transformers:-

Diagram and rating plate
Lifting lugs
Earth terminal
Temperature indicator with alarm and trip
Contacts and maximum pointer
Skid type under base

Jacking lugs

The following fittings are required for 33kV/415V transformer:-

Winding temperature indicator with alarm and trip contacts and maximum pointer.

Double float Buchholz relay.

Heat dissipation shall be by radiators designed to keep the temperature rise within limits as specified below.

To give maximum protection, rust inhibiting, heat resistant paint shall be used on steel surfaces comprising primer, 2 coats of good quality undercoat and 2 coats of bright aluminium. Bright aluminium is the standard paint finish according to the Uganda Electricity Board standards.

The HV and LV windings shall be arranged concentrically on the core and shall be manufactured from high conductivity copper. Insulation materials will be to Class A of BS 2757 and designed to withstand impulse voltage specified in BS 171.

The star point (neutral) of the secondary winding shall be earthed at the transformer
Other details:-

Tappings: Off circuit range +5% to -5% in steps of 2.5 %.

HV termination. Cable box for reception of PVC or XLPE, 4-core cable or single-core cables.

The necessary precautions shall be taken to avoid eddy currents circulating in the sheaths of the L.V. cables. All equipment shall be fully tropicalized and termite proof

Transformer Protection

A double-float Buchholz relay and a winding temperature indicator with alarm and trip settings shall be included with the transformer fittings. Indication of both alarm and trip shall be given by a four-element plug relay which shall be mounted on the same panel as the over current and earth fault relay.

Servicing of Switchgear and Transformers

The servicing of all high and low voltage Switchgear and Transformers must conform to the relevant Specification and the Code of Practice of the UMEME Ltd.

High Voltage Cables and Termination

The HV connection from the UMEME ring main unit or overhead line shall be by a HV cable laid in the ground and ducts and terminated onto transformer terminals using heat shrink glands earthed on both sides as per standard code of practice. This will be added to the General Specifications.

LOW VOLTAGE SWITCHBOARDS, DISTRIBUTION BOARDS AND CONSUMER UNITS

Low Voltage Switchgear Standards

All switchboards shall have a minimum fault capacity of 25kA for one second.

The switchboards for the control of equipment rated 415 Volts shall comply in all respects with BS 5486 (IEC 439), BS 5227, BS 7354, BS 88, BS 5424, BS 7340.

All MCCBs and MCBs shall be Type C, and comply with to BS EN 60898.

General requirements for Switchboards

The main low voltage switchboards shall be of modular cubicle pattern, extendable from both ends, of folded sheet steel construction, and floor standing with operation and switch access from the front and cabling access from the rear. The switchboards shall have fully compartmentalized interior sections with withdraw able switchgear and control gear assemblies, with the design based on IEC 439-1 and related international standards. The Main Switch Boards shall be designed for conductor entry from bottom, unless otherwise required.

All switchgear, distribution boards, motor control centres, and other panels shall comprise

factory built assemblies of the multi-cubicle type. Each air circuit breaker, fuse switch, busbar, instrumentation and protective relaying section indicated on the drawing shall be housed in a separate compartment with an individual cover, fully divided from adjacent compartments by the sheet metal housing; circuit interconnection, etc., penetrations shall be contained within ducting or shrouded around. The entire switchboard shall be of fully shrouded type. The busbars shall be coloured according to phase. All equipment shall have fully shrouded fixed contacts and connection terminals, such that contact with adjacent live metal is impossible when working on individual units. All sections of the board shall be suitable for safe, effective working, for maintenance, cable removal and installation, etc., with the switchboard live and without shutting down adjacent sections.

Panels shall be free standing, of uniform height, flush mounted and totally enclosed to not less than IP 31. When size of starters and other components does not justify this type of construction, wall mounted patterns may be used.

The base of the panel shall be effectively sealed against the ingress of vermin and termites, and all equipment shall be rated for continuous operation in a tropical climate.

Any ventilation louvers shall be backed by brass fine mesh gauze to exclude termites.

Framework for the panels shall be of welded construction, and panels shall be fabricated from mild steel sheet of 2mm minimum thickness, folded and braced where necessary to provide a rigid structure.

All bolts, nuts, screws, hinges, handles, etc, shall be corrosion resistant.

Interiors shall be finished white, and the exterior shall be finished to a light grey shade except the plinth which shall be black.

