ENDUMENI MUNICIPALITY

BID NO: B24/2020-21
RE-ADVERTISEMENT: UPGRADE OF SIBONGILE ELECTRICAL SUBSTATION

1. **Re-advertisement: Upgrade of Sibongile electrical substation.**
   1.1As per specification in document

2. No late submission of bids will be considered.

3. The municipality is not obliged to accept the lowest or any bid

4. No bid sent or submitted by facsimile, telegram or electronic mail will be accepted.

4. The municipality is not obliged to accept the lowest or any bid.

5. As per section 38(d) (i) & (ii) of Endumeni Municipality's Supply Chain Management Policy, bidders or any of their directors who are in arrears with their rates and taxes for more than three months or who have failed to perform satisfactorily on a previous contract in the last five years, will not be considered.

6. Bids will be adjudicated in terms of the Council's Supply Chain Management Policy, and in terms of functionality as part of the minimum requirements as prescribed in the Preferential Procurement Policy Framework Regulations 2017 will not be considered.

7. Documents for formal written bid will be available from the **Finance Department- Mr B.C Sibiya (Bheki) or Mr. M.H .Zulu (Mbekezeli) Room 12, Civic centre 64 Victoria street Dundee from 08h00 to 15H30**, upon payment of a non-refundable deposit of R500.00 per set of documents. Tender documents can also be downloaded free of charge on www.etenders.gov.za and www.endumeni.gov.za NB: documents must be binded unbinded documents will not be accepted.There will be a briefing on...

8. For further enquiries/details regarding this project, you are welcome to contact Mr. **N. Khoza(Fleet officer).**-at Endumeni Municipality on 034212 2121

LIST OF RETURNABLES

- **Company registration certificate**
- **Company Profile**
- **Tax Pin and Valid Tax clearance certificate**
- **Certified ID Copies of members/directors not older than 3 months**
- **Certified copy of B-BBEE Certificate or B-BBEE Affidavit**
- **Statement of Municipal rates not older than 3 months**
- **Relevant traceable experience and contactable references;**
- **Certified copies of accreditation certificate;**
- **Copy of Central Suppliers Database Registration.**

Sealed, bids outwardly marked **"Bid No: 24/2020-21: Re-Advertisement: Upgrade of Sibongile substation"** should be deposited into the bid box before **14:00, Tuesday, 06 April 2021** at **Endumeni Municipal Offices, 64 Victoria Street, Dundee,** at which time and place the bids will be publicly opened.

Mr M.A,Ngcobo
Municipal Manager
Endumeni Municipality
Private Bag 2024
DUNDEE
3000

Notice No: 51/2021

ENDUMENI LOCAL MUNICIPALITY

RE-ADVERTISEMENT:
UPGRADE OF SIBONGILE SUBSTATION
CONTRACT NO. B24/2020-21

CIDB CONTRACTOR GRADING
5 EP OR HIGHER

COMPILED BY:		ON BEHALF OF:	
CIVTECH ENGINEERS	CIVTECH ENGINEERS (PTY) LTD P. O. BOX 71047 RICHARDS BAY 3900		ENDUMENI LOCAL MUNICIPALITY PRIVATE BAG X2024 DUNDEE 3000
Tel Nº:	+27 35 780 0700	Tel Nº:	+27 34 212 2121
Fax Nº:	+27 86 214 2653	Fax Nº:	+27 34 212 3856
Email:	admin@civtech.biz	Email:	ndebeles@endumeni.gov.za

NAME OF TENDERER	
ADDRESS OF TENDERER	
TELEPHONE	
FAX	
TENDER SUM	

TENDER CLOSING DATE: 06 April 2021 TIME: 14H00

TENDER NO. B24/2020-21

UPGRADE OF SIBONGILE SUBSTATION

CONTENTS

THE TENDER

THE CONTRACT

PART T1: TENDERING PROCEDURES

TABLE OF CONTENTS

PAGE

T1.1 TENDER NOTICE AND INVITATION TO TENDER

TENDER NO B24/2020-21: UPGRADE OF SIBONGILE SUBSTATION

CIDB GRADING 5EP OR HIGHER

INVITATION: Endumeni Local Municipality hereby invites experienced and suitably bidders for the upgrade of Sibongile Substation project as detailed hereunder:

PROJECT NAME	CIDB GRADING	CONTRACT NO.	COMPULSORY BRIEFING	BID CLOSING DATE	BID AMOUNT
Upgrade of Sibongile Substation	5EP or higher	B24/2020-21	No site briefing but we will upload the written briefing on website and etenders	06 April 2021 @ 14H00	R 500.00

BID DOCUMENT: **24/2020-21**

Bid documents will be available from **Endumeni Municipality** on cash payment of a non-refundable fee of R 500.00 or deposited to **FNB Bank Acc No. 62025460651**, Please note: Bid Documents will be available from 21 March 2021 to 06 April 2021. Tender documents can also be downloaded free of charge on www.etenders.gov.za and www.endumeni.gov.za **NB Document must be binded. unbinded documents will not be accepted**.

SITE INSPECTION
No compulsory site briefing and site inspection due to the Presidential measures and restrictions issued on the COVID-19 Virus declaring at National Lockdown.

RETURNABLE DOCUMENTS:
Company Registration Document, SARS Tax Pin, Certified copy of BBBEE Certificate (SANAS Approved) or Affidavit BBBEE, Certified copies of Directors Identity Document not older than 6 months, Statement of Municipal Rates not older than 3 months or proof of residence and Letter of Good Standing.

BIDDERS TO NOTE THE FOLLOWING:
The Endumeni Municipality Supply Chain Management Policy will be applied, and the Bids will be evaluated in terms of the 80/20 point system. Failure to complete all Bid forms, data sheets nd submit all supplementary information may render the Bid to be considered as non-responsive and therefore may not be considered for the award of the contract. All Bids submitted should remain valid for 90 days after the Bid closing date. Queries must be addressed to the following email: tenders@endumeni.gov.za and cc Consultant: admin@civtech.biz.

BID SUBMISSION:
Bid Closing Date: 06 April 2021
Sealed Bid documents bearing the **Upgrade of Sibongile Substation and Bid No: B24/2020-21 must be deposited in the Bid Box at the Foyer of Endumeni Municipality before 14H00.** Telegraphic, telephonic, telefax, facsimile, emailed and late Bids will not be accepted.

Endumeni Municipality does not bind itself to accept lowest or any tender, or to furnish any reason for the acceptance or rejection of a tender.

Mr. S D Mbhele
Municipal Manager
Endumeni Local Municipality

T1.2 CONDITIONS OF TENDER

F.1 General

F.1.1 Actions

The Employer and each tenderer submitting a tender offer shall comply with these conditions of tender. In their dealings with each other, they shall discharge their duties and obligations as set out in F.2 and F.3, timeously and with integrity, and behave equitably, honestly and transparently.

F.1.2 Tender Documents

The documents issued by the Employer for the purpose of a tender offer are listed in the Tender Data.

F.1.3 Interpretation

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

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

F.1.3.3 For the purposes of these conditions for the calling for expressions of interest, the following definitions apply:

a) **comparative offer** means the tenderers financial offer after the factors of non-firm prices, all unconditional discounts and any other tendered parameters that will affect the value of the financial offer have been taken into consideration.

b) **corrupt practice** means the offering, giving, receiving or soliciting of anything of value to influence the action of the Employer or his staff or agents, or any official in the public service or in the employ of an organ of state, in any tender process; and

c) **fraudulent practice** means the misrepresentation of the facts in order to influence the tender process or the award of a contract arising from a tender offer to the detriment of the Employer or any public entity or organ of state, including collusive practices intended to establish prices at artificial levels.

d) **quality (functionality)** means the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs.

e) **these conditions of tender** mean the Standard Conditions of Tender (as published and amended from time to time by the Construction Industry Development Board) and the Employers Special Conditions of Tender, the latter of which are demonstrated by appearing in italics.

f) **tenderer** means any employee, partner, shareholder or director of a commercial entity that responds to the Tender Notice by collecting tender documents.

F.1.4 Communication and Employers agent

Each communication between the Employer and a tenderer shall be to or from the Employer's agent only, and in a form that can be read, copied and recorded. Writing shall be in the English language.

The Employer shall not take any responsibility for non-receipt of communications from or by a tenderer. The name and contact details of the Employers agent are stated in the Tender Data.

F.1.5 The Employers right to accept or reject any tender offer

F.1.5.1 The Employer does not bind itself to accept the highest scoring tender or any other tender, and may in addition accept or reject any variation, deviation, tender offer, or alternative tender offer, and may cancel the tender process and reject all tender offers at any time before the formation of a contract. The Employer shall not accept or incur any liability to a tenderer for such cancellation and rejection but will give reasons for such action upon written request to do so.

F.1.5.2 The Employer may not subsequent to the cancellation or abandonment of a tender process or the rejection of all tender offers re-issue a tender covering substantially the same scope of work within a period of six months unless only one tender was received and such tender was returned unopened to the tenderer.

F.1.6 Jurisdiction

Unless stated otherwise in the Tender Data, each tenderer and the Employer undertake to accept the jurisdiction of the courts of law of the Republic of South Africa.

F.2 Tenderers rights and obligations

F.2.1 Eligibility

Submit a tender offer only if the tenderer complies with the criteria stated in the Tender Data and the tenderer, or any of his principals, is not under any restriction to do business with the Employer.

F.2.2 Cost of tendering

Accept that the Employer will not compensate the tenderer for any costs incurred in the preparation and submission of a tender offer, including the costs of attending the site visit and / or clarification meeting(s) and any costs of testing necessary to demonstrate that aspects of the offer satisfy requirements.

F.2.3 Check documents

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

F.2.4 Confidentiality and copyright of documents

Treat as confidential, regardless whether or not a tender offer is submitted, all matters arising in connection with the tender. Use and copy the documents issued by the Employer only for the purpose of preparing and submitting a tender offer in response to the invitation.

F.2.5 Reference documents

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

F.2.6 Acknowledge addenda

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

F.2.7 Site visit and clarification meetings

Attend in person or designate a suitably qualified and experienced person in the direct employ of the tenderer to attend the site visit and / or clarification meeting(s) at which tenderers shall familiarize themselves with aspects of the proposed work, services or supply and raise questions. Details of the meeting(s) are stated in the Tender Data.

F.2.8 Seek clarification

Request clarification of the tender documents, if necessary, by notifying the Employer at least five working days before the closing time stated in the Tender Data. Any variation or deviation based on a point for which clarity should have been requested may render a tenderers offer unresponsive in terms of Standard Condition F.3.8.

F.2.9 Insurance

Be aware that the extent of insurance to be provided by the Employer (if any) may not be for the full cover required in terms of the Conditions of Contract identified in the Contract Data. The tenderer is advised to seek qualified advice regarding insurance.

F.2.10 Pricing the tender offer

F.2.10.1 Include in the rates, prices, and the tendered total of the prices (if any) all costs prescribed as being applicable to the specified pay items as well as all duties, taxes (except Value Added Tax (VAT), and other levies payable by the successful tenderer, such duties, taxes and levies being those applicable 14 days before the closing time stated in the Tender Data.

F2.10.2 Show VAT payable by the Employer separately as an addition to the tendered total of the prices.

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

F.2.10.4 State the rates and prices in Rand unless instructed otherwise in the Tender Data. The Conditions of Contract identified in the Contract Data may provide for part payment in other currencies.

F.2.11 Alterations to documents

Not make any alterations or additions to the tender documents, except to comply with instructions issued by the Employer, or necessary to correct errors made by the tenderer. All signatories to the tender offer shall initial all such alterations. Erasures and the use of masking fluid are prohibited.

F.2.12 Alternative tender offers (including variations and deviations)

F.2.12.1 Submit alternative tender offers only if a main tender offer, strictly in accordance with all the requirements of the tender documents, is also submitted. The alternative tender offer is to be submitted with the main tender offer together with a schedule that compares the requirements of the tender documents with the alternative requirements the tenderer proposes. Alternative tender offers shall not alter any contingency pay items provided in the tender documents, or offer fixed prices (except where such are provided in the postulated pricing schedule) or a fixed price contract.

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

F.2.12.3 Tenderers may qualify a tender offer (except that no qualification shall be in conflict with Special Condition to Tender F.2.8) but undertake to do so by submitting such qualification in terms of conditions F2.12.1 and F.2.12.2.

F.2.13 Submitting a tender offer

F.2.13.1 Submit a tender offer to provide the whole of the works, services or supply identified in the Contract Data, unless stated otherwise in the Tender Data.

F.2.13.2 Return all returnable documents to the Employer *as stated in the Tender Data.*

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

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

F.2.13.5 Seal the original of the tender offer as a separate package marking the packages as stated in the Tender Data.

F.2.13.6 Where a two-envelope system is required in terms of the Tender Data, place and seal the returnable documents listed in the tender data in an envelope marked financial proposal and place the remaining returnable documents in an envelope marked technical proposal. Each envelope shall state on the outside the Employers address and identification details stated in the tender data, as well as the tenderer's name and contact address.

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

F.2.13.8 Accept that the Employer shall not assume any responsibility for the misplacement or premature opening of the tender offer if the outer package is not sealed and marked as stated.

F.2.13.9 May modify, correct or withdraw his tender offer after submission of the tender offer but before the closing time stated in the tender date; provided that the authorized signatory notifies the Employer in writing.

F.2.14 Information and data to be completed in all respects

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

F.2.15 Closing time

F.2.15.1 Ensure that the Employer received the tender offer at the address specified in the Tender Data not later than the closing time stated in the Tender Data. Proof of posting shall not be accepted as proof of delivery. The Employer shall **not** accept tender offers submitted by telegraph, telephone, telex, facsimile or e-mail, unless stated otherwise in the Tender Data.

F.2.15.2 Accept that, if the Employer extends the closing time stated in the Tender Data for any reason, the requirements of these Conditions of Tender apply equally to the extended deadline.

F.2.16 Tender offer validity

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

F.2.16.2 If requested by the Employer, consider extending the validity period stated in the Tender Data for an agreed period of time.

F.2.17 Clarification, modification or withdrawal of tender offer after submission

F.2.17.1 Provide clarification of a tender offer in response to a request to do so from the Employer during the evaluation of tender offers.

This may include providing a breakdown of rates or prices and correction of *imbalanced rates* or arithmetical errors by the adjustment of certain rates or item prices (or both). No change in the total of the prices or substance of the tender offer is sought, offered, or permitted. The total of the prices stated by the tenderer shall be binding upon the tenderer.

F.2.17.2 Accept that the Employer may, at its sole discretion, accept a less favourable tender from those already received or invite fresh tenders if a tenderer, at any time after the opening of his tender offer but prior to the signing of a contract based on his tender offer: -

- withdraws his tender; or
- gives notice of his inability to execute the contract in terms of his tender; or
- fails to sign a contract or furnish the performance security within the period fixed in the letter of award or any extended period fixed by the Employer; or
- fails to comply with a request made in terms of Standard Condition F.2.18.1.

F.2.17.3 Pay the difference between a less favourable tender offer and his own tender offer in the event that a tenderer acts as described in Special Condition F.2.17.2 and/or pay the Employers wasted and additional costs incurred in inviting fresh tenders; provided that the Employer may fully or partly exempt a tenderer from the provisions of this special condition if he is of the opinion that the circumstances justify the exemption.

F.2.18 Provide other material

F.2.18.1 Provide, on request by the Employer, any other material that has a bearing on the tender offer, the tenderers commercial position (including notarized joint venture agreements), preferencing arrangements, or samples of materials, considered necessary by the Employer for the purpose of a full and fair risk assessment. Should the tenderer not provide the material, or satisfactory reason as to why it cannot be provided, by the time for submission stated in the Employers request, the Employer may regard the tender offer as non-responsive and may invoke the same remedy for potential additional costs as provided for under special condition F.2.17.3.

F.2.18.2 Accept the Employers right, at his sole discretion, to appoint suitably qualified persons to report on the financial resources, standing with the South African Revenue Services regarding all taxes, management structure and ownership details of any tenderer and/or to verify the correctness of any information furnished to the Employer in terms of condition F.2.17.1. Comply with the Employers request within the time stated in the request. Failure on the part of the tenderer to cooperate with such an inquiry shall entitle the Employer to declare such tender offer as nonresponsive.

F.2.18.3 Dispose of samples of materials provided for evaluation by the Employer, where required.

F.2.19 Inspections, tests and analysis

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

F.2.20 Submit securities, bonds, policies, etc.

If requested, submit for the Employers acceptance before formation of the contract, all securities, bonds, guarantees, policies and certificates of insurance required in terms of the Conditions of Contract identified in the Contract Data.

F.2.21 Check final draft

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

F.2.22 Return of other tender documents

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

F.2.23 Certificates

Include in the tender submission or provide the Employer with any certificates as stated in the Tender Data.

F.3 The Employers undertakings

F.3.1 Respond to clarification

Respond to a request for clarification received up to five working days prior to the tender closing time stated in the Tender Data and notify all tenderers who drew tender documents.

F.3.2 Issue Addenda

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

F.3.3 Return of tender offers

Return tender offers withdrawn in terms of F.2.13.9 or received after the closing time stated in the Tender Data, unopened, (unless it is necessary to open a tender submission to obtain a forwarding address), to the tenderer concerned.

F.3.4 Opening of tender submissions

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

F.3.4.2 Announce at the opening held immediately after the opening of tender submissions, at a venue indicated in the Tender Data, the name of each tenderer whose tender offer is opened, the total of his prices, preferences claimed and time for completion, if any, for the main tender offer only.

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

F.3.5 Two-envelope system

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

F.3.5.2 Evaluate the quality of the technical proposals offered by tenderers, then advise tenderers who remain in contention for the award of the contract of the time and place when the financial proposals will be opened.

Open only the financial proposals of tenderers, who score in the quality evaluation more than the minimum number of points for quality stated in the Tender Data, and announce the total price and any preferences claimed. Return unopened financial proposals to tenderers whose technical proposals failed to achieve the minimum number of points for quality.

F.3.6 Non-disclosure

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

F.3.7 Grounds for rejection and disqualification

F.3.7.1 Determine whether there has been any effort by a tenderer to influence the processing of tender offers and instantly disqualify a tenderer (and his tender offer) if it is established that he engaged in corrupt or fraudulent practices. In addition, any such disqualification shall entitle the Employer, at its sole discretion, to impose a specified period during which tender offers will not be accepted from the offending tenderer.

F.3.7.2 Communicate to other state tender boards, provincial tender boards or parastatal tender boards any tenderer disqualified in terms of special condition F.3.7.1.

F.3.7.3 Consider rejecting any tender offers received from tenderers who are involved in any form of litigation or legal proceedings by or against the Employer.

F.3.8 Test for responsiveness

Determine, on opening and before detailed evaluation, whether each tender offer properly received:

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

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

detrimentally affect the scope, quality, or performance of the works, services or supply identified in the Scope of Work,

change the Employer's or the tenderer's risks and responsibilities under the contract, or

affect the competitive position of other tenderers presenting responsive tenders, if it were to be rectified.

Reject a non-responsive tender offer, and not allow it to be subsequently made responsive by correction or withdrawal of the non-conforming deviation or reservation.

F.3.9 Arithmetical errors and imbalanced unit rates

Check responsive tender offers for arithmetical errors, correcting them in the following manner:

Where there is a discrepancy between the amounts in figures and in words, the amount in words shall govern.

If a pricing schedule (or schedule of quantities or schedule of rates) applies and there is an error in the line item total resulting from the product of the unit rate and the quantity, the unit rate shall govern and the line item shall be corrected.

However, where there is an obviously gross misplacement of the decimal point in the unit rate, the unit rate will be corrected.

Where there is an error in the total of the prices either as a result of other corrections required by this checking process or in the tenderer's addition of prices, the total of the prices shall be corrected.

Check responsive tender offers for imbalanced unit rates and request tenderers to consider amending and adjusting any rates declared imbalanced by the Employer while retaining the total of the prices derived after any correction made in terms of this condition to tender.

Consider the rejection of a tender offer if the tenderer does not correct or accept the correction of his arithmetical errors or amend/adjust an imbalanced unit rate in the manner described above.

F.3.10 Clarification of a tender offer

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

F.3.11 Evaluation of tender offers

F3.11.1 General

Appoint an evaluation panel of not less than three duly qualified persons. Reduce each responsive tender offer to a comparative offer and evaluate it using the tender evaluation method that is indicated in the Tender Data and described below.

Method 1: Financial offer	1)	Rank tender offers from the most favourable to the least favourable comparative offer.
	2)	Recommend highest ranked tenderer for the award of the contract, unless there are compelling and justifiable reasons not to do so.
Method 2: Financial offer and preferences	1)	Score tender evaluation points for financial offer.
	2)	Confirm that tenderers are eligible for the preferences claimed and if so, score tender evaluation points for preferencing.
	3)	Calculate total tender evaluation points.
	4)	Rank tender offers from the highest number of tender evaluation points to the lowest.
	5)	Recommend tenderer with the highest number of tender evaluation points for the award of the contract, unless there are compelling and justifiable reasons not to do so.
Method 3: Financial offer and quality	1)	Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the Tender Data.
	2)	Score tender evaluation points for financial offer.
	3)	Calculate total tender evaluation points.
	4)	Rank tender offers from the highest number of tender evaluation points to the lowest.
	5)	Recommend tenderer with the highest number of tender evaluation points for the award of the contract, unless there are compelling and justifiable reasons not to do so.
Method 4: Financial offer, quality and preferences	**1)**	**Score quality, rejecting all tender offers that fail to score the minimum number of points for quality stated in the Tender Data.**
	2)	**Score tender evaluation points for financial offer.**
	3)	**Confirm that tenderers are eligible for the preferences claimed, and if so, score tender evaluation points for preferencing.**
	4)	**Calculate total tender evaluation points.**
	5)	**Rank tender offers from the highest number of tender evaluation points to the lowest.**
	6)	**Recommend tenderer with the highest number of tender evaluation points for the award of the contract, unless there are compelling and justifiable reasons not to do so.**

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

F.3.11.2 Scoring Financial Offers

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

N_{FO} = W_1 x A where:

N_{FO} = the number of tender evaluation points awarded for the financial offer.

W_1 = the maximum possible number of tender evaluation points awarded for the financial offer as stated in the Tender Data.

A = a number calculated using either formulas 1 or 2 below as stated in the Tender Data.

Formula	Comparison aimed at achieving	Option 1	Option 2
1.	Highest price or discount	A = (1 □ (*P* □ *Pm*)) / *P*m	A = P/Pm
2.	Lowest price or percentage commission/fee	A = (1 □ (*P* □ *Pm*)) / *P*m	A = Pm/P

Where:

Pm = the comparative offer of the most favourable tender offer.
P = the comparative offer of tender offer under consideration.

F.3.11.3 Scoring quality (functionality)

Score quality in each of the categories stated in the Tender Data and calculate total score for quality.

F.3.11.4 Scoring preference

Score preferences claimed in the responsive tenders offered according to the method stated in the Tender Data.

F.3.11.5 Scoring total quality, financial and preference offers

Score total of the quality, financial and preference offers in accordance with method 4 of Clause F.3.11.1.

F.3.12 Insurance provided by the Employer

If requested by the proposed successful tenderer, submit for the tenderer's information the policies and / or certificates of insurance which the Conditions of Contract identified in the Contract Data, require the Employer to provide.

F.3.13 Acceptance of tender offer

F.3.13.1 Accept tender offer only if the tenderer satisfies the requirements stated in the Tender Data, including the legal requirements

F.3.13.2 Notify the successful tenderer of the Employer's acceptance of his tender offer by completing and returning one copy of the form of offer and acceptance before the expiry of the validity period stated in the Tender Data, or agreed additional period. Providing the form of offer and acceptance does not contain any qualifying statement, it will constitute the formation of a contract between the Employer and the successful tenderer as described in the form of offer and acceptance.

F.3.14 Notice to unsuccessful tenderers

After the successful tenderer has acknowledged the Employers notice of acceptance, notify other tenderers that their tender offers have not been accepted.

F.3.15 Prepare contract documents

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

a) addenda issued during the tender period,
b) inclusion of some of the returnable documents,
c) other revisions agreed between the Employer and the successful tenderer, and
d) the schedule of deviations attached to the form of offer and acceptance, if any.