Cabling access shall be from the rear by means of gasketed bolt-on plates, which shall be fitted with handles to facilitate removal/replacement.

Access to the cubicles or cubicle compartments for all normal routine maintenance shall be from front with hinged and lockable doors fitted with neoprene gaskets (all gaskets shall be termite resistant) and chromium plated lockable tee type handles. All doors shall

be electrically bonded to the main frame, using adequate flexible conductors, protected against mechanical damage. All locks on a given panel unit shall be operated by the same key.

Each multi-compartment control panel shall comprise an assembly of individually constructed cubicles. These shall be assembled to include a metallic sheet between adjacent cubicles.

In each multi-compartment panel at least one empty compartment shall be provided for future use. In single unit panels, enough space shall be available for the addition of at least 10% more components for future use.

Panels shall be readily capable of extension at either end, within the bus-bar rating.

Where panel size is excessive, easily handled sections shall be supplied for site assembly. Sections shall be fitted with eyebolts, which after positioning of the panel, shall be removed and replaced with plated bolts and washers.

Bases shall be of rigid construction capable of withstanding stresses during replacement, such as those imposed by moving the sections on rollers.

Bus-bars

All bus-bars shall be of electro tinned HDHC copper, and shall be of uniform section throughout the length of the panel.

They shall be run in a separate screened compartment, divided with barriers into as many compartments as there are cubicles in the panel. Access to individual compartments shall be via bolt-on cover plates, each bearing the legend in white on a red background:-

"DANGER - LIVE BUS-BARS", also the Red Arrow symbol denoting danger from electric shock.
The neutral bus-bar shall be equal to the cross-sectional area of the phase bars. Phase bars shall be colour coded Red, Yellow and Blue: the neutral shall be black.

Over and under-voltage, phase failure and phase sequence protection

The main incoming 415 volt switchboards and control panels shall be equipped with a relay which detects un-acceptably high or low voltage.

It will monitor all phases and will cause all incoming circuit breaker(s) to trip when the voltage exceeds a maximum or minimum (which shall be selected from a range of settings). Visual indication shall be given of the cause of tripping and an electrical hour's counter will record the time during which the supply exceeds the set limits.

Resetting of the relay shall be automatic but re-closure of the tripped circuit breaker shall be manual.

It shall be possible to delay the operation of the relay in order to ride through transient voltage variations.

Phase failure shall cause the circuit breaker to trip immediately and incorrect phase sequence will prevent the circuit breaker from being closed.

Surge Voltage Protection

In order to give protection against transient over-voltages or voltage surges such as result from lightning strike, surge arresters shall be installed on the bus-bar of the main LV panel.

They shall be connected permanently between each phase and earth and shall be as near as possible to the incoming circuit breakers.

Each unit shall be sealed and encapsulated with connecting tails and be suitable for continuous operation at 415 volts. It shall also comply with the class 2.5kA requirements according to IEC 99.

All solid state control or electronic devices which may be located within the panel shall be individually protected by surge arresters.

Terminals

Terminal board insulation shall be polyamide or equivalent. Melamine types are not acceptable.

All connectors shall be of brass or bronze, with screw of similar material. Contact between dissimilar metals is not acceptable. No steel screws plated or otherwise shall be used. Insulating barriers shall be fitted between supplies at different voltages.

All terminal screws shall be captive.

Terminals shall be mounted at least 250mm above their associated gland plates.

Only one conductor shall be connected to each terminal. Multiple connections shall be effected using links.

Main power terminals shall be stud and nut types, with plain and locking washers. Conductors terminating on these shall be fitted with insulated crimped lugs. Rail mounted terminals for cables in excess of 32mm sq. cross-sectional areas are not acceptable.

Gland Plates

Adequately sized blank gland plates shall be provided below each outgoing terminal section to accommodate the requisite glands.

Gland plates shall be positioned 200mm minimum above the base of the cubicle, and shall be solidly bonded to earth.

Suitably sized compression type cable glands shall be provided for all cables. Glands used for armoured cables shall include provision for sealing the armour wires to protect them from corrosion and to prevent ingress of moisture into the cable.

Brass lugs shall be provided for connection of the cable armouring to earth.

Door and Desk mounted Components

All indicating instruments shall be moving iron type with quadrant scale of minimum length 75mm and conform to IEC 51. Their accuracy shall be to Class 2.5 or better.

Main switchboards and control panels shall be equipped with voltmeter and ammeter selection switches.

All instruments and protective relays shall be flush mounted and effectively sealed against ingress of moisture, dust and insects.
Where connected in motor circuits, ammeters shall have 'overload' scales capable of withstanding starting inrush current. Hours run counters shall be flush mounted cyclometers type, scale 99,999.9 hours.

Control and selector switches shall have their positions clearly labeled, and additionally shall each have a separate label to indicate the switch function. Labels shall correspond with the associated schematic diagrams.

Interlocks of a substantial mechanical type shall be provided on each cubicle between door and the circuit breaker or fuse switch such that the door cannot be opened unless the circuit breaker or fuse switch is in the OFF position. On/Off switches and circuit breakers shall be padlock-able in the "OFF" position.

Push buttons and indication lamps shall be selected from a matching range and they shall be colour coded in compliance with IEC 73 as follows:-

Indicating LampsColour

On GREEN
OffAMBER
FaultRED
AlarmsYellow
HeatersBlue

Push ButtonsColour

Start Green
StopRed

Alarm acceptBlack
Emergency stopRed

Each indicating lamp shall incorporate a push-test feature. Alternatively a test push button shall be provided which activates all lamps simultaneously via a contactor. Lamp fittings shall be capable of re-lamping from the front of the panel, and shall be positively locked against rotation.

Fault indicating lamps shall remain on until the associated trip relay is reset or the fault is corrected. Should there be an interruption to the electricity supply, all fault indicating lamps will again be illuminated on reconnection of the supply, until the fault is cleared or the trip relay is reset.
All exposed terminals on the rear of door mounted components shall be shrouded to prevent accidental contact when the panel doors are open.

Access in service

The Switchboards shall have access for inspection, maintenance, and similar operations, with the following being performed when the assembly is in service:-

a. Visual inspection (all parts)
b. Adjusting relays etc
c. Replacing fuse links
d. Replacing indicator lamps
e. Fault location
f. Testing

Particular Requirements for switchboards

The switchgear, control equipment and all other relevant electrical circuits shall be contained in single, multi section, floor mounted panels. They shall comply with the General Requirements for switch boards, as per the General Specifications. This section should be read in conjunction with the drawings.

Main Low Voltage Distribution Boards

This panel shall be supplied at 415Volts, 3-phase from the Utility Umeme Feeder Pillar

near the Project Site. A Main Distribution Board for the Entire Project Complex shall be supplied at 415V from the Low Voltage side of the transformer using underground armoured copper cables laid in a cable trench or sleeves and the selected 500kVA, 415 volt standby generator, via incoming circuit breakers. It shall perform the following functions:

a. Serve as distribution centre for feeders to the Low Voltage Consumer Units in the various floors of the project complex.

b. House the metering units for each section of the project complex.

In addition to whatever chambers are incorporated for cable termination or cable marshalling, the Panel shall house all the MCCB/MCBs, Instrumentation and all controls and accessories to form a complete system.

Distribution Boards

General lighting and power distribution boards shall comply with BS 3817, BS 5861 and BS 5486 and shall be of the metal clad pattern, mounted in weatherproof self-standing cabinets, except where otherwise specified on the drawings or Bills of Quantities.

a) Construction

Enclosures shall be substantially constructed from 16SWG minimum thickness sheet steel having hinged front cover and shall be vermin and insect proof. Each unit shall house MCBs and shall be supplied complete with bus-bars, earthing terminal, neutral bar, circuit chart and any blanking plate for any spare ways. The incoming isolator switch shall be integral with the distribution board in consumer's units only, or as may specifically be requested for. The distribution boards shall be lockable by key.

b) Mounting

All distribution boards and consumer units shall, unless detailed to the contrary, be mounted within the lockable cubicles.

Notwithstanding the above, generally, switchboards and distribution boards shall be in-

stalled so that any item to which easy access is required such as fuse, circuit breaker, instrument, etc. is not more than 2150 mm above finish floor level.

Isolators, switch fuses (other than those mounted on bus-bar chambers or providing local control), cooker control units, water heater controls, etc., shall on the other hand, unless otherwise stated on the drawings, be mounted at 1350mm from the finished floor level to the underside of the fittings.

c) Miniature Circuit Breakers

All distribution boards shall be supplied with MCBs manufactured to BS 3871 and of a rating as specified on the drawings. The circuit breakers shall incorporate both terminal overload and magnetic short circuit tripping, with a trip-free mechanism.