F.3.16 Issue final contract

Prepare and issue the final draft of contract documents to the successful tenderer for acceptance as soon as possible after the date of the Employer's signing of the form of offer and acceptance (including the schedule of deviations, if any). Only those documents that the Conditions of Tender require the tenderer to submit, after acceptance by the Employer, shall be included.

F.3.17 Complete adjudicator's contract

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

F.3.18 Provide copies of the contracts

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

F.3.19 Delegation of authority

The Employer may delegate any power vested in him by virtue of these Conditions of Tender to an officer or employee of the Employer, provided that such delegation shall be in writing setting out the general or specific powers delegated.

T1.3 TENDER DATA

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: Endumeni Local Municipality Address: 64 Victoria Street, Dundee Tel No: 034 - 212 2121 Fax No: 034 - 212 3856
F.1.2	**The tender documents issued by the Employer will comprise the following:** **Part T1: Tendering Procedures** T1.1 Tender notice and invitation to tender T1.2 Standard and Special Conditions of Tender T1.3 Tender Data **Part T2: Returnable Documents** T2.1 Returnable documents T2.2 Documents for tender evaluation **Part C1: Agreements and Contract Data** C1.1 Form of Offer and Acceptance C1.2 Contract Data C1.3 Form of Guarantee C1.4 Disclosure Statement C1.5 Adjudicators Agreement C1.6 Occupational Health and Safety Indemnity Agreement C1.7 Transfer of rights and indemnity for materials on site **Part C2: Pricing data** C2.1 Pricing instructions C2.2 Pricing Schedules / Bills of Quantities **Part C3: Scope of work** **Site information** **Part C4:**
F.1.4	**The Employers Agent is:** Name: Civtech Engineers (Pty) Ltd

	Address: 103 Bullion Boulevard, Richards Bay Tel No: 035 780 0700 E-Mail: admin@civtech.biz
F2.1	**Eligibility**
F2.1.1	Only those tenderers who have in their employ management and supervisory staff satisfying the requirements of the Scope of Work for labour intensive competencies for supervisory and management staff are eligible to submit tenders. NQF Level 5 will be a minimum requirement for supervisors.
F2.1.2	The following tenderers who are registered with the CIDB, or are capable of being so registered prior to the evaluation of submissions, are eligible to submit tenders: a) contractors who have a contractor grading designation equal to or higher than a contractor grading designation determined in accordance with the sum tendered for a class 6EB or higher of construction work.

F2.1.3	Joint ventures are eligible to submit tenders provided that: a) every member of the joint venture is registered with the CIDB; b) the lead partner has a contractor grading designation in class 6EB or higher of the construction work; and c) 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 class 6EB or higher of construction work.
F2.7	**Site Visit and Clarification Meeting:** No site briefing but we will upload the written briefing on website and etenders.
F2.12.2	**Alternative Offer** If a tenderer wishes to submit an alternative tender offer, the only criteria permitted for such alternative tender offer is that it demonstrably satisfies the Employers standards and requirements, the details of which may be obtained from the Employers Agent. Calculations, drawings and all other pertinent technical information and characteristics as well as modified or proposed Pricing Data must be submitted with the alternative tender offer to enable the Employer to evaluate the efficacy of the alternative and its principal elements, to take a view on the degree to which the alternative complies with the Employers standards and requirements and to evaluate the acceptability of the pricing proposals. Calculations must be set out in a clear and logical sequence and must clearly reflect all design assumptions. Pricing Data must reflect all assumptions in the development of the pricing proposal. Acceptance of an alternative tender offer will mean acceptance in principle of the offer. It will be an obligation of the contract for the tenderer, in the event that the alternative is accepted, to accept full responsibility and liability that the alternative offer complies in all respects with the Employers standards and requirements. The modified Pricing Data must include an amount equal to 5% of the amount tendered for the alternative offer to cover the Employers costs of confirming the acceptability of the detailed design before it is constructed.

F2.13.5	**Submitting a tender offer** Parts of each tender offer communicated on paper shall be submitted as an original plus an electronic BOQ on USB, 0 copies.
F2.13.6 F3.5	**Tender procedure** A two-envelope procedure will not be followed.
F2.13.7	**The Employers Address**: The Municipal Manager Endumeni Local Municipality Private Bag X2024 Dundee 3000 **Location of Tender Box:** Foyer of Endumeni Local Municipality 64 Victoria Street, Dundee
	Identification Details on submission envelope: Tender no: B24/2020-21 Description of Project: Upgrade of Sibongile Substation

F2.15	**Closing detail:** Closing Date: As per advert Closing Time: As per advert Telephonic, telegraphic. Telex, facsimile or e-mailed tender offers will not be accepted.
F2.16	**Tender Offer Validity:** 90 (ninety) Calendar days from the closing day of bid.
F2.23	**Certificates** The following certificates need to be included in the Tender: a) Municipal Rates and Service Charges Statements where the company is located. b) Tax Compliance Certificate. c) CIDB Certificate 5EP (for Construction Bid). d) SANAS approved BBBEE Certificate/JV BBBEE Certificate if the company is a joint venture. e) Joint Venture Agreement if the company has entered a joint venture and specifying the name of the signatory in the JV. f) Entity's copy of Registration with the Registrar of Companies, Close Corporation. g) Certified copies of ID of directors
F3.4	**Opening of Tender Submissions** Tender submissions will be opened at the Foyer of Endumeni Local Municipality, 64 Victoria Street, Dundee, directly after 15h00 on the closing date and the prices and preferences read aloud in public.
F3.11.1	**Evaluation of tender Offers** Tender offers will be evaluated on Method 4: Financial offer, quality, and preferences.

F3.4

Scoring Preferences

The preference evaluation will be conducted in terms of the Preferential Procurement Regulations 2011 of the Endumeni Local Municipality. Preference evaluation will be undertaken on the 80/20 basis. The tenderer is required to submit a certified copy of their BBBEE Status Level of Contribution Certificate.

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

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

F3.11.1

Evaluation of tender Offers

The procedure for evaluation of responsive Tender Offers will be Method 4: Functionality, Financial Offer and preferences

a) The minimum score for functionality to be considered for a contract in terms of this tender, tenderers must achieve as stated below. The description of the functionality criteria and the maximum possible score for each is shown in the table below. The score achieved for functionality will be the sum of the scores achieved for the individual criteria.

Details	Points
Letter of intent to provide Performance Guarantee	**10**
Provided Not Provided *This will be evaluated in (Schedule RS014).*	10 Non-Responsive
Letter of intent to provide Insurance	**10**
Provided Not Provided *This will be evaluated in (Schedule RS015).*	10 Non-Responsive
Tenderers experience in similar projects	**40**
Extensive previous experience (5 projects at 8 points each) Adequate previous experience (> 3 years) Adequate experience with similar projects (> 1 year) Attach reference letters and completion certificates on similar projects. *This will be evaluated in (Schedule RS018).*	40 24 8
Site Agent and Qualification	**20**
National Diploma & 10 years, or NQF 5 & 5 years National Diploma & 7 years, or NQF 5 & 4 years National Diploma & 5 years or less or NQF 5 & 3 years Attach CVs and certificate copies of qualification. *This will be evaluated in (Schedule RS019).*	20 15 10
Foreman and Technical Experience	**20**
More than 10 years experience in electrical projects or NQF 4 6 to 10 years experience in electrical projects or NQF 4 2 to 5 years experience in electrical or NQF 4 Attach CVs and certificate copies of qualification. *This will be evaluated in (Schedule RS019).*	20 15 10
Summary of functionality	**100**
Letter of intent to provide Performance Guarantee Letter of intent to provide Insurance Tenderers experience in similar projects Key personnel: Site agent/contract manager Key personnel: Foreman	10 10 40 20 20
Total points	**100**

The overall minimum score for functionality is **70%**. However, Tenderers should note that the criterion on Financial Status has its own sub-minimum score that must be met for tender to be considered further.

	Tenderers that fail to achieve the minimum scores for functionality will be rejected. A more detailed explanation of the functionality criteria is given under the respective returnable schedules. b) The financial offer will be scored in terms of Formula 2, Option 1 of Table F.1 in Condition of Tender F.3.11.6.1: Where:

	W1 = 80 points where the financial value, inclusive of VAT, of all responsive tenders received have a Rand value equal to or above R30,000-00 and up to R50 million = 90 points where the financial value, inclusive of VAT, of all responsive tenders received have a value above R50 000 000.00 c) The points claimed for Preferences will be scored as follows: The details required in order for the preference points to be claimed are to be filled in on the requisite form included in Part 2, Section T2.2 - Returnable Schedules
F3.11.2	**Scoring Financial Offers** N_{fo} = W X A Where W = 90 The formula to be used in the scoring of the Financial offer will be Formula 2, Option 1 with: A = $\{1-(P-P_m)/P_m\}$
F3.13.1	**Acceptance of Tender Offer** Tender offers will only be accepted if: a) the tenderer has in his or her possession a copy of a valid Tax Clearance Certificate and a PIN issued by the South African Revenue Services; b) the tenderer is registered with the Construction Industry Development Board in an appropriate contractor grading designation; c) the tenderer or any of its directors is not listed on the Register of Tender Defaulters in terms of the Prevention and Combating of Corrupt Activities Act of 2004 as a person prohibited from doing business with the public sector; and d) the tenderer has not: i) abused the Employers Supply Chain Management System; or ii) failed to perform on any previous contract and has been given a written notice to this effect e) Has completed the Compulsory Enterprise Questionnaire and that there are no conflicts of interest which may impact on the tenderers ability to perform the contract in the best interests of the employer or potentially compromise the tender process.
F3.18	**Provide copies of the Contract** The Employer will provide the successful tenderer, now the Contractor, with one copy of the complete, signed contract document.

PART T2.1: RETURNABLE DOCUMENTS

TABLE OF CONTENTS

CONTENTS **PAGE**

RS001: CERTIFICATE OF AUTHORITY FOR COMPANIES

This Returnable Schedule is to be completed by companies and close corporations.

Indicate the status of the tenderer by ticking the appropriate box hereunder. The tenderer must complete the certificate set out below for the relevant category.

(I) COMPANY	(II) CLOSE CORPORATION	(III) PARTNERSHIP	(IV) JOINT VENTURE	(V) SOLE PROPRIETOR

(I) CERTIFICATE FOR COMPANY

I ....., chairperson of the Board of Directors of ....., hereby confirm that by resolution of the Board (copy attached) taken on ..... 20.....,

Mr/Ms ....., acting in the capacity of ....., was authorised to sign all documents in connection with this tender and any contract resulting from it on behalf of the company.

Signature of Chairman: .....

Specimen Signature of Signatory: .....

Date: .....

(II) CERTIFICATE FOR CLOSE CORPORATION

We, the undersigned, being the key members in the business trading as.....

..... hereby authorise Mr/Ms ....., acting in the capacity of ....., to sign all documents in connection with the tender for Contract No ..... and any contract resulting from it on our behalf.

Signatures of Members:

NAME	ADDRESS	SIGNATURE	DATE

Note: This certificate is to be completed and signed by all of the key members upon whom rests the direction of the affairs of the Close Corporation as a whole.

Specimen Signature of Signatory: .....

Date: .....

(III). CERTIFICATE FOR PARTNERSHIP

We, the undersigned, being the key partners in the business trading as, .

.....hereby authorise Mr/Ms.....

acting in the capacity of ..... , to sign all documents in connection with the tender for Contract No ..... and any contract resulting from it on our behalf.

NAME	ADDRESS	SIGNATURE	DATE

Note: This certificate is to be completed and signed by all of the key partners upon who rests the direction of the affairs of the Partnership as a whole.

Specimen Signature of Signatory: .....

Date: .....

(IV) CERTIFICATE
FOR JOINT VENTURE

We, the undersigned, are submitting this tender offer in Joint Venture and hereby authorize Mr/Ms ....., authorized signatory of the company, ...acting in the capacity of lead partner, to sign all documents in connection with the tender offer for Contract No .....and any contract resulting from it on our behalf.

This authorization is evidenced by the attached power of attorney signed by legally authorized signatories of all the partners to the Joint Venture.

NAME OF FIRM	ADDRESS	AUTHORISING SIGNATURE, NAME AND CAPACITY
Lead partner		

Note: This certificate is to be completed and signed by all of the key partners upon who rests the direction of the affairs of the Partnership as a whole.

Specimen Signature of Signatory: .....

Date: .....

(V) CERTIFICATE FOR SOLE PROPRIETOR

I....., hereby confirm that I am the sole owner of the business trading as: ...

Specimen Signature of Sole owner: .....

Date: .....

RS002: RECORD OF ADDENDA TO TENDER DOCUMENTS

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

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

Attach additional pages if more space is required.

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

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

Tenderer

.....

RS003: COMPULSORY ENTERPRISE QUESTIONNAIRE

The following particulars must be furnished. In the case of a joint venture, separate enterprise questionnaires in respect of each partner must be completed and submitted.

Section 1: Name of enterprise: . . . . . .

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 3 partners.

Section 5: Particulars of companies and close corporations

Company registration number . . . . . .

Close corporation number . . . . . .

Tax reference number . . . . . .

Section 6: Record of 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 constitutional institution within the meaning of the National Council of Province the Public Finance Management Act, 1999 a member of the board of directors of any (Act 1 of 1999)
  municipal entity
- an official of any municipality or municipal entity
- an employee of any provincial department, national or provincial public entity or
- 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 been 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 institution within the meaning of the Public National Council of Province Finance Management Act, 1999 (Act 1 of 1999)
- a member of the board of directors of any national or provincial public entity
- an official of any municipality or municipal
- an employee of any provincial department, national or provincial public entity or constitutional
- a member of an accounting authority of any municipal entity
- An employee of Parliament or a provincial entity 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 authorized to do so on behalf of the enterprise:

i) authorizes 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;

iv) 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 .....

Tenderer .....

RS004: DECLARATION OF INTEREST

1. No contract may be awarded to:

- any person in the service of the state (see definition at end) or has been in the service of the state in the previous twelve months.
- if the provider is not a natural person, whether any of its, directors, managers, principal shareholders or stakeholder is in the service of the state or has been in the service of the state in the previous twelve months.
- who is an advisor or consultant contracted with the municipality (this is only applicable where the advisor or consultant is directly involved in a specific bid).
- a spouse, child or parent of the provider or of a director, manager, shareholder or stakeholder of the provider if such is in the service of the state or has been in the service of the state in the previous twelve months.

It is required that the bidder or his/her authorized representative declare his/her position in relation to the evaluating/adjudicating authority and/or take an oath declaring his/her interest as per paragraph (1)

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

2.1. Are you or any person connected with the bidder, in service of the state? **YES/NO**

2.1.2 If so, state particulars:

.. .

2.2. Do you, or any person connected with the bidder, have any relationship (family, friend, other) with a person employed by the state and who may be involved with the evaluation and or adjudication of this bid? **YES/NO**

2.2.1 If so, state particulars:

..

..

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

2.3.1 If so, state particulars:

.

DECLARATION

I, THE UNDERSIGNED (NAME)

CERTIFY THAT THE INFORMATION FURNISHED IN PARAGRAPHS 2.1 TO 2.3.1 ABOVE IS CORRECT, AND THAT THE SIGNATORY TO THIS DOCUMENT IS DULY AUTHORIZED.

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

. ..

Name (print) Signature Date

In the service of the state means:

- a member of
  - (a) any municipal council;
  - (b) any provincial legislature; or
  - (c) the National Assembly or the National Council of Provinces;
- a member of the board of directors of any municipal entity;
- an official of any municipality or municipal entity;
- an employee of any national or provincial department, national or provincial public entity or constitutional institution within the meaning of the Public Finance Management Act, 1999 (Act No. 1 of 1999);
- a member of the accounting authority of any national or provincial or public entity; or an employee of Parliament or provincial legislature.

RS005: DECLARATION OF BIDDERS PAST SUPPLY CHAIN MANAGEMENT PRACTICES

1. This declaration serves to ensure that all reasonable steps are taken to combat the abuse of the Supply Chain Management System.

2. The bid of any bidder may be rejected if that bidder, or any of its directors have:

   a. abused Endumeni s Local Municipalitys Supply Chain Management System or committed any improper conduct in relation to such system:

b. been convicted for fraud or corruption during the past five years;
c. willfully neglected, reneged on or failed to comply with any government, municipal or other public sector during the past five years;
d. been listed in the Register for Tender Defaulters in terms of Section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)

3. In order to give effect to the above, the following questionnaire must be completed.

3.1 Is the bidder or any of its directors listed on the National Treasurys database as a company or person prohibited from doing business with the public sector?

*** YES / NO**

(Companies or persons who are listed on this database were informed in writing of this restriction by the National Treasury after the audi alteram partem rule was applied)

If Yes , furnish particulars:

.

.

3.2 Is the bidder or any of its directors listed on the Register for Tender Defaulters in terms of Section 29 of the Prevention and Combating of Corrupt Activities Act (No 12 of 2004)?

*** YES / NO**

(To access this Register enter the National Treasury s website, www.treasury.gov.za or submit a written request to obtain a hard copy to facsimile number 0123265445)

If Yes , furnish particulars:

..

..

3.3 Was the bidder or any of its directors convicted by a court of law (including a court of law outside the Republic of South Africa) for fraud or corruption during the past five years?

*** YES / NO**

If Yes , furnish particulars:

3.4 Does the bidder or any of its directors owe any municipal rates and taxes or municipal charges to the Endumeni Local Municipality, or to any other municipality / municipal entity, that is in arrears for more than three months?

*** YES / NO**

If Yes , furnish particulars:

.

3.5 Was any contract between the bidder any municipality / municipal entity or any other organ of state terminated during the past five years on account of failure to perform on or comply with the contract?

*** YES / NO**

If Yes , furnish particulars:

.

.

I, the undersigned (Full Name s) ... Certify that the information furnished on this Declaration form True and Correct.

I accept that, in addition to cancellation of a contract, action may be taken against me should this declaration prove to be false.

.. ..

Signature of Managing Director **Date**

..

Registered Name of Company

.

Signature of Witness

..

Full Names of Witness

RS006: CERTIFICATE OF INDEPENDENT BID DETERMINATION

1. This document (MBD 9) forms part of all *bids invited.

2. Section 4 (1) (b) (iii) of the Competition Act No. 89 of 1998, as amended, prohibits an agreement between, or concerted practice by, firms, or a decision by an association of firms, if it is between parties in a horizontal relationship and if it involves collusive bidding or *bid rigging. Collusive bidding is a pe se prohibition meaning that it cannot be justified under any grounds.

3. Municipal Supply Regulation 38 (1) prescribes that a supply chain management policy must provide measures for the combating of abuse of the supply chain management system and must enable the accounting officer, among others, to:

a. take all reasonable steps to prevent such abuse

b. reject the bid of any bidder if that bidder or any of its directors has abused the supply chain management system of the Endumeni Local Municipality or municipal entity or has committed any improper conduct in relation to such system: and

c. cancel a contract awarded to a person if the person committed any corrupt or fraudulent act during the bidding process or the execution of the contract.

4. This MBD serves as a certificate of declaration that would be used by Institutions to ensure that, when bids are considered, reasonable steps are taken to prevent any form of bid-rigging.

5. In order to give effect to the above, the attached Certificate of Bid Determination (MBD 9) must be completed and submitted with the bid.

* all bids: includes price quotations, advertise competitive bids, limited bids and proposals

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

I, the undersigned, in submitting the accompanying bid:

....

(Bid number and Description)

In response to the invitation for the bid made by:

ENDUMENI LOCAL MUNICIPALITY

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

I certify, on behalf of:

.that:

Name of Bidder

1. I have read and understand the contents of this certificate;

2. I understand that the accompanying bid will be disqualified if this certificate is found not to be true and complete in every respect;

3. I am authorized by the bidder to sign this certificate, and to submit the accompanying bid, on behalf of the bidder;

4. Each person whose signature appears on the accompanying bid has been authorized by the bidder to determine the terms of, and to sign, the bid, on behalf of the bidder;

5. For the purposes of this certificate and the accompanying bid, I understand that the word competitor shall include any individual or organization, other than the bidder, whether or not affiliated with the bidder, who:

   (a) has been requested to submit a bid in response to this bid invitation;

   (b) could potentially submit a bid in response to this bid invitation, based on their qualifications, abilities or experience: and

   (c) provides the same goods and services as the bidder and/or is in the same line of business as the bidder

6. The bidder has arrived at the accompanying bid independently from, and without consultation, communication, agreement or arrangement with any competitor. However communication between partners in a joint venture or consortium* will not be construed as collusive bidding.

7. In particular, without limiting the generality of paragraphs 6 above, there has been no consultation, communication, agreement or arrangement with any competitor regarding:

   (a) Prices

   (b) geographical areas where product or service will be rendered (market allocation)

   (c) methods, factors or formulas used to calculate prices;

   (d) the submission of a bid which does not meet the specifications and conditions of the bid; or

   (e) the submission of a bid which does not meet the specifications and conditions of the bid; or

   (f) bidding with the intention no to win the bid.

8. In addition, there have been no consultations, communications, agreements or arrangements with any competitor regarding the quality, quantity, specifications and conditions or delivery particulars of the products or services to which this bid invitation relates.

9. The terms of the accompanying bid have not been, and will not be, disclosed by the bidder, directly or indirectly, to any competitor, prior to the date and time of the official bid opening or the awarding of the contract.

   * Joint Venture or Consortium means an association of persons for the purpose of combining their expertise, property, capital, efforts, skill and knowledge in an activity for the execution of a contract.

10. I am aware that, in addition and without prejudice to any other remedy provided to combat any restrictive practices related to bids and contracts, bids that are suspicious will be reported to the Competition Commission for investigation and possible imposition of administrative penalties in terms of Section 59 of the Competition Act No. 89 of 1998 and or may be reported to the National Prosecuting Authority (NPA) for criminal investigation and or may be restricted from conducting business with the public sector for a period not exceeding ten (10) years in terms of the Prevention and Combating of Corrupt Activities Act No. 12 of 2004 or any other applicable legislation.

Full Name(s) of Service provider(s) :

..

Signature(s) of Service provider(s) ...

..

Full Names of Witness 1 :

Signature of Witness :

Full Names of Witness 2 :

Signature of Witness : ..

RS007: PREFERENTIAL PROCUREMENT

PREFERENCING SCHEDULE

This request for Tenders is subjected to the terms of the Endumeni Local Municipality Preferential Procurement Policy. It is solely the responsibility of the aspirant vendors, who desire to avail themselves of the preferences available under this policy, to familiarize themselves of its contents and to apply to the conditions, to be able to make a claim for preference.

The value of this bid is estimated to be **below** a Rand value of R 50 000 000.00 (all applicable taxes included) and therefore the 80/20 system shall be applicable. Preference points for this bid shall be as follows:

a) Price, and 80%

b) B-BBEE status level contribution 20%

The points for price and B-BBEE must not exceed 100%.

COPY OF BBBEE CERTIFICATE TO BE ATTACHED TO THIS PAGE

Copies of the Endumeni local Municipality Preferential Procurement Policy may be obtained from the SCM offices.

WITNESSES:

1.

SIGNATURE(S) OF BIDDER(S)

2.

DATE: ..

ADDRESS: ..

...

.....

.....

RS008: SITE INSPECTION CERTIFICATE

As required by the General Conditions of Contract, I/we visited the site of works on the date specified below.

I/We carefully examined the site, plans and contract documents, and have made myself/ourselves fully conversant with all the circumstances likely to influence the construction and cost of the works.

I/We further certify that I am / we are satisfied with the description of the works and the explanation given by or on behalf of the Engineer representative at the inspection, and that I/We understand perfectly the work to be done, as specified and implied, in the execution of the contract.

SIGNATURE TENDERER: .

This will certify that .. (Names)

Representing .. (Firm)

Visited the site of the Works for this contract on .... (Date)

Signed: .. (for Engineer)

Municipal Stamp .(for Client)

Municipal Stamp

RS009: DECLARATION OF COMPETENCY ON HEALTH AND SAFETY AND COVID19 ACT REQUIREMENTS

Tenderer to provide a declaration on his competencies in establishing and maintaining a Health and Safety plan as required in terms of the Construction Regulations of 2014 and the Occupational Health and Safety Act (85 of 1993).