Three phase circuits shall be controlled by integrally manufactured three pole breakers, with one common operating lever. An inter-tripping mechanism shall ensure isolation of all three poles in the event of an overload or short circuit on any one phase.

CABLES

All Medium Voltage cables shall be BASEC approved. P.V.C. insulated cables shall be 33kV grade to B.S. 6622.

All Low Voltage cables shall be BASEC approved. P.V.C. insulated cables shall be 600V/1000V grade to B.S. 6004. Flexible cables shall be 300V/500V grade to B.S. 6500.

No cables forming sub-circuits connected to different sub-distribution boards are to be drawn into the same conduit or draw-in box.

No reduction of the strands forming the conductors will be allowed at switch or other terminals, but all strands shall be efficiently secured by screws, nuts and washers or other approved means.

Cables may be jointed together at the terminals of ceiling roses and other accessories. Under no circumstances will joints be permitted in the run of the cable.

All cables shall be of stranded copper conductors.

The minimum size of cables on lighting and power final sub-circuits shall be 1.5mm sq. for lighting and 2.5mm sq. for power.

PVC Insulated Armoured Cables

These shall be 600/1000V grade to BS 6346 and BS 6004 having stranded copper conductors, armoured and PVC sheathed overall. The cores of four core cables shall be distinctively coloured red, yellow, blue and black.

XLPE Insulated P.V.C. Sheathed Armoured Cables

XLPE insulated P.V.C. bedded galvanized steel wire armoured and P.V.C. overall sheathed twin and multicore cables shall have stranded copper conductors, and shall be 600/1000V grade manufactured in accordance with B.S. 5467. This type of case shall generally be treated in a manner similar to that for P.V.C. insulated and sheathed cables.

The Contractor shall provide suitable glands and accessories for all armoured cable terminations and the cost of these items shall be included within the rates inserted in the Bills of Quantities.

Installation

a) Laying of Cables

The work of excavating and back-filling of all trenches for cables is included in this contract and the responsibility for positioning, width and depth of trenches, laying and bedding of all cables and protective covers is included with the Electrical Works covered by this Specification. Unless otherwise stated, all underground cables shall be laid in uPVC conduits with draw pits as shall be indicated on the drawings or as may be required by the site conditions. The uPVC pipes shall be laid to a minimum depth of 500mm below ground. The rates inserted for uPVC pipes shall include the costs of builders' works.

In case it is required to lay cables direct in ground, the following shall apply:-

Where more than one cable is laid in a trench, cables shall be spaced as follows: -

Between MV cables	100mm
Between MV and telephone cables	400mm
Between MV and LV cables	400mm
Between LV and telephone cables	400mm
Between LV cables	100mm

In straight run trenches, cable crossings shall not be permitted except where a cable branches from the main run.

At every draw-in point, joint or junction box, the cable should be snaked.

Before cables are laid, the bottom of the trench shall be evenly graded and cleared of all loose stones and shall then be covered with an 80mm layer of sand or sifted soil and lightly compacted. A further 80mm layer shall be placed on top of the cables.

The approved cable protection shall then be laid and the trench refilled with excavated materials in 200mm layers, each layer being well compacted by hand or mechanical punners before the next layer is filled.

The width of the trench shall be such that a clearance of 80mm shall be provided between the outermost cable and the side of the trench.

Where cables are disposed in more than one layer, the vertical spacing shall be 400mm between centres of cables or cable groups the depth of the trench being made suitable accordingly. Stones or other hard objects shall not be included in any of the backfilling materials.

In the laying of cables in the uPVC ducts, the internal radius of bends shall be six times the overall cable diameter.

The rates inserted for cables shall be deemed to include for the above requirements.

b) Protective Covers

The protective covers, manufactured in accordance with BS 2484 shall be provided over cables laid in the ground, each complete with an interlocking device to prevent lateral displacement. The rates inserted for cables shall be deemed to include for the protective covers.

c) Cable Position Markers

These should be placed adjacent to all points where cables change direction and all intervals of not more than 30 meters and at other positions designated by the Engineer.

d) Sealing of Cable Entries

Where cables enter buildings, pipes, or ducts, the mouths of the pipes or ducts shall be effectively sealed by means of close fitting solignum impregnated wooden plugs and a mixture of compound and transformer oil, or other approved manner.

e) Protection against Mechanical Damages

All cables located in such positions where they are vulnerable to damage by mechanical or other means shall be protected by suitable lengths of steel pipe bushed to prevent damage to the cable.

f) Rating Plates

Each cable when completely erected shall have permanently attached to it at each end in such intermediate positions as may be considered necessary by the Engineer, metal plates upon which is engraved, or stamped, the identification number of cable together with the voltage, size and make-up, and the service which it

supplies.

This information shall be recorded by the contractor so that it may appear on drawings of the completed installation.

g) Cable Sealing and Termination

The contractor shall be wholly responsible for the sealing and jointing of all cables supplied and erected under the contract.

The cable boxes, looping-boxes and glands for LV cables on all items of equipment shall be provided under the contract.

Sealing and jointing shall be in accordance with the best current practice and of first class workmanship. Where cable armouring is used as earth continuity conductor, the glands shall have the necessary contact surface or provide a low resistance path under fault conditions.

The tender shall include for all cable jointing where appropriate and all labour, joining material and compound, together with the use of all jointers' tools and making off the cable tails to the apparatus terminals.

WIRING ACCESSORIES

Non-metallic conduit (Conduits for Electrical Installations)

All non-metallic conduit shall be class "A" heavy gauge, high impact uPVC complying with British Standard BS 6099 Part 1: 1981, IEC 614-1 : 1978 or the latest Edition there-of.

The minimum size to be used on the contract is 20mm external diameter. All conduit installations shall be concealed in the walls and floors or in structural slabs.

Conduits shall be kept at least 150 mm clear of gas piping and colour coded orange when required. Conduits shall be kept at least 150 mm clear of steam and hot water systems and preferably beneath the aforementioned services.

Conduit runs shall be complete before wiring is begun and shall not be dismantled for wiring operations.

Conduit used in flameproof installations shall be of the solid drawn type.

Permissible sizes of uPVC Conduits

Dimensions in mm

Nominal size	Inside Dia.min.	Inside Dia.max	Wall thickness min	Wall thickness Max
16	15.5	16.0	2.1	2.7
20	19.5	20.0	2.7	3.3
25	24.0	25.0	3.7	4.3
32	31.1	32.0	4.4	5.0
38	36.5	38.0	4.8	5.5
40	38.5	40.0	5.0	5.7
50	48.0	50.0	6.4	7.2

Bends

Bends and sets in the conduit will be made in accordance with the manufacturer's instructions. The radius of the bend shall not be less 2.5 times the outside diameter of the conduit, or such greater radius which will facilitate easy drawing in of cables.

All conduit bends are to be made on site and not more than two right angle bends will be permitted without the interposition of a draw box.

Expansion

Adequate allowance shall be made for longitudinal expansion and contraction of the conduit under normal working temperature variations as follows:-

a) Expansion couplers should be used in straight runs exceeding 6 meters with a loose or flexible type joint at the long spout end of the coupler.

b) Saddles as supplied by the manufacturers shall include a sliding support tolerance for longitudinal expansion.

c) Saddles shall be installed within 300mm either side of conduit boxes where the free length of conduit exceeds this distance.

d) Multiple saddles shall be used where two or more surface conduits run parallel and adjacent to each other.

e) Special consideration may need to be given to the fixing of accessories where this may prevent natural conduit movements. Oversize or slotted fixing holes may be necessary or introduction of expansion couplers.

Conduit Boxes and Fittings

a) All conduit boxes shall be circular or square pattern of rigid uPVC suitable for plan connections conforming to sheet 62 BS 4606, Part 2. Boxes supporting a fitting or accessory shall be fitted with a uPVC lid held in position by means of two 2BA round headed screws. Boxes shall have metallic screwed inserts.

b) Circular or square boxes shall be provided at all outlet points, unless otherwise specified; lighting fittings, ceiling fittings, ceiling switches and other accessories will be screwed to the internal lugs of the boxes.