In order to demonstrate these competencies, the Tenderer is to provide with his tender (and attached to this page as a separate document) brief statements as to a safety plan and how the safety management systems will work and what control procedures they plan on using to ensure safety on the construction site.

The following generic aspects should be covered in the safety plan:

- What administrative procedures the Contractor envisage to use in the implementation and maintenance of the safety plan with reference to the construction site.
- How continuous assessment of the safety plan will be assessed and implemented with respect to construction site.
- What control systems the Contractor envisage to implement on site to support his safety program.
- How the Contractor will ensure that he adheres to the construction regulations in respect of competent persons for appointments.
- What external resources the Contractor envisage on using to ensure successful implementation and sustainability of the safety plan.
- What training to employees the Contractor envisage and how he would go about to execute it.
- The Contractor should indicate which competent persons he currently has in his employ or he plans on employing and attach abbreviated Curriculum Vitas of these persons.
- The Contractor should provide proof for the following:
    - Operators competency certificates

- Operators drivers licenses
- Operators medical fitness certificates
- Plant and vehicles roadworthy certificates

The contractor should comply with the Health & Safety regulation for working under strict conditions to eliminate the spread of Covid-19. All required documentation such as Covid19 method statement, Health & Safety plan, Risk Assessment and other required documentation to conform to a government regulation in this regard.

DECLARATION BY TENDERER

It is confirmed that an outline of the Health and Safety plan is attached hereto. We further declare that we have the competence and necessary resources to carry out work safely in compliance with the Construction Regulations 2014 and the recent Covid-19 regulation for construction work.

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

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

Tenderer .....

PART T2.2 : DOCUMENTS FOR TENDER EVALUATION

TABLE OF CONTENTS

PAGE

RS010: TENDERERS PRELIMINARY PROGRAMME

PRELIMINARY PROGRAMME

The tender below shall outline his proposed programme for the completion of the Works to conform with the requirements set out in the Appendix to the Form of Tender.

The successful Tenderer shall use the programme submitted below as the basis for the detailed programme, which is to be provided 14 days after the handing over of the site.

DESCRIPTION OF WORK	ENVISAGED DURATION	STARTING WEEK	FINISHING

SIGNATURE: ..... DATE: .....
(of person authorised to sign on behalf of the Tenderer)

RS011: DECLARATION OF GOOD STANDING - REGARDING TAX

In terms of Section 16 of the Preferential Procurement Policy Framework Act Regulations 2002 (Act No.5 of 2000) it is a condition of this tender that the successful service providers taxation payments must be in order or that suitable arrangements have been made with SARS (South African Revenue Services) to this end and to their satisfaction.

All Service Providers are therefore required to submit a copy of Tax / * VAT Clearance Certificate and Tax Compliance status **PIN** issued by South African Revenue Services which must be attached to this page. If a Service Provider has not obtained the required Tax Clearance Certificate by the Tender closing Time and attached to this page, this tender will not be considered.

ATTACH ORIGINAL TAX CLEARANCE CERTIFICATE HERE

RS012: CERTIFICATE FROM WORKMENS COMPENSATION COMMISSIONER

ATTACH VALID CERTIFICATE OR COPY THEREOF FROM WORKMENS COMPENSATION COMMISSIONER HERE

Failure to do so will lead to your Tender being regarded as non-responsive.

RS013: CONTRACTOR REGISTRATION WITH CONSTRUCTION INDUSTRY DEVELOPMENT BOARD

Attach a copy of valid Certificate of Contractor Registration issued by the Construction Industry Development Board to this page.

ATTACH COPY OF CIDB REGISTRATION CERTIFICATE HERE

Alternatively, the CIDB registration number can be provided as follows:

ENTITY NAME			
CIDB REGISTRATION NO			
CLASS		**CATEGORY**	

RS014: CONFIRMATION OF ABILITY TO OBTAIN A PERFORMANCE GUARANTEE

Attach an original letter of undertaking from a recognized financial institution registered with FSP, confirming the issuing of a performance guarantee equal in value to 10 (ten) % of the tendered amount. The letter of undertaking will not oblige the financial institution to issue a performance guarantee, but merely serves as an indication of the tenderers ability to obtain a performance guarantee.

Failure to do so will lead to your Tender being regarded as non-responsive.

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

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

Tenderer .....

RS015: FORM OF INTENT TO PROVIDE INSURANCE

The Tenderer must attach hereto a letter from an approved insurance provider or institution with whom he has made the necessary arrangements, to the effect that the said insurance provider or institution will be prepared to provide the required insurance when need to do so arise. This letter must clearly indicate this project name, the Tenderers name and the date of the letter.

Failure to do so will lead to your Tender being regarded as non-responsive.

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

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

Tenderer .....

RS016: CENTRAL SUPPLIERS DATABASE

ATTACH HERE PROOF OF REGISTRATION ON CENTRAL SUPPLIERS DATABASE

RS017: SCHEDULE OF THE TENDERERS EXPERIENCE

The tenderer is to provide the following information regarding the five largest relevant projects of similar nature (road construction and rehabilitation) completed by the tenderer during the last five years, in order of contract price. Only experience by the tendering entity, and not by staff members, shall be taken into account in awarding functionality points. Only projects listed in the table below will be considered for acquiring points.

CONSULTING ENGINEER: CONTACT PERSON AND TELEPHONE NUMBER	NATURE OF WORK	VALUE OF WORK (inclusive of VAT)	DATE COMPLETED OR EXPECTED TO BE COMPLETED
CONSULTANT			
CONTACT			
TEL			
CELL			
FAX			
CONSULTANT			
CONTACT			
TEL			
CELL			
FAX			
CONSULTANT			
CONTACT			
TEL			
CELL			
FAX			
CONSULTANT			
CONTACT			
TEL			
CELL			
FAX			
CONSULTANT			
CONTACT			
TEL			
CELL			
FAX			

Signed Date

Name _____ Position _____

Enterprise name _____

RS018/1: KEY PERSONNEL

In terms of the Project Specification and the Conditions of Tender, unskilled workers may only be brought in from outside the local community if such personnel are not available locally.

The Tenderer shall list below the personnel which he intends to utilize on the Works, including key personnel which may have to be brought in from outside if not available locally.

Category of Employee	Number of Persons			
	Personnel, Part of the Contractors Organisation		Personnel to be contracted if not available within the employ of the company	
#Site Agent				
#Site technicians, (Quality Control and Safety officers included)				
#Foremen				
Technicians, Surveyors, etc				
Artisans and other Skilled workers				
Plant Operators				
Unskilled Workers				
Others:				

Notes. The categories marked are Key Personnel.

1. Senior Site Agent on permanent basis with BSc or National Diploma or BTech in Civil Engineering or equivalent qualifications and with experience of not less than ten years; or Junior Site Agent with National Diploma or BTech in Civil Engineering and with experience not less than four years, will score the 5 or respectively 3 functionality points.

2. Three Site Technicians on permanent basis, both with a National Diploma in civil engineering or applicable equivalent qualifications and with not less than five years experience, will score the full 3 functionality points.

3. Three Foremen on permanent basis, all with relevant skills and qualifications and experience of not less than ten years, will score the full 2 functionality points.

4. Half of the above full points will be scored in the case of staff not in the full time employ of the company and contracted for the duration of the contract.

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

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

Tenderer _____

RS018/2: CURRICULUM VITAE FORMAT OF KEY PERSONNEL

To be done for at least the following personnel:
#Site Agent / Project Manager
#Foremen
Quality Controller
Safety Officer

Name:	**Date of birth:**
Profession:	**Nationality:**
Qualifications:	
Professional Registration Number:	
Name of Employer (firm):	
Current position:	**Years with firm:**

Employment Record:

Name of Project	Involvement on Project	Company	Project Duration	Year Completed

Certification:

I, the undersigned, certify that, to the best of my knowledge and belief, this data correctly describes me, my qualifications and my experience.

Signed _____ Date _____

Name _____ Position _____

Tenderer _____

RS019: PROPOSED SUB-CONTRACTORS FOR SOCIO ECONOMIC DEVELOPMENT

Should the **tender value be more than R 10 million**, tenders are required to employ designated Subcontractors on this contract. The designated subcontractors to be utilized should be 100% black owned business and registered with CIDB with minimum grading of 6EB. A contract Participation Goal of at least 30% of the contract price (excl. P & G, specialist subcontractors, contingencies and VAT) for subcontracting to these designated subcontractor has to be achieved by the contractor. The objective is to bring about meaningful transformation in the construction industry through the following:

- Meaningful economic participation
- Transfer of technical, management and entrepreneurial skills
- Creation of sustainable Black Enterprises

Also refer to Contract Data C1.2 Part 1 Employment of Emerging Contractors.

	Name and address of proposed Sub-contractor	**Previous experience with Sub-contractor**	**Proposed extent of works to be allocated to sub-contractor**	**% of total contract allocated to sub-contractor**
1.				
2.				
3.				

4.				
5.				

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

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

Tenderer .....

RS020: PROPOSED AMENDMENTS AND QUALIFICATIONS

The Tenderer should record any deviations or qualifications he may wish to make to the tender documents in this Returnable Schedule. Alternatively, a tenderer may state such deviations and qualifications in a covering letter to his tender and reference such letter in this schedule.

The Tenderers attention is drawn to Clause F.3.3 of the Standard Conditions of Tender referenced in the Tender Data regarding the Employers handling of material deviations and qualifications.

These amendments and qualifications, if accepted by the Employer, will be incorporated in the Acceptance Form as Deviations.

Page	Clause or item	Proposal

Signed _____ Date _____

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

Tenderer .....

RS021: INDEMNITY TO COVER PAYMENT FOR UNUSED MATERIALS ON SITE

We the..... .....(Bank or Insurance Company)

do hereby bind ourselves as surety in solidum and co-principal debtors to recompense the employer in the event of his not acquiring ownership of materials for whatever reason, or in the event of his lawfully being required to make payment of any sum of money to any third party in order to obtain or retain ownership of full and free possession of the said materials, in circumstances where the employer has paid the Contractor for the said materials on site in terms of Clause 52 (1)(e) of the General Conditions of Contract, and for all losses, damages and expenses that may be suffered or incurred by the Employer as a result of such payment for the said materials on site, renouncing all benefits from the legal exceptions ordinis se excursionis et divisions No value received and all other exceptions which might or could be pleaded against the validity of this guarantee, with the meaning and effect of which exceptions we declare ourselves to be fully acquainted; provided that the liability of the undersigned under this guarantee is limited to and shall not exceed

R.....(..... .....)

and will lapse after issue of the Certificate of Completion of the Contract, unless the surety is advised in writing by the Employer before issue of the said Certificate of his intention to institute claims and the particulars thereof, in which event this guarantee shall remain in force until all such claims are paid or settled.

This undertaking is not negotiable nor transferable and must be returned to us upon payment of the abovementioned amount.

Bank/Insurance Company: .....

Address: .....

.....

Date: .....

PART C1: AGREEMENT AND CONTRACT DATA

TABLE OF CONTENTS

CONTENTS **PAGE**

ENDUMENI LOCAL MUNICIPALITY

TENDER NO. B24/2020-21

UPGRADE OF SIBONGILE SUBSTATION

C1.1 FORM OF OFFER AND ACCEPTANCE

C1.1.1 OFFER

The Employer, identified in the acceptance signature block, has solicited offers to enter into a contract for the procurement of:

Tender no. B24/2020-21: UPGRADE OF SIBONGILE SUBSTATION

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 authorized, 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.

Offer to be valid for 90 (ninety) days from the closing day of bid.

THE OFFERED TOTAL OF THE PRICES INCLUSIVE OF VALUE ADDED TAX IS:

R .. (number) . .

.... (in words)

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 to the tenderer before the end of the period of validity stated in the Tender Data, whereupon the tenderer becomes the party named as the contractor in the Conditions of Contract identified in the Contract Data.

Signature . . . . Date . . . .

Name . . . . Capacity . . . .

for the tenderer . . . .

. . . .

(Name and address of organization)

Witness: . . . .

Name Signature Date

C1.1.2 ACCEPTANCE

By signing this part of this form of offer and acceptance, the Employer identified below accepts the tenderers 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 tenderers 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 agreement)
Part C2 Pricing data
Part C3 Scope of work
Part C4 Particular Specification

and drawings and documents or parts thereof, which may be incorporated by reference into Parts C1 to C4 above.

Deviations from and amendments to the documents listed in the Tender Data and any addenda thereto as listed in the tender 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 agreement. No amendments to or deviations from said documents are valid unless contained in this schedule.

The tenderer shall within two weeks after receiving a completed copy of this agreement, including the schedule of deviations (if any), contact the Employers agent (whose details are given in the Contract Data) to arrange the delivery of any 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 fulfill 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 . . . . . Date . . . . . .

Name . . . . . Capacity . . . . . .
for the Employer . . . . . .
(Name and address of organization)

Witness: . . . .
Name Signature Date

Schedule of Deviations

1. Subject . . . . . .
   Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

2. Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

3. Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

4. Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

5. Subject . . . . . .

Details . . . . . .

. . . . . .

. . . . . .

. . . . . .

By the duly authorized 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 tender 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.

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

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

Tenderer .....

C1.2 CONTRACT DATA

C1.2.1 GENERAL CONDITIONS OF CONTRACT (GCC 2015)

The General Conditions of Contract for Construction Works (2015) published by the South African Institution of Civil Engineering, Third Edition, is applicable to this contract.

Copies of these General Conditions of Contract may be obtained from the South African Institution of Civil Engineering:

Block 19, Thornhill Office Park,
Bekker Street, Vorna Valley,
Midrand,
Private Bag X200,
Halfway House, 1685

Tel: 011-805 5947
Fax: 011-805 5971

C1.2.2 AMENDMENTS TO THE GENERAL CONDITIONS OF CONTRACT

AC1 GUARANTEE IN LIEU OF RETENTION

Amend Clause 6.10.3 through:

No guarantee will be accepted in lieu of retention.

C1.2.3 CONTRACT DATA

REFERENCE TO:	CLAUSE	DESCRIPTION
PART 1 - DATA PROVIDED BY EMPLOYER		
Employer	1.1.1.15 1.2.1.2	Endumeni Local Municipality Physical Address: 64 Victoria Street, Dundee Postal Address: Private Bag X 2024, Dundee, 3000 Tel No: 034 - 212 2121 Fax No: 034 - 212 3856
Engineer	1.1.1.16 1.2.1.2	Civtech Engineers y) Ltd (P Physical Address: 103 Bullion Boulevard, Richards Bay Postal Address: P. O. Box 71047, Richards Bay, 3900 Tel No: 035 780 0700 Fax No: 086 214 2653 E-mail: admin@civtech.biz
Year End break	1.1.1.12	Commences 11 December 2020 and ends 4 January 2021
Pricing Strategy	1.1.1.26	Re-measurement Contract
Performance Guarantee	6.2	Within 21 days of appointment date
Value of guarantees	6.2	10% of tender sum (excluding VAT)
Commencement of work	5.3.1	Within 28 days of appointment date
Programme for works	5.6.1	Within 14 days of commencement date
Insurances	8.6.1.1	Required
Liability Insurance	8.6.1.3	R 2 million per claim, number of claim unlimited
Dayworks	6.5.1.2.3	15%
Non-working times	5.8.1	All promulgated South African Public Holidays
Time for Practical completion	5.12.1	4 months from Commencement Date
Penalty for delay	5.13.1	R 2 500-00 per calendar day
The Latent Defect Period	5.16.3	10 years
Contract Price Adjustment	6.8.2	Not Applicable
Percentage advance on materials	6.10.1.5	80%
Retention money	6.10.3	10%
Limit of retention	6.10.2	7.5% of contract value
Retention guarantee	6.10.3	Not permitted
Defects Liability period	1.1.1.13	12 months
Amount to cover professional fees for repairing damage and loss	8.6.1.1.3	14% of required repair work

REFERENCE TO:	CLAUSE	DESCRIPTION
PART 2 - DATA PROVIDED BY CONTRACTOR		
Contractor	1.1.1.9 1.2.1.2	Name of Contractor: . . . . . . Physical Address: . . . . . . Postal Address: . . . . . . Tel No: . . . . . . Fax No: . . . . . E-mail: . . . . .
Security to be Provided by Contractor	6.2.1	Refer to Table Below

Type of Security	**Contractors Choice (Indicate YES or NO)**
Is Value Added Tax included in the Contract Sum and value of Works for calculating percentages?	
Cash deposit of % of the Contract Sum	
Performance Guarantee of % of the Contract Sum	
Retention of % of the value of Works	
Cash Deposit of % of the Contract Sum plus Retention of % of the value of Works	
Performance Guarantee of % of the Contract Sum plus Retention of % of the value of Works	

Note: In the Standard for Uniformity in Construction Procurement in Section 4.4.4.4 it is stated that: "Retention monies that are held shall not exceed 10% of any amount due to a contractor. Where guarantees of an insurance company or bank that are provided are equal to or greater than 10% of the contract price, the total amount of retention monies held shall not exceed 5% of the contract price."

*[**NOTE**: Delete inapplicable]*

NAME: POSITION: ..

SIGNATURE: ..... DATE: .....

(of person authorised to sign on behalf of the Tenderer)

C1.2.4 SPECIAL CONDITIONS OF CONTRACT

SC1: PREAMBLE

The Special Conditions of Contract contains clauses hereinafter defined and forms an integral part of the Conditions of Contract. In the case of any discrepancy or conflict with any part of the General Conditions of Contract, the Special Conditions of Contract shall take precedence and shall govern.

SC2: APPROVALS GRANTED BY CLIENT

Add to Clause 3.2.3

The Employers Agent is, in terms of his appointment by the Employer for the design and administration of the Works, required to obtain the specific approval from the Employer for the execution of the following duties:

3.2.3.1 The issuing of an order to suspend the progress of the Works, the extra cost resulting from such order which is to be borne by the Employer in terms of Clause 5.11 or the effect of which is liable to give rise to a claim by the Contractor for an extension of time under Clause 6.6 of these conditions.

SC3: OCCUPATIONAL HEALTH AND SAFETY ACT

Add to Clause 4.3

Contractors liability as mandatory

Notwithstanding any actions which the Employer may take, the Contractor accepts sole liability for due compliance with the relevant duties, obligations, prohibitions, arrangements and procedures imposed by the Occupational Health and Safety Act, 1993 (Act 85 of 1993), and all its regulations, including the Construction Regulations, 2014, for which he is liable as mandatory. By entering into this Contract it shall be deemed that the parties have agreed in writing to the above provisions in terms of Section 37 (2) of the Act. The Contractor shall also ensure that any sub-contractor employed by him shall comply with the Act and the Regulations.

Contractor to notify Employer

The Employer retains an interest in all inquiries conducted under this Contract in terms of Section 31 and/or 32 of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) and its Regulations following any incident involving the Contractor and/or Sub-Contractor and/or their employees. The Contractor shall notify the Employer in writing of all investigations, complaints or criminal charges which may arise pursuant to work performed under this Contract in terms of the Occupational Health and Safety Act, 1993 (Act 85 of 1993) and Regulations

SC4: CONTRACTORS RESPONSIBILITY FOR SETTING OUT

Add to Clause 8.1.1

The Contractor shall take special precautions to protect all permanent survey beacons, benchmarks, stand boundary pens and trigonometrical beacons regardless whether such pegs or beacons were placed before or during the execution of the contract. If any such beacons or pegs which would not otherwise have been affected by construction of the works, have been disturbed by the Contractor or his employees, the Contractor shall have them replaced by a registered land surveyor at his own cost.

SC5: NATURAL VEGETATION (ADDITIONAL SUB-CLAUSE)

Add new Clause 8.2.1.1

The Contractor shall confine his operation to as small an area of the site as may be practical for the purpose of constructing the works.

Only those trees and shrubs directly affected by the works and such others as the Employers Agent may direct in writing shall be cut down and stumped. The natural vegetation, grassing and other plants shall not be disturbed other than in areas where it is essential for the execution of the work or where directed by the Employers Agent .

SC6: DELAY THROUGH OPPORTUNITIES AFFORDED TO OTHER PERSONS

Add to Clause 4.8.3

Whenever the Contractor considers that he is suffering a delay in the smooth running of his work as the result of the execution of any work on the Site by other persons he shall report to the Employers Agent in writing within twenty-four (24) hours of the occurrence thereof the circumstances and extent of such delay. The Employers Agent shall take such steps to resolve the problem as he considers necessary. Failure on the part of the Contractor to report to the Employers Agent such delay at the time of its occurrence shall invalidate any claim to any extension of time in terms of Clause 6.6.

SC7: ENGAGEMENT OF EMPLOYEES

Add to Clause 4.13

The Contractor shall at all times exercise strict control over his employees to prevent, as far as possible, any unruly or unlawful behaviour by or amongst the labourers and other employed by him.

The Contractor shall not engage or otherwise employ on the Works any person who, at the time of signing the contract, was employed by the Employer or its Consulting Employers Agents engaged upon the Works, unless the Contractor obtains the written consent of the Employers Agent in respect of the employment of such person.

SC8: SOURCE OF MATERIALS

Add to Clause 7.2

The source of supply of all materials including all stone, sand, gravel or soil or any other natural material required in the execution of the works shall be located by the contractor. No material shall be used until it has been approved by the Employers Agent.

SC9: EXTENSION OF TIME DUE TO INCLEMENT WEATHER

Add the following to Sub-Clause 5.12.2.2

(b) Abnormal climatic conditions.

No extensions of the time for completion shall be granted on the grounds of normal rainfall conditions, but extension of time in terms of Clause 5.12 of the General Conditions of contract on the grounds of abnormal rainfall or wet conditions shall be calculated separately for each calendar

month or part thereof, according to the following formula. It shall be calculated as follows for the time for completion, including any extension thereof:

$$V = (Nw - Nn) + \frac{(Rw\ Rn)}{X}$$

V = Extension of time for calendar days of the calendar month concerned. If the value of V is negative and the absolute value thereof is greater than Nn, V is taken as negative Nn.

Nw = Actual number of days during calendar month on which a rainfall of Y mm or more is recorded.

Nn = Average number of days in the calendar month concerned on which a rainfall of Y mm or more is recorded in terms of existing rainfall data

Rw = Actual rainfall for the calendar month concerned in mm

Rn = Average rainfall for the calendar month in mm deduced from existing rainfall data.

For the purposes of the contract Nn, Rn, X and Y shall have the values as stipulated below.

The total extension of time is the algebraic sum of the monthly totals for the period concerned, extension of time for parts of a month shall be calculated by using pro rata values of Nn and Rn. If the algebraic sum of the monthly totals is negative, no reduction of the time for completion as a result of rainfall shall be applicable.

This formula does not take any delays as a result of flood damage, which may cause further or simultaneous delays, into consideration and flood damage shall be treated separately for purposes of extension of time for completion.

The factor (Nw Nn) is considered as a fair allowance for deviation from the normal for the number of days on which the rainfall exceeds Y mm. The factor (Rw Rn)/X is considered as a fair allowance for deviation from the normal for the number of days on which the rainfall does not exceed Y mm, but on which wet conditions will hamper or disrupt work.

The Contractor shall keep daily rainfall records and submit it to the Employers Agent at every site meeting. No additional payment shall be made for the supply and installation of the rain gauge or for the keeping of the rainfall records and all costs must be included in the scheduled items:

Rainfall station : Dundee - Pol

Average annual rainfall : 845 mm

Average number of days per year with rainfall exceeding:

Y = 10mm
X = 20mm

MONTH	***Nn***	***Rn***	***MONTH***	***Nn***	***Rn***

January	4	125	July	1	18
February	3	114	August	1	31
March	3	91	September	2	57
April	2	48	October	3	93
May	1	33	November	4	103
June	1	19	December	3	114

SC10: EXTENSION OF TIME DUE TO DISRUPTION OF LABOUR

Add the following to Sub-Clause 5.12.2.4

Labour disruptions on a regional or national level due to political unrest, organised mass action or related incidents will be considered to be beyond the Contractors control.

Any strike within the confines of the Contractors company and/or this project only, will be deemed to be within the Contractors control .

SC11: VALUATION OF MATERIAL BROUGHT ONTO SITE

Add the following to Sub-Clause 6.10.2

Payment for materials on site will only be considered for those materials which are physically on site. Any statement in which a claim for materials on site is included, shall have attached a declaration that the materials listed in the statement are owned by the Contractor, accompanied by proof of ownership. The ownership of materials shall be transferred to the Employer in accordance with the pro forma Transfer of Rights bound in as an annexure to these Special Conditions of Contract.

SC12: TYPE OF SECURITY

Add the following to Sub-Clause 6.2.1

The contractor shall specify the type of security to be provided on the contract and should specify such on the table indicated below:

Type of Security	**Contractors Choice (Indicate YES or NO)**
Is Value Added Tax included in the Contract Sum and value of Works for calculating percentages?	
Cash deposit of % of the Contract Sum	
Performance Guarantee of % of the Contract Sum	
Retention of % of the value of Works	

Cash Deposit of % of the Contract Sum plus Retention of % of the value of Works	
Performance Guarantee of % of the Contract Sum plus Retention of % of the value of Works	

Note: In the Standard for Uniformity in Construction Procurement in Section 4.4.4.4 it is stated that: "Retention monies that are held shall not exceed 10% of any amount due to a contractor. Where guarantees of an insurance company or bank that are provided are equal to or greater than 10% of the contract price, the total amount of retention monies held shall not exceed 5% of the contract price."

C1.2.5 LABOUR INTENSIVE CONSTRUCTION REQUIREMENTS

PAYMENT FOR THE LABOUR-INTENSIVE COMPONENT OF THE WORKS

Payment for works identified in the Scope of Work as being labour-intensive shall only be made in accordance with the provisions of the Contract if the works are constructed strictly in accordance with the provisions of the scope of work. Any non-payment for such works shall not relieve the Contractor in any way from his obligations either in contract or in delict.

APPLICABLE LABOUR LAWS

The Ministerial Determination, Special Public Works Programmes, issued in terms of the Basic Conditions of Employment Act of 1997by the Minister of Labour in Government Notice N R63 of 25 January 2002, as reproduced below, shall apply to works described in the scope of work as being labour intensive and which are undertaken by unskilled or semi-skilled workers.

1 Introduction

1.1 This document contains the standard terms and conditions for workers employed in elementary occupations on an Expanded Public Works Programme (EPWP). These terms and conditions do NOT apply to persons employed in the supervision and management of a EPWP.

1.2 In this document

(a) department means any department of the State, implementing agent or contractor;
(b) employer means any department, implementing agency or contractor that hires workers to work in elementary occupations on a EPWP;
(c) worker means any person working in an elementary occupation on a EPWP;
(d) elementary occupation means any occupation involving unskilled or semi-skilled work;
(e) management means any person employed by a department or implementing agency to administer or execute an EPWP;
(f) task means a fixed quantity of work;
(g) task-based work means work in which a worker is paid a fixed rate for performing a task;
(h) task-rated worker means a worker paid on the basis of the number of tasks completed; (i) time-rated worker means a worker paid on the basis of the length of time worked.

2 Terms of Work

2.1 Workers on a EPWP are employed on a temporary basis.

2.2 Deleted.
2.3 Deleted.

3 Normal Hours of Work

3.1 An employer may not set tasks or hours of work that require a worker to work
(a) more than forty hours in any week (b) on more than five days in any week; and (c) for more than eight hours on any day.

3.2 An employer and worker may agree that a worker will work four days per week. The worker may then work up to ten hours per day.

3.3 A task-rated worker may not work more than a total of 55 hours in any week to complete the tasks allocated (based on a 40-hour week) to that worker.

4 Meal Breaks

4.1 A worker may not work for more than five hours without taking a meal break of at least thirty minutes duration.

4.2 An employer and worker may agree on longer meal breaks.
4.3 A worker may not work during a meal break. However, an employer may require a worker to perform duties during a meal break if those duties cannot be left unattended and cannot be performed by another worker. An employer must take reasonable steps to ensure that a worker is relieved of his or her duties during the meal break.

4.4 A worker is not entitled to payment for the period of a meal break. However, a worker who is paid on the basis of time worked must be paid if the worker is required to work or to be available for work during the meal break.

5 Special Conditions for Security Guards

5.1 A security guard may work up to 55 hours per week and up to eleven hours per day.

5.2 A security guard who works more than ten hours per day must have a meal break of at least one hour or two breaks of at least 30 minutes each.

6 Daily Rest Period

Every worker is entitled to a daily rest period of at least eight consecutive hours. The daily rest period is measured from the time the worker ends work on one day until the time the worker starts work on the next day.

7 Weekly Rest Period

Every worker must have two days off every week. A worker may only work on their day off to perform work which must be done without delay and cannot be performed by workers during their ordinary hours of work emergency work).

8 Work on Sundays and Public Holidays

8.1 A worker may only work on a Sunday or public holiday to perform emergency or security work.

8.2 Work on Sundays is paid at the ordinary rate of pay.

8.3 A task-rated worker who works on a public holiday must be paid
(a) the workers daily task rate, if the worker works for less than four hours;

(b) double the workers daily task rate, if the worker works for more than four hours.

8.4 A time-rated worker who works on a public holiday must be paid
(a) the workers daily rate of pay, if the worker works for less than four hours on the public holiday;
(b) double the workers daily rate of pay, if the worker works for more than four hours on the public holiday.

9 Sick Leave

9.1 Only workers who work four or more days per week have the right to claim sick-pay in terms of this clause.

9.2 A worker who is unable to work on account of illness or injury is entitled to claim one days paid sick leave for every full month that the worker has worked in terms of a contract.

9.3 A worker may accumulate a maximum of twelve days sick leave in a year.

9.4 Accumulated sick-leave may not be transferred from one contract to another contract.

9.5 An employer must pay a task-rated worker the workers daily task rate for a days sick leave.

9.6 An employer must pay a time-rated worker the workers daily rate of pay for a day s sick leave.

9.7 An employer must pay a worker sick pay on the workers usual payday.
9.8 Before paying sick-pay, an employer may require a worker to produce a certificate stating that the worker was unable to work on account of sickness or injury if the worker is
(a) absent from work for more than two consecutive days; or
(b) absent from work on more than two occasions in any eight-week period.

9.9 A medical certificate must be issued and signed by a medical practitioner, a qualified nurse or a clinic staff member authorised to issue medical certificates indicating the duration and reason for incapacity.

9.10 A worker is not entitled to paid sick-leave for a work-related injury or occupational disease for which the worker can claim compensation under the Compensation for Occupational Injuries and Diseases Act.

10 Maternity Leave

10.1 A worker may take up to four consecutive months unpaid maternity leave.

10.2 A worker is not entitled to any payment or employment-related benefits during maternity leave.

10.3 A worker must give her employer reasonable notice of when she will start maternity leave and when she will return to work.

10.4 A worker is not required to take the full period of maternity leave. However, a worker may not work for four weeks before the expected date of birth of her child or for six weeks after the birth of her child, unless a medical practitioner, midwife or qualified nurse certifies that she is fit to do so.

10.5 A worker may begin maternity leave
(a) four weeks before the expected date of birth; or

(b) on an earlier date

(i) if a medical practitioner, midwife or certified nurse certifies that it is necessary for the health of the worker or that of her unborn child; or
(ii) if agreed to between employer and worker; or

(c) on a later date, if a medical practitioner, midwife or certified nurse has certified that the worker is able to continue to work without endangering her health.

10.6 A worker who has a miscarriage during the third trimester of pregnancy or bears a stillborn child may take maternity leave for up to six weeks after the miscarriage or stillbirth.

10.7 A worker who returns to work after maternity leave, has the right to start a new cycle of twentyfour months employment, unless the EPWP on which she was employed has ended.

11 Family responsibility leave

11.1 Workers, who work for at least four days per week, are entitled to three days paid family responsibility leave each year in the following circumstances - (a) when the employees child is born;
(b) when the employees child is sick;
(c) in the event of a death of
(i) the employees spouse or life partner;
(ii) the employees parent, adoptive parent, grandparent, child, adopted child, grandchild or sibling.

12 Statement of Conditions

12.1 An employer must give a worker a statement containing the following details at the start of employment
(a) the employers name and address and the name of the EPWP;
(b) the tasks or job that the worker is to perform; and
(c) the period for which the worker is hired or, if this is not certain, the expected duration of the contract;
(d) the workers rate of pay and how this is to be calculated;
(e) the training that the worker will receive during the EPWP.

12.2 An employer must ensure that these terms are explained in a suitable language to any employee who is unable to read the statement.

12.3 An employer must supply each worker with a copy of these conditions of employment.

13 Keeping Records

13.1 Every employer must keep a written record of at least the following
(a) the workers name and position;
(b) in the case of a task-rated worker, the number of tasks completed by the worker; (c) in the case of a time-rated worker, the time worked by the worker; (d) payments made to each worker.

13.2 The employer must keep this record for a period of at least three years after the completion of the EPWP.

14 Payment

14.1 An employer must pay all wages at least monthly in cash or by cheque or into a bank account.

14.2 A task-rated worker will only be paid for tasks that have been completed.

14.3 An employer must pay a task-rated worker within five weeks of the work being completed and the work having been approved by the manager or the contractor having submitted an invoice to the employer.

14.4 A time-rated worker will be paid at the end of each month.

14.5 Payment must be made in cash, by cheque or by direct deposit into a bank account designated by the worker.

14.6 Payment in cash or by cheque must take place
(a) at the workplace or at a place agreed to by the worker;
(b) during the workers working hours or within fifteen minutes of the start or finish of work; (c) in a sealed envelope which becomes the property of the worker.

14.7 An employer must give a worker the following information in writing
(a) the period for which payment is made;
(b) the numbers of tasks completed or hours worked;
(c) the workers earnings;
(d) any money deducted from the payment; (e) the actual amount paid to the worker.
(f) If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it.
(g) If a workers employment is terminated, the employer must pay all monies owing to that worker
within one month of the termination of employment.

14.8 If the worker is paid in cash or by cheque, this information must be recorded on the envelope and the worker must acknowledge receipt of payment by signing for it.

14.9 If a workers employment is terminated, the employer must pay all monies owing to that worker within one month of the termination of employment.

15 Deductions

15.1 An employer may not deduct money from a workers payment unless the deduction is required in terms of a law.

15.2 An employer must deduct and pay to the SA Revenue Services any income tax that the worker is required to pay.

15.3 An employer who deducts money from a workers pay for payment to another person must pay the money to that person within the time period and other requirements specified in the agreement law, court order or arbitration award concerned.

15.4 An employer may not require or allow a worker to
(a) repay any payment except an overpayment previously made by the employer by mistake; (b) state that the worker received a greater amount of money than the employer actually paid to the worker; or
(c) pay the employer or any other person for having been employed.

16 Health and Safety

16.1 Employers must take all reasonable steps to ensure that the working environment is healthy and safe.

16.2 A worker must
(a) work in a way that does not endanger his/her health and safety or that of any other person;
(b) obey any health and safety instruction;
(c) obey all health and safety rules of the EPWP;
(d) use any personal protective equipment or clothing issued by the employer;
(e) report any accident, near-miss incident or dangerous behaviour by another person to their employer or manager.

17 Compensation for Injuries and Diseases

17.1 It is the responsibility of the employers (other than a contractor) to arrange for all persons employed on a EPWP to be covered in terms of the Compensation for Occupational Injuries and Diseases Act, 130 of 2014.

17.2 A worker must report any work-related injury or occupational disease to their employer or manager.

17.3 The employer must report the accident or disease to the Compensation Commissioner.

17.4 An employer must pay a worker who is unable to work because of an injury caused by an accident at work 75% of their earnings for up to three months. The employer will be refunded this amount by the Compensation Commissioner. This does NOT apply to injuries caused by accidents outside the workplace such as road accidents or accidents at home.

18 Termination

18.1 The employer may terminate the employment of a worker for good cause after following a fair procedure.

18.2 A worker will not receive severance pay on termination.

18.3 A worker is not required to give notice to terminate employment. However, a worker who wishes to resign should advise the employer in advance to allow the employer to find a replacement.

18.4 A worker who is absent for more than three consecutive days without informing the employer of an intention to return to work will have terminated the contract. However, the worker may be reengaged if a position becomes available for the balance of the 24-month period.

18.5 A worker who does not attend required training events, without good reason, will have terminated the contract. However, the worker may be re-engaged if a position becomes available for the balance of the 24-month period.

19 Certificate of Service

19.1 On termination of employment, a worker is entitled to a certificate stating
(a) the workers full name;
(b) the name and address of the employer;
(c) the EPWP on which the worker worked;
(d) the work performed by the worker;
(e) any training received by the worker as part of the EPWP; (f) the period for which the worker worked on the EPWP;
(g) any other information agreed on by the employer and worker.

20 Contractors default in payment to Labourers and Employees

(a) Any dispute between the Contractor and labourers, regarding delayed payment or default in payment of fair wages, if not resolved immediately may compel the Employer to intervene.

(b) The Employer may, upon the Contractor defaulting payment, pay the moneys due to the workers not honoured in time, out of any moneys due or which may become due to the Contractor under the Contract.

21 Provision of Handtools, PPE and EPWP overalls

(a) The Contractor shall provide his labour force with hand tools of adequate quality, sufficient in numbers and make the necessary provisions to maintain the tools in good and safe working conditions.

All workers shall be provided with the necessary PPE and the standard EPWP two piece orange overall set. The overalls should have the DPW logo on the left hand side, the EPWP logo on the right hand side (chest). EPWP should also be printed in Arial, Bold, Black on the back of the overall.

22 MINIMUM LABOUR BASED TARGETS

The following minimum labour based targets are required to be met:

22.1 LABOUR BUDGET AS PERCENTAGE OF PROJECT BUDGET

A minimum of 25% of the Project Budget is required to be spent on local community labour.

22.2 EMPLOYMENT OF LOCAL LABOUR

(i) The Contractor is required to make maximum possible use of the local labour force from the community, which is at present underemployed or unemployed.

(ii) To this end the Contractor is required to give preference to the use of local labour and limit the use of non-local labour to key personnel only.

(iii) The Contractor shall, through all available community structures, inform the local community of the labour intensive works and the employment opportunities presented thereby. Preference must be given to people with previous practical experience in construction and / or who come from households:

a) where the head of the household has less than a primary school education;
b) that have less than one full time person earning an income;
c) where subsistence agriculture is the source of income.
d) those who are not in receipt of any social security pension income

(iv) Local labour is defined as people who reside in the community who have preferable been identified by the Project Steering Committee to be employed

(v) Key Personnel are defined as foremen and skilled labourers without whom the particular job could not be accomplished. As far as possible these people should impart their management and building skills to individuals within the community workforce who show a keen interest and display a willingness to learn.

22.3 EMPLOYMENT OF WOMEN, YOUTH AND DISABLED PERSONS

The Contractor shall endeavour to ensure that the expenditure on the employment of temporary workers is in the following proportions:

a) 55 % women;
b) 40% youth who are between the ages of 18 and 35; and
c) 2% on persons with disabilities.

22.4 EMPLOYMENT OF LOCAL SUB-CONTRACTORS

The Contractor may also as part of the requirement to spend a minimum of 25% of the Project Budget is on local community labour make use of local sub-contractors. These sub-contractors will be identified by the available community structures and then be selected by the contractor through a quotation process.

23 MINIMUM REPORTING

23.1 CONTRACTORS REPORT

The Contractor is required to complete a Contractors Report, which is to be submitted together with the Contractors Payment Claims all as per the Reporting Schedule 1 - 5 (overall) attached hereto. Payment of the contractor is conditional on the information being accurately and timeously provided.

23.2 PROGRESS REPORTS

Progress report detailing production output compared to the programme of works shall be submitted monthly.

23.3 WORKER CONTRACTS

All worker contracts for workers employed during the month must accompany the Reporting Schedule 1 - 5 attached hereto.

24 ATTACHMENTS

Reporting Schedule 1 (Daily Site Attendance Register)
Reporting Schedule 2 (Payment Register)
Reporting Schedule 3 (Beneficiary List)
Reporting Schedule 4 (Monthly progress report)
Reporting Schedule 5 (Contractors Monthly Report on Sub-contractors)

ENDUMENI LOCAL MUNICIPALITY

TENDER NO. B24/2020-21

UPGRADE OF SIBONGILE SUBSTATION

C1.3 FORM OF GUARANTEE

Tender no. B24/2020-21

WHEREAS **Endumeni Local Municipality** (hereinafter referred to as the Employer) entered into, a Contract with:

. . . . . .

(hereinafter called the Contactor) on the . . . . . day of . . . . .20. . . ., for the

UPGRADE OF SIBONGILE SUBSTATION.

AND WHEREAS it is provided by such Contract that the Contractor shall provide the Employer with security by way of a guarantee for the due and faithful fulfillment of such Contract by the Contractor;

AND WHEREAS . . . . . has / have at the request of the Contractor, agreed to give such guarantee;

NOW THEREFORE WE . . . . . do hereby guarantee and bind ourselves jointly and severally as Guarantor and Co-principal Debtors to the Employer under renunciation of the benefits of division and excussion for the due and faithful performance by the Contractor of all the terms and conditions of the said Contract, subject to the following conditions:

1. The Employer shall, without reference and / or notice to us, have complete liberty of action to act in any manner authorized and/or contemplated by the terms of the said Contract, and/or to agree to any modifications, variations, alterations, directions or extensions of the completion date of the works under the said Contract, and that its rights under this guarantee shall in no way be prejudiced nor our liability hereunder be affected by reason of any steps which the Employer may take under such Contract, or of any modification, variation, alterations of the completion date which the Employer may make, give, concede or agree to under the said Contract.

2. This guarantee shall be limited to the payment of a sum of money.

3. The Employer shall be entitled, without reference to us, to release any guarantee held by it, and to give time to or compound or make any other arrangement with the Contractor.

4. This guarantee shall remain in full force and effect until the issue of the Certificate of Completion in terms of the Contract, unless we are advised in writing by the Employer before the issue of the said Certificate of his intention to institute claims, and the particulars thereof, in which event this guarantee shall remain in full force and effect until all such claims have been paid or liquidated.

5. Our total liability hereunder shall not exceed the Guaranteed Sum of . . . . . .Rand (in words);

   R . . . . . (in figures)

6. The Guarantor reserves the right to withdraw from this guarantee by depositing the Guaranteed Sum with the beneficiary, whereupon our liability hereunder shall cease.

7. We hereby choose our address for the serving of all notices for all purposes arising here from as:

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

IN WITNESS WHEREOF this guarantee has been executed by us at . . . . on this . . . . . day of . . . . . 20 . . . . . .

Signature . . . . . .

Duly authorized to sign on behalf of . . . . . .

Address . . . . . .
. . . . . .

As witnesses:

1 . . . . . .

2 . . . . . .

ENDUMENI LOCAL MUNICIPALITY

TENDER NO. B24/2021-21

UPGRADE OF SIBONGILE SUBSTATION

C1.4: DISCLOSURE STATEMENT

General Conditions of Contract for Construction Works, Third Edition (2015)

PRO FORMA

***Please note that words in italics within brackets are items which should* be stated.**

(Date):

Contract:

Contractor:

Employer: ENDUMENI LOCAL MUNICIPALITY

Employer's Agent: CIVTECH ENGINEERS (PTY) LTD

Dear Sirs

I am willing and available to serve as *(ad-hoc/standing)* Adjudication Board Member in the above-mentioned Contract.

In accordance with the General Conditions of Contract for Construction Works Adjudication Board Rules relating to disclosure statements by selected or nominated persons to the adjudication, I hereby state that:

- I shall act with complete impartiality and know of nothing at this time, which could affect my impartiality.
- I have had no previous involvement with this project.
- I do not have any financial interest in this project.
- I am not currently employed by the Contractor, Employer or Employer's Agent.
- I do not have any financial connections with the Contractor, Employer or Employer's Agent.

- I do not have or have not had a personal relationship with any authoritative member of the Contractor, Employer or the Employer's Agent which could affect my impartiality.

- I undertake to immediately disclose to the parties any changes in the above position which could affect my impartiality or be perceived to affect same.

Should there be any deviation from the foregoing statements, details shall be given.

I further declare that I am experienced in the work which is carried out under the Contract and in interpreting contract documentation.

Name in full:

Signature:

C1.5 ADJUDICATORS AGREEMENT

This agreement is made on the .. day of ..... between: ..... (name of company / organisation) of

.....

.....

.....

(address) And ..... (name of company / organization) of

.....

....

(address)

(the Parties) and

.....

(name) of

.....

.....

(address)

(the Adjudicator).

Disputes or differences may arise/have arisen* between the Parties under a Contract dated ..... and known as. ..... and these disputes or differences shall be/have been* referred to adjudication in accordance with GCC 2010, Clause 10.5.2, and the Adjudicator may be / has been* requested to act.

* Delete as necessary

IT IS NOW AGREED as follows:

1. The adjudication shall be conducted in accordance with the rights and obligations of the Adjudicator and the Parties as set out in the Procedure as per Clause 10.5.2 of the GCC 2010.

2. The Adjudicator hereby accepts the appointment and agrees to conduct the adjudication in accordance with the Procedure.

3. The Parties bind themselves jointly and severally to pay the Adjudicator's fees and expenses in accordance with the Procedure.

4. The Parties and the Adjudicator shall at all times maintain the confidentiality of the adjudication and shall endeavour to ensure that anyone acting on their behalf or through them will do likewise, save with the consent of the other Parties which consent shall not be unreasonably refused.

ENDUMENI LOCAL MUNICIPALITY

TENDER NO. B24/2020-21

UPGRADE OF SIBONGILE SUBSTATION

5. The Adjudicator shall inform the Parties if he intends to destroy the documents which have been sent to him in relation to the adjudication and he shall retain documents for a further period at the request of either Party.

6. The Adjudicator shall be paid at the hourly rate of R..... in respect of all time spent upon, or in connection with, the adjudication including time spent travelling.

7. The Adjudicator shall be reimbursed in respect of all disbursements properly made including, but not restricted to:

   (a) Printing, reproduction and purchase of documents, drawings, maps, records and photographs.
   (b) Telegrams, telex, faxes, and telephone calls.
   (c) Postage and similar delivery charges.
   (d) Traveling, hotel expenses and other similar disbursements.
   (e) Room charges.
   (f) Charges for legal or technical advice obtained in accordance with the Procedure.

8. The Adjudicator shall be paid an appointment fee of R . . . . . This fee shall become payable in equal amounts by each Party within 14 days of the appointment of the Adjudicator, subject to an Invoice being provided. This fee will be deducted from the final statement of any sums which shall become payable under item 6 and/or item 7. If the final statement is less than the appointment fee the balance shall be refunded to the Parties.

9. The Adjudicator is/is not* currently registered for VAT.

10. Where the Adjudicator is registered for VAT it shall be charged additionally in accordance with the rates current at the date of invoice.

11. All payments, other than the appointment fee (item 8) shall become due 7 days after receipt of invoice, thereafter interest shall be payable at 5% per annum above the Reserve Bank base rate for every day the amount remains outstanding.

SIGNED by:

_____

Name: _____

who warrants that he / she is duly authorized to sign for and on behalf of the first Party in the presence of

Witness: _____

Name: _____

Address: _____

_____

_____

Date: _____ SIGNED

SIGNED

by: _____ by: _____

Name: _____ Name: _____ who warrants that he / she is duly the Adjudicator in the presence authorized to sign for and behalf of of the second Party in the presence of

	Name: _____	Name:	_____
	Address: _____	Address:	_____
Witness: _____	_____		_____
Witness: _____	_____		_____
	Date: _____	Date:	_____

* Delete as necessary **C1.6 AGREEMENT OF INDEMNITY IN TERMS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT 1993 ENTERED INTO**

BETWEEN

THE ENDUMENI LOCAL MUNICIPALITY

duly represented herein by in his capacity as

.. (hereinafter referred to as the "EMPLOYER")

and

. . . .

duly represented herein by ... . in his capacity as

..