Care must always be taken when considering the use of totally enclosed fittings with uPVC circular boxes where the temperature within the box is likely to rise above 60 deg. C (140 deg. F). In this case, special steel insert clips should be used in conjunction with circular boxes where this problem can arise and also in situations where heavy pendants are used.

c) Looping in boxes of circular uPVC pattern to sheet 63 BS 4607 Part 2 may be used in such work as dictated by the structure of the buildings. Conduit entry shall be made by means of uPVC bushes.

d) Adaptable boxes shall be of moulded or fabricated uPVC of square or oblong shape

complete with uPVC lids secured by 2BA brass or steel plated round-headed screws. All adaptable boxes and lids of the same size shall be interchangeable. No adaptable box smaller than 75mmx50mm or larger than 300mmx300mm shall be employed. Boxes shall be of adequate depth in relation to the size of conduit entering them.

e) Conduits shall be terminated at adaptable boxes; fuse boards, switches, sockets or other equipment possessing push-in or threaded spouts, by means of appropriate size female adaptor and uPVC hexagonal headed male bush. All cemented joints to be made to a depth of not less than the diameter of the conduit being used.

Earth Continuity

Earth continuity shall be provided by a separate insulated conductor drawn into the plastic conduit and rated in accordance with circuit loadings and appropriate Regulations or as mentioned on the drawings.

Where required under the regulations and earth continuity conductor shall be provided for lighting fittings in which case the control switches shall be equipped with an appropriate earth terminal.

Arrangement of Conduit Layout

The conduit system shall be carefully planned and erected to avoid all unnecessary bends or changes in direction. Conduits shall be laid in straight horizontal or vertical lines with easy sets. Where several conduits follow similar routes, they shall be neatly grouped in multiple runs. Where multiple runs change directions, the radii of the sets shall be laid out from a common centre. Where draw-in boxes for right angled change of direction are required in multiple runs, adaptable boxes shall be used for such sizes as to allow all conduits to enter the box with sets.

Where conduits are concealed or laid on structural floors, they shall be secured by a fixed method to be approved by the Engineer. Where it is essential that conduits cross one another in floors, the chases shall be deepened and the conduits set to create the minimum desirable diversion.

Care shall be taken to ensure that there is no obstruction to cables within the conduits

caused by the ingress of plaster, concrete or other matter. Conduit ends must be cut square and cleaned of burrs.

EARTHING

General Installation Earthing

a) Earth electrodes shall be minimum 1200mm long by 15mm diameter hard drawn copper rod, and shall be located at a convenient position as close as possible to the building. The terminal head of each electrode shall be in a concrete inspection pit, with cover. If the resistance to earth is not satisfactory with one electrode, then additional electrodes or an earth mat shall be provided as directed by the Engineer.

b) Particular attention should be given to conduit and trunking installations to ensure that the earth continuity is reliable and permanent.

c) All apparatus or parts thereof not solidly connected to the earthing system shall be connected thereto in an approved manner by solid copper conductors secured by means of substantial bonding clamps.

d) All services entering the installation at earth potential shall be efficiently bonded to the main earth point.

e) All joints in the earth system shall be made with solder less connectors, or by an approved brazing method.

f) The resistance of the earth continuity system when measured between the main earth point and any other point in the installation, including all metalwork which may provide a path to earth, such as gas, water pipes, etc., shall not exceed 0.5 ohms.

g) All flexible metallic tubing shall have a bare earth conductor run with the tubing, the ends being securely bonded. The size of the earth conductor shall be as indicated in the current edition of the IEE Regulations.

h) Care should be taken that the neutral conductor does not become accidentally earthed.

i) In accordance with the UMEME Limited procedure of multiple neutral earthing, the

neutral of the supply is to be bonded to the earth pipe.

j) Earthing shall conform to the 17th edition of the IEE Regulations.

Distribution System Earthing

All distribution boards shall be earthed in accordance with the IEE Regulations. All metalwork associated with the installation shall be earthed to comply with the Regulations currently in force.

TESTING AND INSPECTION

Testing of Earthing System

The resistance of the earth continuity system, when measured between the main earthing point and any other point in the installation, including all conduit and other metal work which may provide a path to earth, shall not exceed 0.5ohms where steel conduit forms part or whole of the system, or 1.0 ohms if the earth continuity system is composed entirely of copper, copper alloy or aluminium. The Contractor is expected to allow for any necessary additional materials required to achieve the above resistance values.