(hereinafter referred to as the "MANDATORY")

The EMPLOYER and the MANDATORY hereby agree, in terms of the provisions of Section 37(2) of the Occupational Health and Safety Act 1993 (Act 85 of 1993, hereinafter referred to as the Act), that as far as the work described in 1 hereafter, the following arrangements and procedures shall apply between them to ensure compliance by the MANDATORY with the provisions of the Act, namely:

1. DESCRIPTION OF WORK: .....

.....

.....

.....

2. DEFINITIONS:

EMPLOYER: means any person who employs or provides work for any person and remunerates that person or expressly or tacitly undertakes to remunerate him, but excludes a labour broker as defined in Section 1(1) of the Labour Relations Act, 1956 (Act No 28 of 1956).

ENDUMENI LOCAL MUNICIPALITY

TENDER NO. B24/2020-21

UPGRADE OF SIBONGILE SUBSTATION

MANDATORY: includes an agent, a contractor or a sub-contractor for word, but without derogating from his status in his own right as an employer or a user.

3. ARRANGEMENTS AND PROCEDURES:

3.1 The MANDATORY as an employer in his own right, undertakes to acquaint the appropriate officials and employees of the MANDATORY with all relevant provisions of the Act and the regulations promulgated in terms of the Act;

3.2 The MANDATORY undertakes that all relevant duties, obligations and prohibitions imposed in terms of the Act and Regulations will be fully complied with;

3.3 The MANDATORY hereby accepts sole liability for such due compliance with the relevant duties, obligations and prohibitions imposed by the Act and Regulations and expressly absolves the EMPLOYER from itself being obliged to comply with any of the aforesaid duties, obligations and prohibitions; and

3.4 The MANDATORY agrees that any duly authorized officials of the EMPLOYER shall be entitled, although not obliged, to take such steps as may be necessary to ensure that the MANDATORY has complied with his undertakings as set out more fully in paragraphs 1 and 2 above, which steps may include, but not be limited to, the right to inspect any appropriate site or premises.

3.5 The MANDATORY undertakes to furnish the EMPLOYER with a letter of good standing in terms of Section 89 of the Compensation for Occupational Injuries and Diseases Act 1993 (Act No 130 of 1993) before any work in terms of this agreement is commenced.

3.6 The MANDATORY undertakes to appoint a designated responsible person in terms of the Act, and to furnish the EMPLOYER with a copy of such appointment before any work in terms of this agreement is undertaken.

THUS, DONE AND SIGNED AT . ON THIS ...DAY OF 20

AS WITNESSES:

1. ....

(For and on behalf of the **EMPLOYER**)

2. .....

THUS, DONE AND SIGNED AT RICHARDS BAY ON THIS DAY OF . 20 ..

AS WITNESSES:

1. .....

2. .....

(For and on behalf of the **MANDATORY**)

C1.7 TRANSFER OF RIGHTS AND INDEMNITY FOR MATERIALS ON SITE

Claim for materials on site, Payment Certificate No: .. .. Date:

Contract No: for (*contract title*) .

..

I, the undersigned (*name of signatory*) . .. .. in my capacity as

. of (*name of Contractor*) .
duly authorized hereto on behalf of the Contractor hereby transfer, cede and assign all the Contractors rights, title and interest in and to the materials and goods, for which evidence of bona fide ownership is attached hereto,
unto and in favour of (*name of Employer*) . . ..
Insofar as the Contractor retains actual control of the materials and goods, the right of ownership thereof passes to the Employer by *constitutum possessorium*.

I herewith indemnify the Employer against any claim to and in respect of said materials by reason of the Contractors sequestration or liquidation or of any effect in the Contractor s title to the materials and agree that no payment for materials on site will be made by the Employer until such time as I have submitted documentary proof of bona fide ownership of the said materials and goods.

The transfer shall become effective upon conclusion of the Contractor receiving payment from the Employer or from any other person on behalf of the Employer for the materials and goods as Materials on Site, payment of retention money thereon excluded.

I further confirm that I am fully responsible for all materials and goods listed under this Transfer of Rights and that they gave been insured adequately against all risks and will remain insured until they are built into or used in the permanent works and taken over by the Employer.

ENDUMENI LOCAL MUNICIPALITY

TENDER NO. B24/2020-21

UPGRADE OF SIBONGILE SUBSTATION

This certificate of Transfer of Rights applies only to the materials and goods as listed in the following table:

DESCRIPTION OF ITEM	UNIT	QTY	RATE	AMOUNT	SUPPLIER
TOTAL VALUE OF MATERIALS AND GOODS					

Signed by . Date .. for and on behalf of the Contractor,

Witnesses by ... . . Date ..

[Note: This form, together with the documentary proof of ownership or proof of payment by the Contractor to the supplier, shall accompany the Contractors claim for payment for materials on site in terms of Clause 52(1)(e) of the General Conditions of Contract 1990.]

PART C2: PRICING DATA

CONTENTS

C2.1: PRICING INSTRUCTIONS

C2.1 PRICING INSTRUCTIONS

2.1.1 SCOPE

The Schedule of Quantities comprises items covering the measurement and payment of the Contractors costs of general liabilities, the construction of temporary and permanent works, defects correction (when specified) and profit.

The Conditions of Tender or Requirements for Tendering (as applicable), Conditions of Contract, Specifications (including the Project Specification) and the Drawings are to be read in conjunction with the Schedule of Quantities.

2.1.2 METHOD OF MEASUREMENT AND PAYMENT

The Schedule of Quantities has been drawn up generally in accordance with the methods and procedures applicable to the category of work concerned as set out in SABS 1200 Standardized Specification for Civil Engineering Construction and in Civil Engineering Quantities (published by the South African Institution of civil Engineers), and current at the time of the Tender.

The measurement and payment clause of each Section of the Standard and Particular Specification, read together with the relevant clauses of the Project Specification, set out what ancillary or associated activities are included in the rates for the operations specified. Should any requirement of the measurement and payment clause(s) of the applicable Standard Specification, or the Particular Specification or the Project Specification conflict with the terms of the Schedule of Quantities or, when relevant, with Civil Engineering Quantities , the requirements of the Standard, particular or Project Specification, as applicable, shall prevail.

2.1.3 DESCRIPTION AND DIRECTIONS

Directions and descriptions of materials to be used and works to be executed given in the Schedule of Quantities, are for identification purposes only, are abbreviated and are not necessarily complete. Reference shall be made to the Conditions of Contract, Specifications and the Drawings for the full information.

2.1.4 REFERENCES

Where cross references are given in the Schedule of Quantities to clauses in other contract documents in which items are mainly described, such references are not necessarily complete. References to sections of and clauses in other contract documents and to the drawings will normally be abbreviated and prefixed as follows:

Document Prefix

Conditions of Tender or Requirements for Tendering	T
Conditions of Contract	C
Project Specification	PS
Particular Specification	P
Standardized SABS 1200 Specification Series	Not prefixed
Standard (In-house) Specifications	S
Civil Engineering Quantities	SEQ
Contract Drawing	D

The prefixes are followed by the relevant section and/or clause number or drawing number, as applicable.

2.1.5 RATES AND PRICES

The rates and prices to be inserted in the Schedule of Quantities are to be the full inclusive prices to be paid by the Employer for the work described under the several items. Such rates and prices shall cover all costs and expenses that may be required in and for the construction of the work described and shall cover the cost of all general risks, liabilities and obligations set forth or implied in the documents on which the Tender is to be based.
The Tenderer is at liberty (subject to the provision of Sub-Clause 1.9 hereinafter) to insert a rate of his own choosing for each item in the Schedule of Quantities and his attention is drawn to the fact that the Contractor has the right, under various circumstances, to payment for additional works carried out and that the Engineer is obliged to base his Assessment of the rates of prices to be paid for such additional work on the rates inserted in the Schedule of Quantities by the contractor.

A price, rate or the word Nil is to be entered against each item in the Schedule of Quantities against which a unit of measurement is stated, whether a quantity is stated or not. An item against which no price or rate is entered or to which a word other than Nil is entered, will be considered to be covered by the other prices or rates in the Schedule of Quantities but the rate will nevertheless be taken as nil and no claim will be considered if the quantity of such item should increase or decrease.

2.1.6 VALUE ADDED TAX, SURCHARGES AND LEVIES

All rates and prices tendered shall be exclusive or Value Added Tax (VAT) and provided for as a lump sum in the Summary of the Schedule of Quantities.

All rates and prices tendered including rates for Day work items shall be inclusive of any statutory surcharges and levies by the Regional Services Council payable by the Contractor on all items to which these apply at the time of the closing of the tender.

2.1.7 NETT MEASUREMENT

Unless otherwise stated, all items shall be measured nett in accordance with the Drawings and as specified. When relevant prices and rates are to allow for waste of whatever nature, for all straight cutting (notwithstanding any trade customs to the contrary), and for over-break in excavations.

2.1.8 ARITHMETICAL ERRORS IN PRICES SCHEDULE

In the event of discrepancies between the unit rates and the extended totals, the unit rates will be taken as correct. The employer reserves the right to correct the total Tender Sum in the event of there being any errors of extension or addition in the priced Schedule of Quantities. In such an event, the Tenderer will be consulted but, failing agreement between the parties, the decision of the Employer shall be final and binding. Adjustment of the Tender sum will take place only after acceptance of the Tender, but prior to the signing of the Contract Agreement.

2.1.9 REJECTION OF TENDER

A tender may be rejected if the rates or prices for some of the items in the schedule of Quantities are, in the opinion of the Employer, obviously unreasonable or out of proportion or not in consistence with other rates or prices in the Schedules and the Tenderer fails, within a period of seven days after having been notified in writing by the employer or the Engineer to adjust and/or amend the rates or prices of such items, to make the adjustment(s) and/or amendments required.

2.1.10 USE OF SCHEDULE OF QUANTITIES

The Schedule of Quantities will form the basis for the re-measurement of the Works, the evaluation of interim payment and the valuation of any additional or substituted work ordered by the Engineer in terms of the Conditions of Contract. The Schedule will, however, not be adjusted on the grounds of factors or items not taken into account by the Contractor.

The quantities of work and material stated in the Schedule shall not be considered as limiting or extending the amount of work to be executed or material to be supplied by the Contractor.

The Schedule of Quantities is not intended for use in ordering materials, and the contractor is advised to obtain his own information from the Specifications and Drawings and to consult the Engineer before the ordering of materials.

2.1.11 PROVISIONAL QUANTITIES AND ITEMS

Provisional quantities and items may be scheduled in the Schedule of Quantities in respect of which:

(a) The relevant quantity cannot be calculated from the tender drawings; or

(b) Where it is anticipated that the quantities calculated from the tender drawings may be subject to variation. If quantities are schedule twice for the same item of work, the one item being designated in the Schedule of Quantities as a Provisional Quantity, the Tenderer is at liberty to enter rates which he deems appropriate, and the rates shall be based on the assumption that measurement and payment shall only be effected under the pay item designated as Provisional, once the quantity under the other pay item has been fully measured.

2.1.12 INSCRIPTIONS

The Tenderer must do all his entries legibly in the Schedule of Quantities in black ink.

2.1.13 PREAMBLE TO DAYWORK SCHEDULE

2.1.13.1 Scope

Day work shall be deemed to be work (including stand-by time) and/or materials which are measured and valued in terms of Time and Cost and the Day work Schedule shall only be used for the valuation of any additional or substituted work and/or material which cannot, in terms of Sub-Clauses 40(1)(a), (b) and (c) of the General Conditions of Contract, conveniently be valued at rates and prices so far as possible consistent with rates and prices set out in the Schedule of Quantities.

2.1.13.2 The Engineer may order work on a day work basis and the Contactor shall execute such day work in terms of Sub-Clause 40(1)(d) of the General Conditions of Contract.

2.1.13.3 Day work shall be measured and the Contractor shall be paid for such day work in terms of Sub-Clause 40(4)(a) of the General Conditions of Contract and in terms of Civil Engineering Quantities for materials supplied, labour employed and plant used, unless otherwise specified in this Preamble to the Day work Schedule.

2.1.13.4 Day work shall be valued by the Engineer for payment to the Contractor in accordance with the provisions for materials labour and plant in this Preamble, which valuation shall be either in accordance with fixed unit rates tendered for the respective categories of materials, labour and plant, or in accordance with the percentages of the actual nett costs stated by the Engineer or tendered by the Contractor (as the case may be) separately for materials, labour and plant, which percentages shall be added to the actual nett costs; provided always that no payment shall be made for transport of materials, plant and labour to and from the Site specifically for employment on day work unless to and approved of in writing by the Engineer prior to the employment thereof.

2.1.13.5 The fixed unit rates tendered and/or the percentage allowances stated or tendered (as the case may be) for addition to the actual nett costs for materials, labour and mechanical plant shall include all overhead charges and profit, site supervision and site staff, foreman, time

keeping, clerical work, insurances, holidays with pay, the use and maintenance of hand tools and other non-mechanical plant and equipment, travelling allowances and/or costs, lodging allowances and any other emoluments and allowances payable to workmen at the date of submission of the Tender, provide always that the said unit rates and/or the said percentage allowances in respect of labour and plant shall be applicable to such workmen and to such plant as should be available on the Site of Works for the due execution of the works in terms of the Contract.

2.1.13.6 The percentage, allowance to be added (if applicable) to actual nett costs shall not be subject to price adjustment. The fixed unit rates tendered shall be subject to price adjustment in terms of the Conditions of Contract by the application of the relevant indices referred to in the applicable contract Price Adjustment Schedule for materials, labour and plant respectively (as the case may be), provided that price adjustment on special materials (if any) shall be applied as provided for in the said adjustment schedule.

2.1.13.7 Time shall be measured per hour to the nearest one fifth of an hour and shall be deemed to be the period of active use or employment on an item of day work, save as provided for stand-by below.

Stand-time, when measured and paid for at hourly rates, shall be deemed to be periods during which plant and/or workmen (labour) allocated to day work and in readiness for employment on the specific item of day work is compelled to stand idle and be inactive due to reasons beyond the Contractors control. Payment for stand-by time will be made only for periods of inactivity during normal working hours.

2.1.13.8 The Contractor shall submit rates or prices for the Engineers approval prior to the employment on day work of any labour, materials, plant, transport or whatever in respect of which no scheduled rates for day work are applicable.

2.1.13.9 Materials

Materials supplied and delivered shall be measured by the actual quantities used, including reasonable and unavoidable wastage and valued (if applicable) in accordance with invoices at actual nett cost. Materials used shall be paid either at the said nett cost plus a percentage allowance or at the unit rates for materials (as the case may be) in the materials Day work Schedule.

The unit rates and/or percentage allowance shall be exclusive of Value Added Tax and inclusive of surcharge(s) applicable at the time of the closing of the tender and transport and delivery costs to the usual points at which materials are receive on the Site, but exclusive of any cash discounts to the Contractor. Distribution costs to individual sites where day work is in progress shall be chargeable in addition.

The Employer shall be entitled, but not obligated, to receive materials for temporary use on day work (such ads formwork, wires, chains, etc.) in his store after use.

2.1.13.10 Labour

Labour employed shall be measured by the actual period of employment per hour for each of the relevant workmen and foremen and valued (if applicable) at the nett actual cost, i.e. the gross remuneration of the workmen applicable to the period of employment. Labour shall be paid either at the said nett cost plus a percentage allowance or at the unit rates for each category of labour (as the case may be) in the labour Day work Schedule.

The unit rates and/or percentage allowance shall include the cost of the working time of foremen and travelling time of the workmen and foremen to and from the Site (unless the workmen are brought to the Site specifically for employment on day work as pre-agreed and approved of by the Engineer).

Additional payment shall be made for overtime in the same proportion as paid to the workmen.

2.1.13.11 Plant

The use of mechanical plant shall be measured by the actual time employed and time standing by respectively per hour and valued (if applicable) at actual nett cost in accordance with hire rates pre-agreed and approved of by the Engineer. Mechanical plant shall be paid either at the said nett cost plus a percentage allowance or at the unit rates for each category of plant (as the case may be) in the plant Day work Schedule.

The unit rates and/or percentage allowance shall include for the hire and/or use of such plant, the plant operators time, insurance, consumable stores, fuel, lubrication, maintenance and transport to, on and from the Site (unless brought on to the Site specifically for use on day works as pre-agreed and approved of by the Engineer), provided that the pre-agreed hire rates on which the actual nett costs are to be based shall not be greater than the rates ruling in the area under consideration; and provided further that the percentage allowance shall not be applied to the Contractors plant hire rates for his own plant.

Only when provided as such in the plant Day work Schedule, payment at hourly rates shall distinguish between periods of actual operation and stand-by time.

2.1.14 PREAMBLE TO CONTRACT PRICE ADJUSTMENT SCHEDULE

Matters pertaining to contract price adjustment are dealt with in the relevant Annexures to the General and Special Conditions of Contract and in the Appendices to Tender, when applicable.

C2.2: BILL OF QUANTITIES

SECTION 1: PRELIMINARY AND GENERAL

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
	SANS 1200 A	**SECTION 1: PRELIMINARY AND GENERAL**				
	8.3	FIXED-CHARGE ITEMS				
1.1	8.3.1	Contractual Requirements	Sum	1		
	8.3.2	Establish Facilities on the Site :				
	8.3.2.1, PS 6.2	a) Facilities for Engineer (SANS 1200 AB)				
1.2		Office and furniture for meeting purposes	Sum	1		
1.3		Name-boards as per drawing	No.	2		
1.4		Telephone	Sum	1		
	8.3.2.2	b) Facilities for Contractor				
1.5		Offices and storage sheds	Sum	1		
1.6		Workshops	Sum	1		
1.7		Ablution and latrine facilities	Sum	1		
1.8		Tools and equipment	Sum	1		
1.9		Water supplies, electric power and communications	Sum	1		
1.10	PS 10.6.1215	Dealing with water (Subclause 5.5) including de-watering pipe trenches and road excavation.	Sum	1		
1.11	PS10.6.8, D5.1.4.1	Pollution (Subclause 5.6)	Sum	1		
1.12	PS10.6.6	Access (Subclause 5.8)	Sum	1		
1.13	8.3.3	Other fixed-charge obligations	Sum	1		
1.14	8.33	Provision of As-built drawings	Sum	1		
1.15	8.3.4, PS10.6.17	Remove Engineer's and Contractor's Site establishment on completion	Sum	1		
	PS11	OCCUPATIONAL HEALTH AND SAFETY				

SECTION 1: PRELIMINARY AND GENERAL

1.16		a) Preparation of Health and Safety Plan	Sum	1		
TOTAL CARRIED FORWARD						

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
1.17		b) Health and Safety Training	Sum	1		
1.18		c) Personal Protective Clothing and Equipment	Sum	1		
1.19		d) Fences, Signs and Barricades	Sum	1		
1.20		e) Establishment of Safety Administration	Sum	1		
1.21		f) Other Health and Safety Fixed-charge Obligations	Sum	1		
	8.4	TIME-RELATED ITEMS				
1.22	8.4.1	Contractual Requirements	Months	4		
	8.4.2	Operate and maintain facilities on the Site:				
	8.4.2.1, PS 6.2	a) Facilities for Engineer for duration of construction (SANS 1200 AB)				
1.23		Office and furniture for meeting purposes	Months	4		
1.24		Telephone	Months	4		
	8.4.2.2	b) Facilities for Contractor for duration of construction, except where otherwise stated				
1.25		Offices and storage sheds	Months	4		
1.26		Workshops	Months	4		
1.27		Ablution and latrine facilities	Months	4		
1.28		Tools and equipment	Months	4		
1.29		Water supplies, electric power and communications	Months	4		

SECTION 1: PRELIMINARY AND GENERAL

1.30	PS 10.6.1315	Dealing with water (Subclause 5.5) including de-watering pipe trenches and road excavation.	Months	4		
1.31	PS10.6.8, D5.1.4.1	Pollution (Subclause 5.6)	Months	4		
TOTAL CARRIED FORWARD						

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
1.32	PS10.6.6	Access (Subclause 5.8)	Months	4		
1.33	8.4.3	Supervision for duration of contract	Months	4		
1.34	8.4.4	Company and head office overhead costs	Months	4		
1.35	8.4.5	Other time-related obligations	Months	4		
	PS11	OCCUPATIONAL HEALTH AND SAFETY				
1.36		a) Implementation and maintenance of Health and Safety Plan	Months	4		
1.37		b) Provision of Construction Safety Officer(s)	Months	4		
1.38		c) Implementation and maintenance of Training	Months	4		
1.39		d) Maintenance of Personal Protective Clothing and Equipment	Months	4		
1.40		e) Maintenance of Fences, Signs and Barricades	Months	4		
1.41		f) Implementation and maintenance of Safety Administration	Months	4		
1.42		g) Other Health and Safety Time-related Obligations	Months	4		
1.43		h) Submission of Health and Safety File	Sum	1		
	8.5	SUMS STATED PROVISIONALLY BY ENGINEER				

SECTION 1: PRELIMINARY AND GENERAL

1.44		Specified Soil testing as order by engineer at approved laboratory.	PC Sum	1		30 000,00
1.45		Extra over 1,.44 for profit, administration etc.	%	30 000		
	8.7	DAY WORKS				
		Personnel				
1.46		a) Unskilled labour	h	27		
1.47		b) Semi-skilled labour	h	27		
1.48		c) Skilled labour	h	27		
TOTAL CARRIED FORWARD						

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
TOTAL BROUGHT FORWARD						
1.49			h	18		
		d) 250 cmf compressor (7m^3/min) complete with 2 tools and operators				
		Transport				
1.50		a) LDV	km	48		
1.51		b) Flatbed truck	km	16		
1.52		c) Lowbed transport of plant	km	16		
	8.8	TEMPORARY WORKS				
1.53	8.8.1	Access 300 m complete with150 G7 Gravel mixed and compacted to 95% MDD road to works (construct and maintain)	Sum	1		
1.54	PSA8.8.2	Deal with traffic and accommodation of traffic	Sum	1		
	8.8.4	Existing services				
1.55		Excavate by hand in soft material to expose existing service as indicated on drawings or as directed by the Engineer	m3	200		
		PROVISIONAL SUMS BY ENGINEER				

SECTION 1: PRELIMINARY AND GENERAL

1.56		Appointment of Community Liaison Officer (CLO)	PC Sum	1		48 000,00
1.57		Extra over 1.56 for profit, administration etc.	%	48 000		
1.58		For relocating electrical services and poles to be undertaken by approved sub-contractor	PC Sum	1		150 000,00
1.59		Extra over 1.58 for profit, administration etc.	%	150 000		
1.60		Provisional Sum for Remote monitoring of metering systems. (R50 000.00. Tenderer to insert in RATE column when pricing)	P/Sum	1		50 000,00
1.61		Extra over 1.60 for profit, administration etc.	%	50 000		
TOTAL CARRIED FORWARD TO FINAL SUMMARY						

SECTION 2: ELECTRICAL UPGRADE

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
		SECTION 2: ELECTRICAL UPGRADE				
2.1	**B2**	**MV SWITCHGEAR UPGRADE** Supply, deliver, install and commission new MV switchgear in substation per specifications consisting of following components: Refer to SLD and Schedule in specifications for equipment details.				
2.1.1	PI.1.1	800A Incomer panels with ABB protection relays	No.	2		
2.1.2	PI.1.1	800A Bus-section panel	No.	1		
2.1.3	PI.1.1	630A Feeders with ABB protection relays	No.	5		
2.1.4	PI.1.1	630A Transformer feeder panel with ABB protection relays	No.	1		
2.1.5	B4 / PI.1.2	110VDC-10A-29A/Hour BTU for 12 hour backup	No.	1		
2.1.6	B2	Stand-off switch and Operating tools mounted on wall	No.	2		
2.1.7	B2	Deliver and rigging panels in position	Item	1		
2.1.8		Installation and commissioning of MV panels and BTU by manufacturer authorised installer	Item	1		
2.1.9		**Factory Acceptance Test (FAT Tests)** Allowance for FAT test at the Manufacturers facility. Costs to be allowed for 1 x engineer and 1 x client representative for travel, accommodation and subsistence over a 2 day period.	Item	1		
2.1.10		**Site Acceptance Test (SAT Tests)** Allowance for SAT test by installer after panel installation. Full test report to be provided.	Item	1		

2.1.11	Pi.2.1	**SAT and Protection Testing** Full protection report and testing to be carried out on site in presence of Engineer. Note only an approved Protection Engineer to carry out this works.	Item	1		
TOTAL CARRIED FORWARD						

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
TOTAL BROUGHT FORWARD						
2,2	A7	**MV CABLES**				
	PI.3.1	Supply and install 11kV XLPE, Type A, insulated, individually copper tape screened, PVC bedded, steel wire armored, PVC sheathed, Cu cables. Terminations and joints for cables are also to be included. Contractors to note that the supply of cables and joints is provisional and may not be				
2.2.1	PI.3.1	Supply of 95 mm^2 6.35/11kV 3-C cable	m	210		
2.2.2		Install and commission item 2.2.1 complete. Only to be procured on instruction from the Engineer.	m	210		
2.2.3	PI.3.1	Supply of 25 mm^2 6.35/11kV 3-C cable 3-C cable	m	30		
2.2.5		Install and commission item 2.2.3 complete.	m	30		
2.2.6	PI.3.2	Supply of 95 mm^2 6.35/11kV 3-C cable joint	No.	7		
2.2.7		Install and commission item 2.2.6 complete. Only to be procured on instruction from the Engineer.	No.	7		
2.2.8	PI.3.2	Supply of 95 mm^2 -150mm 6.35/11kV 3-C cable termination	No.	7		
2.2.9		Install and commission item 2.2.8 complete. With special termination boots if required as specified by Panel manufacture.	No.	7		
2.2.10	PI.3.2	Supply of 25 mm^2 6.35/11kV termination	No.	2		

2.2.11		Install and commission item 2.2.10 complete. With special termination boots if required as specified by Panel manufacture.	No.	2		
2.3	**B3**	**NEW MINI-SUBSTATION**				
2.3.1	**PI.1.3**	Supply new 200kVA MSS for the local circuits. MSS to comply with technical specifications supplied. LV feeds in MSS to be as per SLD	No.	1		
2.3.2		Install and commission item 2.3.1 complete. To include concrete Plinth	No.	1		
TOTAL CARRIED FORWARD						

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
TOTAL BROUGHT FORWARD						
2.4	**A4**	**SMALL POWER AND LIGHTING**				
2.4.1	PI.4.1	Supply of 1500mm, Surface mounted, glass fiber reinforced body. Polycarbonate injection molded lens with linear prism, with standard clips. 2 x T5 tubular Fluorescent luminaires complete with electronic control gear. Minimum 4450 Lumens. 4000K Cool White. colour white.	No.	4		
2.4.2		Install and commission item 2.4.1 complete.	No.	4		
2.4.3	PI.4.1	Supply of wall Mounted LED Bulkhead . IP 65, die-cast Aluminium. Corrosion resistant luminaire, complete with 1 x LED lamps, electronic control gear and all necessary accessories. Minimum 1510 lumens . 4000K (cool white). Colour: Black.	No.	2		
2.4.4		Install and commission item 2.4.3 complete.	No.	2		
2.4.5	PI.4.2	Supply of double SSO. Including SSO, Cover and extension box.	No.	3		
2.4.6		Install and commission item 2.4.5 complete.	No.	3		

2.4.7	PI.4.2	Supply of double pole 60amp isolator unit complete with extension box and cover	No.	1		
2.4.8		Install and commission item 2.4.7 complete.	No.	1		
2.4.9	PI.4.2	Supply of single lever light switch with extension box.	No.	1		
2.4.10		Install and commission item 2.4.9 complete.	No.	1		
2.4.11	PI.4.3	Supply 12-way, 63A 10kA rated distribution board. To include backing plate, all breakers and relevant wiring. Refer to SLD	No.	1		
2.4.12		Install and commission item 2.4.11 complete.	No.	1		
TOTAL CARRIED FORWARD						

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
TOTAL BROUGHT FORWARD						
2.5	A5	**CONDUITS & CONDUIT BOXES** Supply and installation of conduit and boxes as specified for lighting, power and auxiliary outlets, including couplings, bushes, locknuts, bending, drawboxes and fixing, etc in accordance with metallic conduit and accessories as per SANS 60614 and nonmetallic conduit and accessories as per SANS 950				
2.5.1		Supply of plain ended metallic galvanised bosal conduit	m	80		
2.5.2		Install 20 mm on surface of brickwork or concrete complete.	m	80		

2.6	A5	**CIRCUIT WIRING** Supply and drawing of copper PVC insulated conductors in conduit or trunking system in roof space for lights, including connection to switches and equipment. For Live, Neutral and Earth.				
2.6.1		Supply of 16 mm† 3-C cable	m	40		
2.6.2		Install and commission item 2.6.1 complete.	m	40		
2.6.3		Supply of 2.5 mm† (Live, Neutral and Earth)	m	300		
2.6.4		Install and commission item 2.6.3 complete.	m	300		
2.6.5		Supply of 1.5 mm† (Live, Neutral and Earth)	m	150		
2.6.6		Install and commission item 2.6.5 complete.	m	150		
TOTAL CARRIED FORWARD						

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
TOTAL BROUGHT FORWARD						
2.7	**A3**	**EARTHING AND LIGHTNING PROTECTION** Supply and Installation of Earthing & Lightning Protection per SANS 10313, 62305 and 10142. To be undertaken by specialist earthing and lightning contractor.				

SECTION 2: ELECTRICAL UPGRADE

2.7.1		Supply of 8mm aluminium conductor mounted on parapet using approved clamps.	m	50		
2.7.2		Install and commission item 2.7.1 complete.	m	50		
2.7.3		Supply of 8mm x 300mm high aluminium Air termination rods complete with base mounted on roof parapet. To include all bolts, nuts, mounting brackets and supports.	m	4		
2.7.4		Install and commission item 2.7.2 complete.	m	4		
2.7.5		Supply of bonding of roof aluminium conductors with ground Copper conductors with approved connections.	No.	2		
2.7.6		Install and commission item 2.7.5 complete.	No.	2		
2.7.7		Copper earth conductors installed in trenches, sleeves and in earth trench. Terminations to include drilling, bolting, connections, sealing and testing. Only cad weld joints will be allowed.				
2.7.7.1		Supply of 70 mm^2 bare Copper Earth Wire (BCEW)	m	220		
2.7.7.2		Install and commission item 2.7.7.1 complete.	m	220		
2.7.7.3		Supply of 50 mm^2 covered Copper Earth Wire for down conductors in bosal conduit(CEW) Bi-metal connections to be used to link to aluminium conductor on roof.	m	12		
2.7.74		Install and commission item 2.7.7.3 complete.	m	12		
2.7.7.5		Supply crows foot earthing at mini-sub for MV and LV per details.	No.	2		
2.7.7.6		Install and commission item 2.7.7.5 complete.	No.	2		
TOTAL CARRIED FORWARD						

SECTION 2: ELECTRICAL UPGRADE

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
TOTAL BROUGHT FORWARD						
2.8		**EARTH BARS**	No.	1		
2.8.1		Supply of Copper earth bar. 6mm x 50mm x 900mm in substation. (3 x 300mm sections. See drawings)	No.	1		
2.8.2		Install and commission item 2.8.1 complete.				
2.9		**SOIL RESISTIVITY TESTS**	Item	1		
2.9.1		Conduct a complete soil resistivity survey for the Switching station area. It shall include a certificate and any further recommendation regarding the soil conditions.				
2.10		**EARTH ELECTRODES**				
		Supply and install 'Cad weld' 16 mm diameter copper earth electrodes driven in ground, including 'Cad weld' joining sleeves as required	No.	18		
2.10.1		Supply of 1000 mm long electrodes	No.	18		
2.10.2		Install and commission item 2.10.1 complete.	No.	18		
2.10.3		Supply of Bond 70mm^2 bare copper from Earth loop to earth rod	No.	18		
2.10.4		Install and commission item 2.10.3 complete.	No.	1		
2.10.5		Earthing and Lightning test certificate from approved specialist.				
2.11		**TRENCH EXCAVATIONS:**				
		Excavate for cables and Earthing including temporary support of sides, keeping excavation dry, bedding material, backfilling, compacting and testing as specified. All backfill material to be suitable as per SANS codes and engineers approval. Backfill material to be imported if necessary.	m‡	138		
2.11.1	Pl.3.3	In soft or pickable soil (60%)	m‡	92		
2.11.2		In soft rock (40%)				
	Pl.3.3.1					
	Pl.3.3.2					

TOTAL CARRIED FORWARD		

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
TOTAL BROUGHT FORWARD						
2.12		**OTHER**				
2.12.1		Disconnect existing MV cables from wooden poles and re-route to switchgear inside substation, those being:				
2.12.1.1		95/150mm^2 11kV Cu XLPE cables	No	2		
2.12.1.2		95mm^2 11kV Cu XLPE cables	No	5		
2.12.1.3		25mm^2 11kV Cu XLPE cable	No	1		
2.12.2	PI.3.4	Supply of Cable warning tape	m	50		
2.12.3		Install and commission item 2.12.2 complete.	m	50		
2.12.4	PI.6.1	Labeling of all switches, switchgear and equipment as specified.	Sum	1		
2.13		**TESTING AND COMMISSIONING**				
2.13.1	PI.5.1	Test and commission complete installation as specified	Sum	1		
2,14		**DOCUMENTATION**				
2.14.1	PI.7.1	Submit As-Built drawings to the Employer's Agent satisfaction, as follows:	Sum	1		
2.14.1.1		1 x full set "red line" drawings (hard copy)				

2.14.1.2		3 x sets manufacturers and supplier schedules and drawings (hard copy + CD)				
TOTAL CARRIED FORWARD						

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	TOTAL
TOTAL BROUGHT FORWARD						

SECTION 2: ELECTRICAL UPGRADE

2.14.2	PI.7.2	Submit Operation & Maintenance Manuals to the Employer's Agent satisfaction. 3 x sets manufacturers and supplier schedules, O&M manuals and drawings (hard copy + CD)	Sum	1		
2.14.3	PI.7.3	Issue test certificates and Certificate of compliance (CoC) in terms of SANS 10142-1 (LV) and 10142-2 (MV).	Sum	1		
2.15		**TRAINING**				
2.15.1		Provide training to municipality Personnel on systems. Training: Allow for 3 days for 3 people	Sum	1		
2.16		**EXISTING EQUIPMENT AND STRUCTURES**				
2.16.1		All temporal equipment to be removed from site to approved dump site and/or Municipal stores if instructed.	Sum	1		
2.16.2		Dismantle and remove old substation equipment.	Sum	1		
2.16.3		Dismantle and remove existing wooden structures, cross-arms and links.	Sum	1		
		Excavation and backfilling and compaction of pole holes and making good the surrounding area.				
TOTAL CARRIED FORWARD TO FINAL SUMMARY						

SECTION 3: BUILDING UPGRADE

ITEM NO	PAY ITEM	DESCRIPTION	UNIT	QTY	RATE	AMOUNT
		SECTION 3: BUILDING UPGRADE				
3.1		Allowance for repair damaged aprons	Sum	1		12 000,00
3.2		Allowance for pressure cleaning the building	Sum	1		5 000,00
3.3		Allowance for paintint the interior of the building	Sum	1		25 000,00
3.4		Allowance for cleaning and repainting louver	Sum	1		15 000,00
3,5		Allowance for DB and lighting protection	Sum	1		15 000,00
3.6		Allowance for removing, repairing and repainting doors	Sum	1		35 000,00
3.7		Allowance for fencing	Sum	1		120 000,00

3,8		Allowance for access gate	Sum	1		20 000,00
TOTAL CARRIED FORWARD TO FINAL SUMMARY						

FINAL SUMMARY

SECT NO	DESCRIPTION	AMOUNT
	FINAL SUMMARY	
1	Preliminaries and General	
2	Electrical Upgrade	
3	Building Upgrade	

	Sub Total	
	ADD: 5% CONTINGENCIES	
	Sub Total	
	ADD: VAT @ 15%	
TOTAL CARRIED FORWARD TO TENDER		

PART C3: SCOPE OF WORKS

CONTENTS

C3.1: DESCRIPTION OF WORKS

C3.1 DESCRIPTION OF WORKS

C3.1.1 Employers Objectives

The employers objectives is to upgrade an existing substation which was previously damaged by the community by burning power station with tyres. This power station is currently working on temporal bypassed system which must be restored through this contract.

C3.1.2 Extent of Works

The contractor is required to replace the MV Switchgear with a new ACTOM SBV4E unit which must ordered out of the country, transported to site of works, stored in a safe location and installed at the site of works.

As part of the works, the contractor is required to undertake building upgrades, perimeter fencing and to also decommission the existing temporal supply.

The Contractor will be responsible for carrying out all work under the contract in accordance with the drawings, specifications, and schedule of quantities. The drawings, specifications and schedule of quantities define the scope of this contract and indicate all work to be done. They may be supplemented by additional drawings to supply information regarding details of construction and exact lines, levels, and depths.

The description of the works is not necessarily complete and shall not limit the work to be carried out by the contractor in respect of this contract.

C3.1.3 Location of the Works

The substation is located within Sibongile Township, 3km south of Dundee town. The location of the service centre is indicated in figure 1 below:

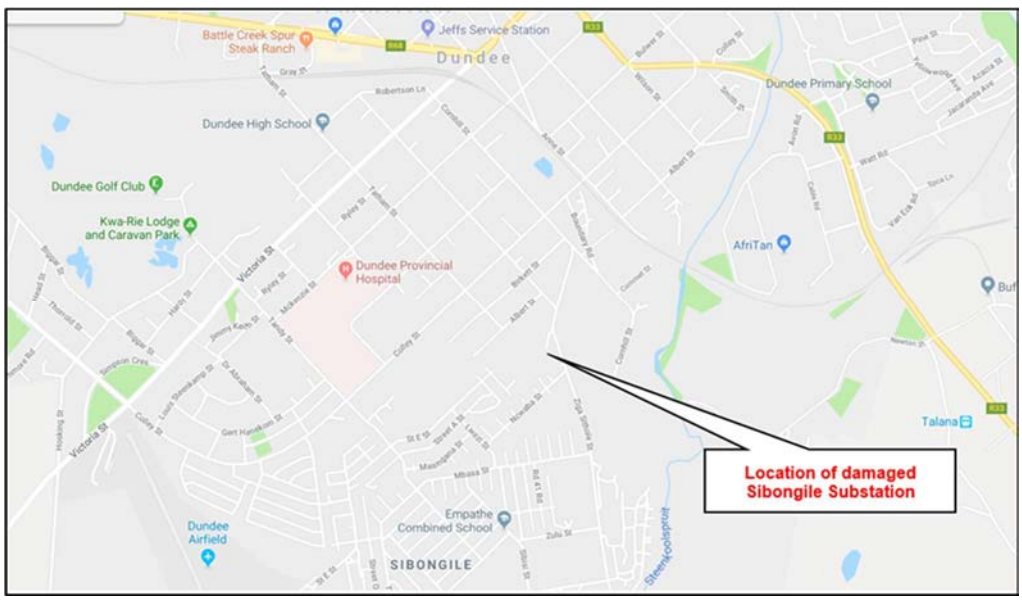

Fig.1: Location

The specific location of the substation is along Zinga Sithole street adjacent to Zion church.

C3.1.4 Scope of the Works

The scope of the works is summarised below:

- Removal of damaged MV (11kV) switchgear and replacing with new MV switchgear

- Substation earthing and lightning protection
- Substation small power and lighting
- Relocation of all incoming and outgoing 11kV cables to the new MV switchgear
- Auxiliary power supply and mini-substation installation
- Testing and commissioning of the full electrical system

C3.1.5 **Contract Requirements**

This contract provides for:

- The maintenance of records and accurate measurements of the works for certification by the Engineer.
- The compilation of as-built drawings on completion of the works.
- The supply and application of all safety procedures, equipment, clothing and signage applicable to the works.
- The supply of all plant, equipment, materials, transport, labour, incidentals, fuels etc. and supervision to carry out the works.
- The removal of all redundant material, rubble and spoil to an approved designated Municipal dump area, or other designated area as directed.
- The construction and quality control testing and maintaining of a quality control system.
- Payment of import and custom duties.
- Discarding all unusable materials from site during excavations, the contractor may be directed to stockpile some of the re-usable excavated materials on site.
- Transportation and delivery of all materials required in terms of the scope of works to the designated site in Endumeni.
- Supervision of execution of the contract works, i.e. offloading from transport, safe storage, handling to situation, processing, placing, setting to work, testing, maintaining woks prior to the practical completion date and all other work incidental thereto.

C3.2. PART A: GENERAL SPECIFICATION

C3.2. PART A: GENERAL SPECIFICATION

C3.2.1 DESIGN CRITERIA

C3.2.1.1 **Codes and Standards**

A. Code Design Basis: The following codes and ordinances were used in the design of the project and shall be complied with during construction of the project.

a) The Occupational Health and Safety Act no. 85 of 1993, as revised, whereby SANS 10142 is enclosed.
b) Government notices.
c) The Local Government Ordinance 1939 (Ordinance 17 of 1939) as amended and the municipal by-laws and any special requirements of the local supply authority,
d) The Fire Brigade Services Act 1993, Act 99 of 1987 as amend,
e) The National Building Regulations and Building Standards Act 1977 (Act 103 of 1977) as emended,
f) The Post Office Act 1958 (Act 44 of 1958) as amended,
g) The Electricity Act 1984 (Act 41 of 1984) as amended,
h) The Regulations of the local Gas Board where applicable.

B. Standards: Refer to standard specifications for general administrative/procedural requirements related to compliance with applicable standards. This Work and all materials shall meet the standards set forth in the applicable portions of the following recognized standards:

a) Building Code SANS 10400
b) Electrical Wiring Code SANS 10142-1 and SANS 10142-2
c) Protection against lightning - Physical damage to structures and life hazard SANS 10313
d) All other relevant SANS Codes

C3.2.1.2 **Compliance with Standard Specifications**

Except where otherwise specified, the equipment shall comply with the current editions of the relevant specifications of the South African Bureau of Standards and the British Standards Institution or the International Electro Technical Commission recommendations.

C3.2.1.3 **Site and System Conditions**

C3.2.1.3.1 Site Conditions

Altitude: The altitude is 1276 m above mean sea level.

Temperature:	Ambient temperature between 3”C and 34”C.
	Average daily maximum ambient: 32”C.
Humidity:	Maximum 100 %
	Average 82 %
Rainfall:	Approximately 684mm per annum. An average of 2 3 working days per month is lost due to inclement weather. No claims for delays as a result of adverse weather conditions will be considered.
Lightning:	The area is subject to severe lightning storms, approximately 4,5 flashes/km†/year.
Wind:	Design wind speed of 108 km/h (700 pa).
Mean annual value of solar radiation:	1,0 kW/m^2

C3.2.1.3.2 Electricity Supply System

The electricity on the property is fed by Endumeni Municipality. The nominal system voltage is 11 kV, 400 V three phase and 230 V single phase.

The maximum MV system voltage is 12,5 kV.

The system frequency is 50 Hertz and the phase rotation is R-W-B anti-clockwise.

C3.2.1.4 **General Requirements**

C3.2.1.4.1 Safe Design and Standardization

All equipment supplied and installed under this contract shall be designed:

- To prevent any injury to personnel employed on the construction, operation and maintenance of the plant.
- To facilitate inspection, cleaning and repair of the equipment.
- To operate continuously and satisfactorily in the prevailing site conditions.
- To be able to withstand without damage such sudden variations of electrical load as may be met under normal working conditions, including short circuits and lightning strikes.
- To obviate risks of accidental short-circuits due to animals, birds and insects.
- To avoid pockets in which water can collect in outdoor equipment.
- To avoid condensation in closed compartments by the provision of adequate ventilation or where necessary, heaters.
- Such that conductors can carry normal load and fault currents without overheating or other damage.
- Such that moving parts can be readily lubricated. Grease nipples shall be provided in accessible positions for this purpose.

- To be vermin proof.

- To be corrosion resistant.

C3.2.1.5 **Quality of Materials and Workmanship**

All materials and equipment for this Contract shall be new and undamaged. Corresponding parts shall be interchangeable.

Where so directed by the specification or by the Engineer, the Contractor shall provide samples and test certificates of materials for approval.

The labour used by the Contractor shall at all times be adequately qualified and experienced for the particular task.

C3.2.1.6 **Fixings and Connections**

A. Nuts and Bolts: Metric size nuts and bolts shall be used unless otherwise specified. Each bolt or stud shall project at least one thread but not more than 6 mm from the nut. Special spanners shall be provided where nuts and bolts are not easily accessible. The nuts on the moving plant or plant subject to vibration shall be fixed by means of locknuts, Loctite or other approved locking method. Bolts and studs shall be adequately sized to carry the loads, which may be imposed on them.

B. Materials of Nuts and Bolts: Only stainless steel nuts, bolts and washers shall be used for all electrical connections.

C3.2.1.7 **Non Corroding Materials**

A. Because steel corrodes rapidly in the coastal conditions pertaining to Dube Trade Port, **noncorroding materials** shall be used in the construction of outdoor equipment and plant. This includes all cable racks, trays and clips,

B. The permissible grades and alloys are as follows:

Stainless Steel	:	Grade 316 or better
Extruded Aluminium	:	6082-T6
Cast Aluminium:		L-2520
Glass fibre	:	To the relevant SANS specification

C3.2.1.8 **Galvanising and Painting**

Dube Trade Port has a highly corrosive atmosphere and special attention shall be given to all finishes.

NO drilling, cutting, bending, punching, welding and forming of the steel or any surface damage shall be allowed **after galvanising** or painting.

All the steel work shall be prepared, hot dipped galvanised and painted using the processes detailed hereunder:

A: For all unpainted steel work:

- Pickle,
- Hot dip galvanised in accordance with SANS 121.

B: For all painted steel work

- For the primer coat: Apply a single coat of Epoxy Prima to a minimum of 40 microns dry film thickness.

- For the intermediate coat: Apply a single coat of Highbuild Aluminium Flake Filled Epoxy to a minimum of 125 microns dry film thickness.

- For the final coat: Apply a single coat of a Highbuild Aluminium Flake Filled Epoxy to a minimum of 125 microns dry film thickness.

C. Damage to paint work during transit or erection shall be touched up with matching paint.

C3.2.2 EARTHING AND LIGHTNING PROTECTION

C3.2.2.1 **Codes and Standards**

A. Codes and Standards: The earthing and lightning protection shall comply fully with the applicable SANS specifications as set out below and all equipment shall bear the mark of approval of the South African Bureau of Standards.

a) The latest issue of SANS 10313: Protection against lightning - Physical damage to structures and life hazard Requirements of surge protective devices

b) The latest issue of SANS 61312: Requirements of surge protective devices

c) The latest issue of SANS 62305: Protection against lightning

d) The latest issue of SANS 10292: Earthing of low-voltage (LV) distribution systems

e) The latest issue of SANS 10199: The design and installation of earth electrodes

f) The latest issue of NRS076: Earthing of distribution substations with nominal voltages up to and including 132 kV

B. Manufacturers: If they comply with these specifications and requirements will be acceptable.

C: Installers: The electrical contract shall appoint a specialist Earthing and Lightning Protection Contractor to design and install the earthing and lightning protection system. The specialist installer must be certified or registered installers of the manufacturers or their representatives. Manufacturers or their representatives must also have registered offices in South Africa and the local office must carry sufficient stock and spare parts for the project.

C3.2.2.2 **Scope of Works**

The specialist contractor shall:

- Carry out earth resistivity tests on the site of works and provide a test results certificate together with recommendations of the installation to the Engineer.
- Once approved, Supervise the installation in compliance with SANS requirements.
- Carry out interim earthing tests and if below required value, improve on earthing installation until earthing values are achieved.
- Provide as-built drawings of the complete earthing and lightning protection system.
- Provide test certificates and a sign-off certificate of the completed earthing and lightning protection system.

C3.2.2.3 **Design Criteria**

A provisional earthing and lightning protection system is indicated on the drawings and measured in the Bill of Quantities. The earthing system shall follow the same trench and rod system as indicated on the drawings.

Earthing shall be installed in trenches of 600mm deep below finished ground level (FGL)

The tops of the earth rods shall be no less than 600mm below FGL with rods installed vertically. If this is not achievable, then rods should be installed in a horizontal position and indicated on as-built drawings.