Installation Testing

After completion and before commissioning, the entire installation shall be subjected to the following tests and any faults found shall be rectified by the Contractor at no extra cost.

a) Polarity

All fuses and control devices shall be connected in live conductors only.

b) Insulation Resistance

When tested with a 500V DC supply, the insulation resistance between conductors of live lines, lines and neutral, line and earth, neutral and earth shall not be less than 1 mega-ohm.

c) Earth Continuity Resistance

Resistance of earth continuity measured from a control pillar to the farthest end of a circuit shall not exceed 0.5 ohms.

In addition to the above, the following tests and inspection shall be carried out where applicable:-

i. Phase rotation
ii. Earth loop impedance
iii. Operation of over current and earth fault relays by injection test.
iv. Operation of all other protective relays and devices.

v. Levels of illumination.
vi. Correct sequencing of all control equipment.
vii. Visual inspection

The Engineer shall be given full opportunity to witness all tests and shall approve all test results.

The Engineer shall have the right to ask for specific tests to be repeated.

Inspection and Witnessing of testing of Major Equipment

The Engineer shall inspect and witness the testing of all major plant and equipment at the manufacturer's works before shipment. The costs for the Engineer's inspection shall be included in the tender document as indicated in the Bills of Quantities.

AUTOMATIC VOLTAGE STABILISERS

These shall be products of manufacturers with recorded experience and certified in the home country as regular manufacturers of Automatic Voltage Stabilizers.

The stabilizers shall be solid state with an output voltage accuracy better than +/- 1% and shall be maintained over the full range of input voltage variations from zero to full load irrespective of power factor, frequency variations and ambient temperature variations up to 45^{o}C.

The stabilizer shall maintain the accuracy of each phase voltage even in the event of unbalanced input voltage, unbalanced load and power factor.

The overall efficiency of the unit shall be better than 99% with negligible waveform distortion irrespective of load and a correction time of less than 40 cycles of mains frequency.

The stabilizers shall be fitted with facilities to ensure low voltage at switch on before full stabilization, and to ensure soft stop, spike suppression, surge protection.

The stabilizers shall be electromagnetic compatible to BS 6527 and BS 6667 part 3.

The units shall be enclosed in robust floor standing cubicles with door access, lifting eye-bolts and conform to IP20 protection or better and BS 5490.

The Contractor shall supply and install a three-phase automatic AC voltage stabilizer as part of the low voltage main switchgear installation.

The static voltage stabilizer shall incorporate essential components including a buck-boost transformer for voltage correction, solid-state power switching devices such as IGBTs or thyristors in a

PWM or AC-AC chopper topology for rapid regulation, a digital microcontroller or DSP-based control unit with true RMS voltage/current sensing for precise feedback and independent phase balancing, integrated protection circuitry with fuses, surge suppressors, overload relays, and safeguards against over/under voltage, short circuit, and single-phasing, plus an LCD display panel or digital interface for real-time monitoring of input/output parameters, faults, and optional communication ports like RS485/Modbus, ensuring maintenance-free operation, response times under 50ms, and compliance with IEC electrical standard. The design expected input and output voltage ranges are specified in the Bills of Quantities.

The stabilizer unit shall consist of, but not limited to the following features: -

a) High accuracy of voltage output from zero to full load
b) Solid state control
c) High efficiency of 95% minimum of full load
d) Negligible waveform distortion
e) Integral manual by-pass provision
f) Unaffected by supply frequency variations and load power factor
g) Be rated for indoor tropical use with no output derating for operation up to 45^{o}C
h) Transient suppression
i) True RMS sensing of input
j) Lightning surge protectors on input.

COMMISSIONING AND SYSTEM DEMONSTRATION

The whole installation shall be tested to the statutory requirements of the Uganda Electricity Distribution Company Ltd, IEE Wiring Regulations and commissioned in the presence of and to the satisfaction of the Engineer.

Further to the above, and as per Statutory requirements, the Contractor shall liaise with the officials of the Fire Brigade and other Local and State bodies to obtain the relevant Inspection and Test/Completion Certificates. The Contractor shall include the cost of obtaining these documents in the rates for the priced items in the Bills of Quantities, and no extra cost claims shall be accepted on this account.

Four copies of test reports shall be provided within seven days of carrying out the test; and the reports shall include full details of how each test was carried out and a copy of all readings taken. These shall be included in the Operating and Maintenance Manuals as stated elsewhere in the Specification.