Final measures will be based on installed quantities up to the Bill measured values only. Material above bill measured quantities shall be approved by the Engineer prior to installation.

C3.2.2.4 **Earthing of Substations**

All substations shall be earthed in accordance with the requirements of the supply authority. If no earthing is specified and no specific requirements of the supply authority exist, the following method shall be adopted.

A main earth bar (minimum cross-sectional area 50 mm x 6 mm and of HDHC copper) must be provided and fixed to the high voltage room wall by means of shock proof insulators. Suitable space shall be provided between the earth bar and the wall.

All earth wires shall be secured to the earth bar by means of 10 mm diameter brass bolts. Lock nuts shall be provided for all terminals.

The following connections shall be made from this earth bar system:

1. 70 mm† insulated stranded conductor to the transformer neutral.
2. 70 mm† to the transformer tank.
3. 70 mm† bare copper earth conductor to MV switchgear earth bar.
4. 70 mm† copper earth conductor to switchgear frame and board.
5. 2 x 70 mm† bare copper earth conductors to earth mat/earth rods.

Where necessary, earth connections shall be protected against mechanical damage and corrosion. Two earth rods shall be driven into the ground in the immediate vicinity of the substation at least 3m apart with their tops not less than 600 mm below ground level. The rods shall be interconnected with a 70 mm† bare copper conductor buried at a depth of not less than 750 mm. A 70 mm† earth conductor shall be taken from each of the two earth rods to the main earthing bar in the high voltage room.

C3.2.2.5 **Earthing of Switch Rooms**

The earthing of switch rooms shall conform to the earthing requirements of substations as described above.

C3.2.2.6 **Earthing of Outdoor Equipment**

In cases where substations contain transformers or switchgear installed outdoors, the compulsory fence, if no other method is specified, shall be earthed as follows:

1. A 70 mm† earth conductor shall be installed 400 mm below ground level and 500 mm from the fence on the outside of the substation along the entire perimeter of the fence. This earth conductor shall be earthed at each corner by means of a 1,8m earth rod and the rod and earth conductor bonded to the fence.

   The earth conductor shall be bonded, at least at two points, to the main earthing system.

2. A 70 mm† earth conductor shall also be buried at a depth of 400 mm around each transformer and switch and bonded to the main earthing system.

C3.2.2.7 **Earthing of Buildings**

All hot and cold water pipes and discharge pipes shall be interconnected by means of 12 x 1,6 mm solid or perforated copper tape and clamped with brass bolts and nuts. Copper tapes shall be fixed to walls by means of brass screws at intervals not exceeding 250mm.

Iron roofs, gutters, down-pipes, etc., shall be interconnected in the same way.

Connections shall be carried out with brass bolts and nuts (not self-tapping screws).

Iron roofs shall be connected at intervals not exceeding 15m with a common earth conductor of bare copper wire. The common earth conductor shall run under the roof over the full length firmly fixed to the upper purlin.

This earth conductor shall also be connected to the main earth conductor of every distribution board. When plastic conduit is used, a 2,5mm† bare copper conductor shall be installed throughout for earth continuity.

This copper conductor shall be securely fixed to all metal appliances and equipment, including switch boxes, socket outlet boxes, draw boxes, switchboards, luminaires etc.

C3.2.2.8 **Earthing of LV Systems**

A separate earth connection shall be installed from every sub-distribution board to the earth terminal on the main distribution board. These earth connections shall consist of bare copper conductors, drawn into conduit or piping, together with PVC conductors or cables.
Socket outlets shall be connected with 2,5 mm† earth conductor to the earth busbar in the relative distribution board.
The earth terminals of lighting circuits shall be connected to the nearest earth terminals by means of 2,5 mm† stranded copper conductors.

A readily accessible earthing terminal shall be provided for the bonding of other services such as a telephone, an audio or a video system, and the like, to a building. Such an earth terminal shall be bonded to the consumers earth terminal by a conductor of at least 6mm^2 copper or equivalent, and shall be identified by the earth symbol. Labels shall be fitted to all distribution boards where the readily accessible earthing terminal for the bonding of other services is provided.

The earth terminals on the main distribution board shall be earthed by means of a 70 mm† bare copper conductor connected to the earth mat.

C3.2.2.9 **Earthing of Installation**

The trench earth shall consist of minimum 70mm^2 bare copper conductor buried in a 600mm trench around each building.

Roofs, gutters and down pipes: All metal parts of roofs, gutters and down pipes shall be bonded and earthed. The roof and gutters shall be connected at 15m intervals or as shown on the drawings to this conductor by means of 50mm^2 down conductors or equivalent as approved by the engineer in 20mm PVC conduit. All bolts and nuts to be galvanised. Self-tapping screws are not acceptable. The earth should be connected to the earth mat.

Sub-distribution boards: A separate earth connection shall be supplied between the earth busbar in each sub-distribution board and the earth busbar in the Main Switchboard. These connections shall consist of a bare or insulated stranded copper conductors installed along the same routes as the supply cables or in the same conduit as the supply conductors. Alternatively armoured cables

with earth continuity conductors included in the armouring may be utilised where specified or approved.

Sub-circuits: The earth conductors of all sub-circuits shall be connected to the earth busbar in the supply board in accordance with SANS 10142.

Non-metallic Conduit: Where non-metallic conduit is specified or allowed, the installation shall comply with the specification for conduit and conduit accessories .

Stranded copper earth conductors shall be installed in the conduits and fixed securely to all metal appliances and equipment, including metal switch boxes, socket-outlet boxes, draw-boxes, switchboards, luminaires, etc. The securing of earth conductors by means of self-threading screws will not be permitted.

Flexible Conduit: An earth conductor shall be installed in all non-metal flexible conduit. This earth conductor shall not be installed externally to the flexible conduit but within the conduit with the other conductors. The earth conductor shall be connected to the earth terminals at both ends of the circuit.

Connection: Under no circumstances shall any connection points, bolts, screws, etc., used for earthing be utilised for any other purpose. It will be the responsibility of the Contractor to supply and fit earth terminals or clamps on equipment and materials that must be earthed where these are not provided.

Unless earth conductors are connected to proper terminals, the end shall be tinned and lugged.

C3.2.2.10 **Lightning Protection**

The lightning Protection system shall be designed and installed by a certified specialist contractor.

The lightning protection system of buildings and structures shall include:

- Bonding of metal roofs and structures
- Installation of 8mm aluminium Lightning conductor on concrete and non-metallic roof structures
- Bonding of lightning protection system with earthing system.

The contractor to use approved methods for joints, terminations and bonding.

- Lightning conductors shall be fixed to walls and parapets by means of raised galvanised saddles and secured onto the structure.
- If waterproofing is installed, lightning conductors to be installed above the waterproofing membrane.
- Care must be taken to prevent damage to waterproofing membranes and any damage or penetration onto waterproofing membranes must be first approved by the waterproofing installers prior to drilling/cutting.
- All repairs to waterproofing membranes must be done by the specialist waterproofing installers at the contractors cost.

- Down conductors to be 50mm copper conductor in PVC conduit to the earth mat of test points as indicated on the drawings.
- Test points shall be installed 600mm above finished ground level in a suitably approved IP65 box with a removable cover.
- Test points shall be provided with a bolted connection and labelled for future testing.
- Down conductor tails from the test point to earth mat/rod shall be of $50m^2$ copper conductor and to be exothermically welded onto the earth mat/rod. No crimps or clamps will be allowed.
- All drilling of holes onto structures and frames and re-instatement of protective coatings, eg. paint or galvanising shall form part of this contract.
- All connections to earth rods and conductor joints shall be by means of exothermic welds.

- Bonding to steel reinforcing shall be by means of approved clamps.
- All connections between different metals shall be by means of suitable bi-metal connections.

C3.2.3 LIGHTING FIXTURES

C3.2.3.1 **Codes and Standards**

A. Codes and Standards: The lighting fixtures shall comply fully with the applicable SANS specifications as set out below and all equipment shall bear the mark of approval of the South African Bureau of Standards. The latest issue of the SANS codes will be applicable:

a. SANS 475: Luminaires for interior lighting, streetlighting and floodlighting - Performance requirements
b. SANS 1464: Safety of luminaires Part 22: Luminaires for emergency lighting
c. SANS 10114-1: Interior lighting Part 1: Artificial lighting of interiors
d. SANS 10114-2: Interior lighting Part 2: Emergency lighting
e. SANS 10389-1-3: Exterior lighting Part 1-3
f. SANS 61547: Equipment for general lighting purposes EMC immunity requirements
g. SANS 62560: Self-ballasted LED lamps for general lighting services by voltage > 50V - Safety specifications
h. SANS 62031: LED modules for general lighting Safety specifications
i. SANS 60598: Luminaires - Part 1: General requirements and tests
j. SANS 1662: Self ballasted LED Tubular lamps for general lighting services >50V - Safety requirements.
k. SANS 62612: Self ballasted LED lamps for general lighting services with supply voltages > 50V - Performance requirements.

B. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:

The manufacturer must be an ISO9001 certified company. Proof of certification is to be submitted together with the tender document, failing which the tender may be disregarded.
Products must carry the SABS mark or an international certification and approved for use in South Africa.

C3.2.3.2 **Fluorescent Lighting Fixtures**

A. General: Furnish and install fluorescent lighting fixtures of the types and manufacturers scheduled on the Drawings. Fixtures shall be furnished with all required accessories and trim as required for a complete installation in the ceiling type shown on the Architectural Drawings.

B. Lamps: Fluorescent fixtures shall be complete with lamps of the type, colour, wattage, and size indicated on the Lighting Fixture Schedule.

C. Ballasts:

1. General: Ballasts for use on 230 Volt systems shall be suitable and guaranteed for a voltage range of 205 Volts to 240 Volts. Ballasts for use on 400 Volt systems shall be suitable and guaranteed for a voltage range of 380 Volts to 420 Volts.

2. Electronic Ballasts: Fluorescent fixtures indicated to be provided with electronic ballasts shall be complete with parallel wired, Class "P" thermal protected, electronic ballasts certified by CE and complying with SANS limits governing EMI and RFI.

a. Electronic ballasts shall comply with SANS standards for surge protection. Total harmonic distortion shall not exceed 10%. Ballast case operating temperature shall not exceed 60^{o}C.

Electronic ballasts shall be capable of starting at temperatures of 0ºC or higher. Power factor shall not be less than 0.95.

3. Dimming Ballasts: Wherever fluorescent fixtures are to be dimmed, the fixture supplier shall coordinate the type of dimming ballast to be used with the dimming equipment supplier to insure compatibility. The fluorescent lighting fixtures shall be provided with circuit interrupting lamp holders as required for the single or double lamp dimming ballasts being used.

4. Low Temperature Ballasts: Unless otherwise indicated, where fluorescent lighting fixtures are installed in unheated areas of the building(s) or parking garages, or where installed outdoors, the fixtures shall be provided with the appropriate ballasts with a minimum Sound rating as recommended by the manufacturers.

5. Low Leakage Ballasts: Where fluorescent fixtures are installed on isolated power circuits, low leakage ballast suitable for isolated power use shall be provided.

E. Louvers: Lighting fixture louvers shall be, pre-anodized aluminium semi-specular lowiridescent parabolic louvers. Louver shall be securely fastened with T-hinges and springloaded cam latches. The louver should be capable of hinging and latching from either side. All steel parts, excluding fasteners, shall be painted after fabrication. Pre-coat finishes shall not be acceptable.

F. Fluorescent fixtures in continuous rows shall be supplied with all fixture couplings, close nipples and/or other accessories recommended by the manufacturer for continuous row installation.

G. Guards: Fluorescent strip fixtures with exposed bare lamps shall be provided with guards as required by safety codes.

C3.2.3.3 **Led Lighting Fixtures**

A. General: Furnish and install LED lighting fixtures of the types and manufacturers scheduled on the Drawings. Fixtures shall be furnished with all required accessories and trim for a complete installation in the ceiling type shown on the Architectural Drawings.

B. Lamps: LED fixtures shall be complete with lamps of the type, colour, wattage and size indicated on the Luminaire Schedule, or as specified by the lighting fixture manufacturer. Unless otherwise noted, all lamps shall be Cool white.

C. Minimum requirements:

- The minimum lamp life should be equal or greater than 30 000 hours
- The Colour Rendering Index (CRI) must be 80 or greater
- Power factor must be greater than 0.9
- Test reports from an approved and accredited test laboratory must be submitted when called for.
- Alternate fixture manufacturers shall submit computer generated illumination calculations and files (.ies) to the engineer for approval

D. Luminaire Markings: All products shall be marked according to SANS 62031 as follows:

- Lamp rating in Watts
- Lamp life in hours
- Colour Correlated Temperature (CCT) or colour name
- Colour Rending Index (CRI)
- Initial lamp life output

- Energy Efficiency Marking /label per SANS codes

C3.2.3.4 **Submittals**

A. Shop drawings submittals shall include, but not be limited to, the following:

1. Cut sheets on all lighting fixtures with all accessories and details clearly indicated.
2. Cut sheets and complete technical data on ballasts, lamps, lens, poles, etc.
3. Photometric performance data.
4. Computer generated illumination calculations in the latest Dialux format and files (.ies) to the engineer for approval
5. Additional information as required.

C3.2.3.5 **Installation**

A. All lighting fixtures shall be furnished complete with mounting accessories to suit the specific service and installation intended. The Electrical Contractor shall verify the required fixture ceiling/trim coordination prior to light fixture orders.

B. Fixtures shown on the fixture schedule to be recessed shall be complete with plaster frames, mounting yokes, rod hangers, etc., and/or any other accessories required to fit the fixture to the ceiling construction.

However, where ceiling system cannot maintain said support, provide supplemental steel support members connected to the building structure capable of carrying the weight of the fixture plus 100kg at each support without sagging. Provide the necessary supports for hangers located between structural members. Securely fasten the luminaire to the ceiling framing members. In plaster ceilings, provide threaded hanger rods secured to the main ceiling suspension structure and supplementary horizontal steel members as required, and to the luminaire housing, using two nuts at each end of rod.

C. Connect each ceiling-recessed luminaire into the conduit system by means of flexible cabtyre cable with plug top not more than 3m or less than 1.2m in length routed from an above-ceiling outlet point.

D. Provide alignment clips on all pendant or ceiling mounted luminaries used in continuous rows.

E. Chain-suspended lighting fixtures shall be connected to the outlet box mounted directly above the fixture using flexible metallic conduit, and the flexible metallic conduit shall be strapped to the fixture chain.

F. Fixture supports shall be provided in all outlet boxes from which fixtures are suspended. Fixtures shall not be suspended by means of cover or canopy screws. Canopies shall completely cover the ceiling opening of all ceiling fixtures except lay-in fixtures in T-bar construction, and trimless fixtures.

G. Where surface mounted lighting fixtures (i.e., exit lights, etc.) are installed on lay-in panels in T-bar ceiling construction, the outlet boxes shall be rigidly supported to the ceiling system using metal channels spanning perpendicular across the T-bars and securely attached to each side of the outlet box.

H. Connect each fixture housing to the equipment grounding conductor by means of a crimped spade-type terminal connector secured to the housing with a self-tapping screw.

I. All fixtures shall be clean at the time of acceptance of the Work, and shall be properly aimed or adjustable as required. No extra will be permitted for cleaning, aiming or adjustable fixtures to meet the requirements of the Engineer at the time of acceptance of the Work.

J. All lamps used during construction and prior to final inspection, shall be replaced prior to final acceptance of the building by the Owner.

K. The locations indicated for outlet boxes of lighting fixtures are diagrammatic. Outlets shall be located as required to coincide with suspension hangers where they occur and with structural an architectural elements of the building and shall be located in accordance with the Architectural Reflected Ceiling Plan (RCP).

C3.2.3.6 **Mounting and Positioning of Luminaires**

The Contractor is to note that in the case of board and acoustic tile ceilings, i.e. as opposed to concrete slabs, close co-operation with the building contractor is necessary to ensure that as far as possible the luminaires are symmetrically positioned with regard to the ceiling pattern.

The layout of the luminaires as indicated on the drawings must be adhered to as far as possible and must be confirmed with the Engineer or representative.

Fluorescent luminaires installed against concrete ceilings shall be screwed to the outlet boxes and in addition 2 x 6mm expansion or other approved type fixing bolts are to be provided. The bolts are to be of the length of the luminaires apart.

Fluorescent luminaires to be mounted on board ceilings shall be secured by means of two 40mm x No. 10 round head screws and washers. The luminaires shall also be bonded to the circuit conduit by means of locknuts and brass bushes. The fixing screws are to be placed of the length of the fitting apart.

Earth conductors must be drawn in with the circuit wiring and connected to the earthing terminal of all fluorescent luminaires as well as other luminaires exposed to the weather in accordance with the Wiring Code .

Luminaires are to be screwed directly to outlet boxes in concrete slabs. Against board ceilings the luminaires shall be secured to the brandering or joists by means of two 40mm x No. 8 round head screws.

C3.2.3.7 **Luminaire Identification**

Lighting outlets are numbered on the drawings.

The numbering of the outlets defines the circuitry and control required. Each luminaire shall be furnished with the wattage and colour as specified or as implied by the catalogue number of the luminaires specified.

The luminaire shall bear the SANS 60598-2-3 and SANS 60598-2-5 safety mark or equivalent International rating. The luminaire shall have a Ta rating not less than = 40”C. The luminaire shall be manufactured by an ISO 9002 accredited company. The luminaires company shall be a ISO Marked Bearing Company or International Equivalent.

C3.2.3.8 **General**

The electrical subcontractor shall only commence with the installation of light fittings after the paintwork in the vicinity of the fitting is complete and dry. Care shall be taken to ensure that ceiling boards and paintwork is not damaged during the installation of light fittings.
The type of light fittings to be used are indicated and specified on both the relevant drawings as well as in the lighting schedule.

Positions of light fittings: The mounting positions of light fittings are indicated on the relevant drawings and shall be verified on site.

Mounting heights of light switches: Light switches shall be installed 1,4 metres above finished floor level unless specified to the contrary.

Mounting of light fittings: Surface mounted fittings shall be screwed to the ceiling by means of at least two 4 mm diameter electroplated self tapping screws. On concrete, plastered and brick surfaces good quality plastic expansion plugs shall be used and on suspended and soft ceilings a solid timber backing strip of at least 40 x 40 mm timber shall be supplied and installed between supports and the screws fixed to these backing strips. Surface mounted fluorescent fittings will be firmly mounted to ensure close contact with the ceiling over the entire length of the fitting. On concrete slabs the fittings shall be mounted by means of two screws into the ceiling conduit box as well as two round headed 4 mm x 30 mm electroplated self tapping screws and plastic expansion plugs, one at either end. On suspended ceilings the fittings shall be similarly mounted but timber backing strips of at least 40 x 40 x 450 mm shall be placed in position on top of the ceiling board and the end screws secured to these strips to spread the load.

C3.2.4 CIRCUIT WIRING AND OUTLET POINTS

C3.2.4.1 **Codes and Standards**

A. Codes and Standards: The conduit and conduit accessories shall comply fully with the applicable SANS specifications as set out below and the conduit shall bear the mark of approval of the South African Bureau of Standards.

a) The latest issue of SANS 60614 and SANS 61035, parts 1 and 2: Metallic conduit and accessories
b) The latest issue of SANS 950: Non-metallic conduit and accessories
c) The latest issue of SANS 1507: Electric cables with extruded solid dielectric insulation for fixed installations.

C3.2.4.2 **Conductors**

A. All wiring shall, unless expressly stated otherwise in the detail specification, comprise of PVC insulated, stranded copper conductors and bare stranded copper or green PVC insulated, stranded earth continuity conductors. The conductors shall comprise of high conductivity annealed stranded copper conductors and shall be insulated with general purpose PVC, of the 600/1000 grade. All conductors used for the wiring of the electrical installation shall comply with SANS 1507.

Conductors shall be from new stocks and shall be delivered to site with unbroken seals.

B. PVC insulated unarmoured cables with a bare earth conductor

(i) General: This section covers the following PVC insulated unarmoured cables with a bare earth conductor:

(1) PVC insulated flat multicore cable with a bare earth conductor
(2) PVC insulated round multicore cable with a bare earth conductor and with metal stiffening.

The cable shall comply with the requirements of SANS 1507.

(ii) Installation: The cables shall be installed in accordance with SANS 1507 and as specified in the detail specification.

The cables shall be terminated by means of PVC glands fitted with a neoprene seal. The neoprene seal shall have a round opening for the round multicore cable and a rectangular shaped opening for the flat multicore cable.

C. **Wiring terminals:** Terminal bodies and screws shall be constructed from non-corrosive metal, enclosed in fire resistant, moulded plastic insulating bodies. No part of the terminal body or fastening screws shall project beyond the insulating material which shall afford suitable protection against accidental contact by personnel and against short circuits or tracking.

The terminal block and its associated mounting rail shall be constructed in such a manner as to ensure a firm and positive fastening of the terminal block to the rail. Terminal blocks shall be held in position by means of standard end clamps. It shall furthermore be possible to extend the terminal block by adding additional terminal blocks within the terminal sequence without having to disconnect or dismantle the terminal strip.

It shall be possible to intermix terminals of various sizes, for different conductor sizes, whilst utilising the same mounting rail. Where smaller terminal blocks occur adjacent to larger terminal blocks, suitable shielding barriers shall be inserted to conceal the terminals that might otherwise be exposed.

The terminal bodies and clamping screws shall be so constructed as to ensure that conductors are not needed or severed when the clamping screws are tightened. Screws shall not come into direct contact with the conductors.

Each terminal block shall have provision for clip-in numbering or labelling strips to be installed, together with protective, clear caps over the sheets.

C3.2.4.3 **Installation**

A. The electrical subcontractor shall ensure that the wiring of the electrical installation for the building or other structure is carried out in accordance with SANS 10142.

B. **Wireways:** All unarmored conductors shall be installed in conduits, trunking or power skirting and such conductors shall under no circumstances be exposed.

C. **Circuits:** The circuits for the complete electrical installation are indicated on the relevant drawings. The following are the maximum number of points normally connected to each type of circuit unless otherwise indicated on the drawings:

Light points per circuit = 8
Socket outlets per circuit = 4

Conductors supplying circuits which are fed from different switchboards shall not be installed in the same wireway. The wiring of one circuit only will be allowed in a 20 mm diameter conduit, with the exception of the wiring from switch boards to fabricated sheet metal boxes located close to switchboards, in which case more than one circuit will be allowed. For larger conduit sizes the requirements of SANS 10142 shall be met.

D. **Looping and joints:** A loop-in wiring system where conductors are looped from outlet to outlet shall be employed. Joints in conductors shall be avoided as far as possible but where it becomes unavoidable, joints will be accepted in cable channels only and not in conduits. Joints shall be soldered or shall alternatively consist of approved ferruling properly covered with the correct size heat-shrink sleeves. The use of PVC insulation tape is not acceptable.

E. **Grouping of conductors:** In cases where the conductors of more than one circuit are installed in the same wireway, the conductors of each separate circuit, including the circuit earth continuity conductor, shall be grouped at intervals of at least one (1) metre using plastic cable ties. The conductors of different circuits shall however remain separate in order to ensure that any given circuit may be withdrawn from the wireway. Conductors entering distribution boards or control boards shall be grouped and bound by means of plastic cable bands. The use of PVC insulation tape for grouping conductors will not be accepted.

F. **Pulling-through of conductors:** The electrical subcontractor shall take utmost care whilst pulling conductors through conduit to ensure that the conductors are not kinked, twisted or strained in any manner. Care shall furthermore be taken to ensure that conductors do not come into contact with materials or surfaces that may damage or otherwise adversely affect the insulation and durability of the conductor.

G. **Conductor colours:** The colours of conductor PVC insulation shall comply with SANS 10142.

The colours of conductors for sub-circuits shall as far as possible correspond with the colour of the supply phase. The colours of conductors for the wiring of two-way and intermediate switches shall preferably differ from the colour of phase conductors.

H. **Earth continuity conductors:** Bare copper earth continuity conductors or green PVC insulated stranded copper earth continuity conductors, as specified in the detail specification, shall be used throughout the installation.