Subsequent to the completion of all testing and commissioning to the approval of the Engineer, prior to the date of issue of the Practical Completion Certificate, the Contractor, when required by the Engineer, shall operate the plant and demonstrate that the overall systems function automatically correctly in accordance with the requirements of this Specification. A period of at least one week's full running and operation including cost of fuel and other input shall be considered reasonable for this demonstration and shall be included in the Contractor's price inserted in the Tender documents.

During this period the Contractor shall be responsible for the operation and maintenance, if applicable, of the plant and may if appropriate, use this time to instruct the Employer's staff in the operation and maintenance of the systems. The Contractor will provide an operational report of the demonstration.

TENDER PRICING

Schedule of Basic Rates

The tenderer shall insert unit rates in the "Schedule of Basic Rates" and may add such other items as he considers appropriate.

The schedule shall be read with the preceding parts of the specification.

The unit rates shall include for the whole of the works in accordance with the Specifications.

Thus rates of conduits and cables shall include for connectors, glands, bushings, saddles, screws, clips, hangers and cable lugs (where required), etc.

The unit rates shall be used to assess the value of additions or omissions arising from authorised variations to the contract works.

Where specific manufacturers are stated in these rates or elsewhere in the Specification, alternative makes will only be accepted subject to the express approval of the Engineer.

Tender Figure Inserted

Lump sum all-inclusive tender figures are to be inserted as necessary for each electrical installation item and, in each case the installation or quantities will be subject to re-measurement on completion and pricing at rates inserted in the Unit Rates or in the Schedule of Basic Rates.

No other adjustments of the contract amounts will be permitted.

Note: BOQs and drawing are attached for your refference and bidding puposes.

Part 3: Local Purchase Order Agreement

Special Conditions of Contract

Procurement Reference Number: **MU-JHU -0043-2026-RFQ**

Purchase Order Serial Number:_____
[Purchase Order Serial Number to be completed in the event of award of contract only]

The clause numbers given in the first column correspond with the relevant clause number of the General Conditions of Contract.

Subject and GCC clause reference	Special Conditions
Eligible Countries-GCC 1.1(g)	All countries are eligible, unless as a matter of law or official regulation, the Government of Uganda prohibits commercial relations with that country or by an act of compliance with a decision of the United Nations Security Council taken under Chapter VII of the Charter of the United Nations, the Government of Uganda prohibits any import of Supplies from that country or any payments to persons or entities in that country.
Site-GCC 1.1(o)	The Site for delivery of the Works is **MUJHU Care Ltd**
Incoterms Edition-GCC 4.2(b)	Incoterms shall be governed by the rules prescribed in Incoterms 2010.
Notices GCC 8.1	Any notice shall be sent to the following addresses: For MU-JHU Care Ltd, the address shall be as given on the first page of this Purchase Order and the contact's name shall be **Crescent Nuwagira** For the Provider, the address and contact name shall be as given on the first page of this Purchase Order.
Delivery and Documents-GCC 12.1	The Works are to be delivered within: **Four weeks** from the date of purchase order. The shipping and other documents to be furnished by the Provider are: (a) Works completion form (b) Certificate of completion (c) signed delivery note; (d) A Tax Invoice
Terms of Payment GCC 16.1	. The structure of payments shall be: The lump sum price of the work will be paid upon submission of the final deliveries, reports and other documents to and acceptance by organisation and the documents listed in clause 12.1. **Note:** The payment of Milestone shall satisfy the other requirements under the Contract
Terms of Payment GCC 16.3	Payments shall be made no later than thirty days after submission of an invoice and its certification by MU-JHU Care Ltd

Subject and GCC clause reference	Special Conditions
Terms of Payment **GCC 16.4**	The currency of payment shall be the currency of order specified in the List of works and Price Schedule in the Statement of Requirements.
Packing **GCC 24.2**	The packing, marking and documentation within and outside the packages shall be: **MU-JHU Care Ltd WORKS**
Insurance **GCC 25.1**	The Works _____ be insured. The insurance shall be _____.
Incoterm for Transportation **GCC 26**	The supplies required for works shall be delivered **MU-JHU Care Ltd**
Liquidated Damages-GCC 28	Liquidated Damages shall not apply.
Warranty**-GCC 29.3**	The period of the warranty shall be twelve months.
Defects Liability Period - **GCC 44.1**	The Defects Liability Period is_____days.