When earth continuity conductors are looped between earth terminals of equipment, the looped conductor ends shall be twisted together and then ferruled or soldered to ensure that a positive earth continuity is maintained when the conductors are removed from any earth terminal.

Where bare copper earth wires are specified for circuits installed in power skirting and floor ducting, the electrical subcontractor shall provide a suitable length of PVC sleeving over the bare earth conductor where it passes behind or is connected to power outlets to ensure that such an earth conductor does not come into contact with any live parts.

I. **Wiring inside vertical wireways:** Conductors installed in vertical wireways shall be secured at intervals not exceeding 5m to support the weight of the conductors. Approved clamps shall be supplied and installed in suitable draw-boxes for this purpose.

J. **Conductor sizes:** The conductor size for each circuit type is specified in the detail specification. In the event that a conductor size is not specified in the detail specification, the following minimum conductor sizes shall be used:

Circuit	Minimum Conductor (Size)	
	Phase (mm^2)	Earth (mm^2)
Lighting	1,5	2,5
Socket outlet	2,5	2,5

K. **Single pole switches:** Single pole switches shall be connected to the phase conductor and shall not be connected to the neutral conductor.

L. **Three phase outlets:** With the exception of three phase outlets, wirings to circuits connected to different phases shall not normally be present at lighting, switch or socket outlet boxes. Where this is unavoidable, barriers shall be provided between terminals or connections of the various phases and the box shall be suitably labelled internally and externally to indicate the presence of three phase voltages.

A separate neutral conductor shall be installed together with each three phase circuit to outlets intended for equipment connection by means of isolators or sockets, irrespective of whether the particular equipment normally requires a neutral or not.

M. **Connections:** The insulation of conductors shall only be removed over the portion of the conductors that enter the terminals of switches, socket-outlets or other equipment. When more than one conductor enters a terminal, the strands shall be securely twisted together.

Under no circumstances shall any of the strands be removed to enable easier insertion of the conductors into terminals.

No more than two conductors shall be permitted to be fastened to any one terminal. The electrical contractor shall take care to ensure that the copper strands are not kicked during the removal of the insulation. PVC insulated conductors shall not be used for the direct connection to equipment where the temperature exceeds 75C, such as stoves, geysers, electric water heaters and high power LED lamps. Silicon coated or other approved conductors shall be used in such cases.

N. **Terminals:** Terminals shall be sized and current rated to match the conductors that are connected to them.

C3.2.4.4 **Power Outlets**

A. The electrical contractors shall only commence with the installation of power outlets in the conduit outlets allowed therefore of the plasterer and painter have completed their work in the vicinity of the outlet.

B. **Socket outlets with switches:** All socket outlets with switches shall be of the standard 16A 3-pin pattern, white in colour. Emergency socket outlets shall be red, with the flattened earth pin on top. UPS outlets shall be blue, with the flattened earth pin on the right.

Units for flush mounting shall be suitable for 100 x 100 x 50 mm deep flush wall box. Surface mounted patterns shall be housed in heavy pressed steel boxes. Shutters shall be provided. All socket outlets with switches shall be continuously rated at 16A and shall be suitable for operation on a 250V, 50 Hz, a.c. system.

All socket outlets with switches shall fully comply with SANS 164 as amended. Covers shall have bevelled edges which overlap the box.

C. **Isolators:** Moulded case isolators shall be of the double pole ON-LOAD type.

Toggles shall be interlocked with the covers. All isolators shall comply with SANS 60947. To distinguish the switches from circuit breakers the operating handles of isolators shall have a distinctive colour and where called for in the "particular specification" the switch shall be clearly and indelibly labelled "ISOLATOR".

C3.2.4.5 **Installation**

A. Socket outlets and power outlets shall be installed in the positions as indicated on the drawings.

B. **Socket outlets:** Unless otherwise specified socket outlets shall be installed at the following heights above finished floor level, measured to the underside of the outlet:

Outlet Point	**Location**	**Height (from finished floor level to underside of outlet)**
Socket Outlet	General applications	300mm
Socket Outlet	Battery Trip Unit	1200mm

C3.2.4.6 **Light Switches**

A. **Flush mounted switches:** Flush mounted switches shall comply with SANS 60947 and shall bear the SABS mark. All flush mounted switches shall be suitable for mounting in 100 x 50 x 50 mm galvanised steel wall boxes unless otherwise specified in the detail specification.

The switch mechanism shall be of the tumbler operated micro-gap type with silent operation and shall be rated for 16 A at 250 V and 50 Hz.

Switches shall have protected terminals for safe wiring. Multi-lever switches shall be constructed so as to enable individual defective switches to be removed and replace without having to remove the remaining switches.

The mounting holes provided on the yoke strap shall be slotted to allow for easy alignment. A brass earthing terminal shall furthermore be provided on the yoke to ensure the positive earthing of the switch assembly.

B. Switches with pilot light indication: Flush mounted switches with pilot light indication shall comply with the relevant SANS specification and shall bear the SABS mark.

Switches with pilot light indication shall be suitable for mounting in 100 x 50 x 50 mm galvanised steel wall boxes. The switch shall be rated at 16 A at 250 V and 50 Hz. A red neon indication lamp shall form an integral part of the switch level and shall light-up when the switch is in the on position.

C. Cover plates for switches: Cover plates for flush mounted switches shall have levelled edges which overlap the wall box in order to conceal all wall imperfections and shall conform to SANS 60947.

Cover plates shall be finished in ivory coloured baked enamel and shall bear the identical manufacturing batch number.

C3.2.5 TESTING

C3.2.5.1 **Installation Tests**

Tests as stipulated in the " Occupational Health and Safety Act no. 85 of 1993, as amended, and in the "Code of Practice for the Wiring of Premises" SANS 10142 (as amended), must be done. Test report forms must be filled in fully and correctly in ink, signed by the installation electrician and handed to the Engineer or its representative.

Tests must be conducted on site after the whole installation is complete, unless the Engineer grants written permission to the contrary. The tests must include a full-load test for an adequate period to ensure the satisfactory working of the installation. If negative test results are obtained, faults must be rectified and tests again done.

The contractor must supply all testing apparatus, correctly calibrated.

All tests shall be carried out in conjunction with and to the satisfaction of the Supply Authority and in the presence of the Engineer or his representative. The contractor shall make all arrangements for testing and inspection, the costs thereof being included in the Tender Price.

Each length of cable shall be tested for insulation and polarity by means of a 1000 Volt Megger designed for that purpose. In the case of underground cables this shall be done before back filling. In addition, the earth-loop impedance of each conductor earth electrode shall be measured. The earth resistance shall be tested by means of an approved instrument.

"Danger" notices shall be displayed at remote ends of cables under test.

The contractor shall ensure that the installation is completed in every respect and that there are no major defects prior to notifying the Engineer (in writing) for a first delivery inspection. The Engineer will accept zero minor defects during the final inspection. Should the number of defects be exceeded at the final inspection then the Engineer will terminate that inspection and request that the contractor arrange an additional final inspection.

C3.2.5.2 **Submittals**

A. Submittals shall include, but not be limited to, the following:

1. Three (3) copies of certified test results for each test indicated herein, for approval and future references.
2. Certifications as required herein.
3. Additional information as required in the specifications.

C3.2.5.3 **Conductor Tests (600 Volts or less)**

A. Prior to energizing of all new feeders, test all conductors for continuity of circuitry and for short circuits. No submittal is required for this test. Each wiring system with devices connected must test free from short circuits and grounds.

B. Each new feeder conductor shall have its insulation resistance tested after its installation is completed except for connection at its source and point of termination.

C. Test shall be made using a Megger or equivalent at a voltage of not less than 1000 VDC, and after one minute of operation at slip speed. Resistance shall be measured by connecting one terminal of the megger to the conductor and other terminal to earth. Reading shall be observed after 15 seconds of operation of the megger.

D. Conductors which do not meet or exceed the following insulation resistance values shall be removed, replaced, and retested.

E. Conductor test results shall indicate weather conditions, temperature, relative humidity, date and time, feeder tested, conductor size and type and resistance measurements.

C3.2.5.4 **Service Switchboard Earth Resistance Test**

A. Perform earth resistance test on the switchboard earthing system for comparison of future inspection and testing data by the Owner. Overall system resistance shall not exceed 25 ohms. Eliminate any stray currents, shorts, or non-consistencies in the grounds system.

B. The test shall be performed using a Megger Earth Tester or equivalent test instrument and shall not be performed immediately following wet weather conditions.

C. Switchboard earth resistance test results shall indicate weather conditions for test, earthing system tested, earthing configuration and test results.

C3.2.5.5 **Earth Fault Protection System Tests**

A. Factory test: The switchboard ground fault protection system shall be factory tested prior to shipment.

The switchboard manufacturer shall provide factory ground fault interlocking and protection system test for circuit testing, and verification of interlocking and tripping characteristics. The manufacturer shall pass predetermined values of current through the relay sensors, and measure the relay tripping time for each phase, and neutral. The measured time/current relationships shall be compared to the relay trip characteristics curves. If the relay trips outside

the range of values indicated on the curve, the relay shall be replaced. This test shall include verification of polarity of the ground sensor circuits interconnection.

B. Certified "factory test" results shall indicate relay number, device served, actual characteristic curves, design characteristic curves and overall test results.

C. Field test: Following completion of the construction and prior to final acceptance testing, the earth fault protection system shall be field tested and reset to the manufacturer's recommended setting for both time and current, by a representative of the Manufacturer. The field test shall be conducted in a similar manner to the factory test in that a cable from a low voltage, high-current test set shall be passed through each current sensor. This test shall also demonstrate the complete system reliability in that it must operate the associated shunt trips and show that the overcurrent devices which they operate will actually open.

D. Certified "field test" results shall indicate relay tested, relay settings, and test results.

C3.2.5.6 **Special Testing**

A. Certify in writing that the system operation is in accordance with specifications and code requirements.

C3.2.5.7 **Balancing of Electrical Circuits**

A. The system of feeder and branch circuits for power and lighting shall be connected to distribution board bus-bars in such a manner that loads connected thereto will be balanced on all phases as close a practicable.

B. Should there be any unfavourable condition of unbalance on any part of the electrical system, the electrical contractor shall make such changes that may be necessary to remedy the unbalanced condition.

C. Prior to completion of the project, provide a complete list of all panels stating the measured loads on each phase. Test results shall indicate panels tested, amperage per phase, and any remedial action taken.

C3.2.5.8 **Operational Testing**

A. Take voltage and currents readings for each feeder and motor circuit under maximum operating conditions. Questionable readings shall be repeated at no cost for confirmation.

B. Controls for lighting and receptacle circuits shall be demonstrated.

C. Demonstrate running of motors with controls and interlocks.

D. Demonstrate operation of electrical equipment appliances.

C3.2.5.9 **Cables**

Each cable shall be tested after installation in accordance with SANS 1507 (up to 1kV) and SANS 97 (up to 11kV) as well as the requirements of the local and supply authorities.

LV cables shall be tested by means of a suitable megger at 1kV and the insulation resistance shall be tabulated and certified.

MV cables shall be pressure tested in accordance with the manufacturers recommendations and exact leakage current shall be tabulated and certified.

The contractor shall make all arrangements, pay all fees and provide all equipment for these tests. The cost of testing shall have been included in the tender price.
The contractor shall notify the Engineer and if applicable the Supply Authority timeously so that their representative may witness the tests.

On completion of the tests on any cable, the contractor shall without delay submit three (3) copies of the certified test results to the Engineer.

The contractor shall provide all the testing equipment as required for the respective tests.

C3.2.6 MV AND LV CABLES

C3.2.6.1 **Scope**

A. General: This specification details the requirements for the supply and installation of cables up to and including cables rated at voltages up to 11000 volts (RMS), above ground and buried in the ground. The installation of cables in buildings, and in the ground for system voltages up to 11000 volts, 50 Hz, shall conform to the latest SANS codes 10142-1, SANS 1507, and SANS 1339 all as amended

B. Types: The following cable types shall be used unless otherwise specified in the detailed technical specification:

1. Medium voltage supplies (6600/11000 Volts)

   - 11kV XLPE Type A Copper (Cu) Cables, copper tape screened, steel wire armoured cable manufactured to SANS 1339

2. Low voltage supplies in ground

   - PVC insulated steel wire armoured with ECC

C3.2.6.2 **Codes and Standards**

A. Codes and Standards: Cables supplied and installed shall comply with the following Acts and regulations:

1. The latest issue of SANS 10142-1: Code of Practice for the Wiring of Premises-Part 1: Low Voltage Installations,

2. The latest issue of SANS 1507-3: Electric cables with extruded solid dielectric insulation for fixed installations (300/500 V to 1900/3 300 V) Part 3: PVC Distribution cables,
3. The latest issue of SANS 1339: Electric cables - Cross-linked polyethylene (XLPE) insulated cables for rated voltages 3,8/6,6 kV to 19/33 kV,

a) The Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended,
b) The Local Government Ordinance 1939 (Ordinance 17 of 1939) as amended and the municipal by-laws and any special requirements of the local supply authority,
c) The Fire Brigade Services Act 1993, Act 99 of 1987 as amend,
d) The National Building Regulations and Building Standards Act 1977 (Act 103 of 1977) as emended,
e) The Post Office Act 1958 (Act 44 of 1958) as amended,
f) The Electricity Act 1984 (Act 41 of 1984) as amended,
g) The Regulations of the local Gas Board where applicable.

B. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:

The manufacturer must be an ISO9001 certified company. Proof of certification is to be submitted together with the tender document, failing which the tender may be disregarded.

Products must carry the SABS mark or an international certification and approved for use in South Africa.

Installers must be certified or registered installers of the manufacturers or their representatives. Manufacturers or their representatives must also have registered offices in South Africa and the local office must carry sufficient stock and spare parts for the project.

C3.2.6.3 **Submittals**

Shop drawing submittals shall include, but not be limited to, the following:

1. The Contractor shall submit to the Engineer for review, a list of the proposed manufacturers of cables, cable lugs, cable connectors, and termination fittings listed herein. The Contractor may install cable, cable lugs, cable connectors, joints and termination fittings furnished by any manufacturer listed on the approved submittal.
2. Cut sheets on all conductors with manufacturers name, ratings and capacities, insulation characteristics, and available colours, clearly listed.
3. Cut sheets indicating all cable lugs, termination fittings, joints and cable connectors.
4. Cut sheets indicating types of conductor identification bands.
5. Additional information as required in the specification.

C3.2.6.4 **Installation - General**

All cables laid directly in the ground shall be laid at a depth such that the vertical distance from the top of the cable to the finished ground surface is not less than the values given below:

Cables in open ground or under pedestrian paved areas	MV Cables	LV cables
Residential sites	800mm	450mm
Industrial sites	1000mm	500mm
Road Crossings	1100mm	1100mm
Railway crossings	1500mm	1500mm

Cables shall not be laid in the ground if any corrosive agent is found in the ground.

Before cable laying is commenced, all cable trenches shall be drained, the bottoms graded and compacted and all loose stones and similar debris removed.

Cable trench width for one or two cables shall be a maximum of 550mm. The width shall be increased as more cables are installed allowing for at least two cable diameter spacing for each cable added.

C3.2.6.5 **Handling of Cable Drums on Site**

Note: It is recommended that a correctly designed spreader must be used to load and unload the drums with a crane.

Every drum must be mounted on jacks or on a cable-drum trailer with a horizontal supporting beam of suitable size and strength to handle the width and weight of the drum. The drum may not be allowed to rotate freely when the cable is rolled off. (Free rotation causes the cable to twist and loosen the windings, which can cause the inside armouring/insulation of the cable to be stretched). The cable must enter the trench from the top of the reel. All cables ends including that left on the drum or in a trench must be sealed to prevent the penetration of moisture into the cable. The free cable end on the drum must be fastened to the side of the drum.

C3.2.6.6 **Cable Laying**

Cable rollers shall be used at all times to run out cables. Rollers shall be spaced so that the length of cable will be totally suspended during the laying operation.

Where cables have to be drawn through pipes or ducts, a suitable cable sock shall be used and care shall be exercised to avoid abrasion, elongation or distortion of any kind.

Where cables have to be drawn around corners, well lubricated securely fixed skid plates shall be used.

Cables shall be pulled into trenches etc, by hand or approved whinch system only.

C3.2.6.7 **Spacing of Cables**

Cables installed in a common trench shall be laid parallel to each other spaced as follows: (LV: up to 1000V; MV: 1000V to 11000V)

LV/LV	:	2 x cable diameters
LV/MV	:	300mm minimum

Wher MV and LV cables have to be installed in the same trench, the MV cable shall be laid on the one side of the trench at a depth as specified and the covered with soil. The LV cable shall be then laid on the other side of the trench at the depth specified. Cables shall not be buried on top of each other unless layers are specified. The minimum spacing between layers shall be 200mm.

Cables for telephones, communication systems and other low voltage systems (less than 50V) shall be seperated from power cables by at least 1000mm. All control or pilot cables shall be laid at least 300mm from power cables.

C3.2.6.8 **Installation in Buildings**

Particular attention shall be paid to the application of grouping factors in respect of current rating and the appropriate spacing of cables shall be allowed.

Cables for services above 650 volts shall be run separately from all other cables with a minimum clearance of 2300mm. cables for service below 100 volts including sound and telephone systems shall also be segregated from all other cables.

All cables shall be adequately supported throughout their length as specified by the Wiring Regulations or, where not specified as recommended by the cable manufacturers. No joints shall be allowed in cables of less than 300m length, unless as specified or specifically approved.

Cable run indoors shall be supported on cable trays or cable rack, secured thereto by heavy duty plastic strapping. The cables shall be fixed at intervals not greater than those stipulated in SANS 10142 and shall be spaced sufficiently to avoid de-rating in terms of SANS 10142 1. Cables shall be individually fixed so that anyone may be removed from a group without disturbing the others. Every run of cable shall be a single length without joints.

Save that where a run exceeds the general drum length of where the length of a run is increased after the cable is delivered on site, a through box will be permitted. Such through boxes shall be so placed as to afford easy access for maintenance and repair; when they are required in underground cable runs the contractor shall provide special cable markers to locate them.

All cable tails shall be provided with either cable lugs or ferrules as may be appropriate. At each sealing end straps-on cable markers shall be fixed, showing clearly and indelibly the number and size of cable cores and the destination of the cable.

C3.2.6.9 **Cables in Concrete Trenches**

In concrete trenches, cables shall be laid side by side on the bottom of the trench without crossovers. When necessary to maintain spacing factors, cables shall be fixed to the sides of the trench using cleats as specified for installation above floor level.

C3.2.6.10 **Cables in Ducts**

The total cross sectional area of all cables installed in a duct shall not exceed 50% of the internal cross sectional area of the duct. After installation of the cables, duct stoppers shall be fitted to each end of each duct run and at the entry to the building to effectivly seal the duct from ingress of vermin, etc.

C3.2.6.11 **Cable Routes**

Cables shall follow the routes shown on the drawings; the routes shall only be varied with the written permission of the Engineer. Where no routes are defined on the drawings the contractor may select routes to his reasonable preference but shall obtain written approval of them before installing the cables.

The contractor shall, before trenching commences, familiarizes him with the routes and site conditions and the procedure and order of doing the work shall be planned in conjunction with the general construction program for other services and building requirements.

The contractor shall acquaint himself with the position of all the existing services such as storm water pipes, water mains, sewer mains, gas pipes, telephone cables, etc. before any excavations are commenced. For this purpose he shall approach the Engineers representative, the local municipal authority and any other authority which may be involved, in writing.

The Engineer reserves the right to alter any cable route or portion thereof in advance of cable laying. Payment in respect of any additional or wasted work involved shall be at the documented rates.
The removal of obstructions along the cable routes shall be subject to the approval of the Engineer.

C3.2.6.12 **Cable Joints**

Cable joints shall be carried out strictly in accordance with the manufacturers instruction and by personnel competent in jointing the cables involved.

No joints in cable runs will be allowed unless a cable run exceeds the maximum length available on a cable drum (normally 300m)

The joint shall not impair the characteristics of the cable.

Joints shall be fully water and airtight and shall be free of voids and air pockets

The crossing of cores in joints shall not be permitted under any circumstances.

The contractor shall notify the Engineer timeously of the day on which jointing is to be carried out in order that the inspection may be arranged if so required. Any cable joint not inspected by the Engineer because of insufficient notice being given shall be opened for inspection and redone at the discretion of the Engineer and at the cost of the contractor.

C3.2.6.12.1 **Connection of Cable Cores**

When cutting away insulation from cable cores to fit into lugs, care shall be taken that no strands are left exposed. Under no circumstances may any of the conductor strands be nicked or cut away to fit into lugs

Contact surfaces shall be thoroughly cleaned and smoothed and fixing bolts shall match the hole size of the lug.

Suitable lugs shall be crimped to cable core ends using mechanical or pneumatic tolls designed for the purpose.

Cables that are connected to clamp type terminals where that clamping screws are not in direct contact with the conductor, need not be lugged but the correct terminal size shall be used.

Ferrules shall be used where cable cores are connected directly to equipment with screws against the conductor strands.

C3.2.6.13 **Trenching**

The contractor shall, before trenching commences, familiarise himself with the routes and site conditions. The procedure and order of doing the work shall be co-ordinated with the general construction programme.

Trenching shall be programmed in advance and the approved program shall not be departed from except with the consent of the Engineer. The contractor will be held responsible for damage to any existing services brought to his attention by the relevant authorities and shall be responsible for the cost of repairs.

The contractor shall take all the necessary precautions and provide the necessary barriers, warning signs and/or lights to ensure that the public and/or employees on site are not endangered. The contractor shall ensure that the excavations will not endanger existing structures, roads, railways, other site constructions or other property. Trenches shall connect the points shown on the drawings in a straight line. The Engineer beforehand shall approve any deviations due to obstructions or existing services.

Trenches shall be as straight as possible and shall be excavated to a depth as indicated in this specification. The excavated material shall be placed adjacent to each trench in such a manner as to prevent nuisance, interference or damage to adjacent drains, gateways, trenches, water furrows, other works, properties, or traffic. Where this is not possible the excavated materials shall be removed from site and returned for back filling on completion of cable lying.

In the event of damage to other services or structures during trenching operations the contractor shall immediately notify the Engineer and institute repairs.

Prior to cable laying the trench shall be inspected thoroughly and all objects likely to cause damage to the cables either during or after lying shall be removed.

Where ground conditions are likely to reduce maximum current carrying capacities of cables or where the cables are likely to be subjected to chemical or other damage or electrolytic action, the Engineer shall be notified before installing the cables. The Engineer will advise on the course of action to be taken.

Extreme care shall be taken not to disturb surveyor's pegs. These pegs shall not be covered with excavated material. If the surveyor's pegs are disturbed, a person qualified to do so shall replace them. The contractor shall ensure that the excavations will not endanger existing building structures, roads, railways, or other site construction or other property before excavating.

The contractor shall take all the necessary precautions and provide the necessary warning signs, barricades, shoring and/or lights to ensure that the public and /or personnel on site are not endangered.

Trenching crossing roads, footpaths or access ways shall not be left uncovered. If cables cannot be laid immediately, the contractor shall install sleeves or temporary bridges or cover plates, of sufficient strength to accommodate the traffic concerned.

The bottom of the trench shall be smooth and free of any sharp dips or rises which may cause tensile forces in the cable during backfilling.

The nature of the soil can be encountered is classified as follows:

a) **Soft Soil**: Shall mean ground that can removed by pick and shovel and includes hand pickable soil that can be loosened by hand pick and includes hard shale, compact gravel stone and rocks up to 0.003 cubic meters in volume.

b) **Soft rock**: Shall mean rock that can only be excavated by machine excavation and includes granite, quartzitic sandstone, slate and rock of similar or greater hardness, solid shale and boulders over 0.03 cubic meter in volume.

c) **Hard Rock**: Shall mean rock that can only be excavated by explosives.

Should blasting be necessary, the contractor shall obtain all necessary authorities from the relevant departments and Local Authorities. The contractor shall take full responsibility and observe all conditions and regulations set forth by the above Authorities.

The necessary insurance cover must be obtained to cover possible damage and losses.

Blasting shall be subject to the approval of the Engineer.

C3.2.6.14 **Cable Sleeves**

Where cables cross under roads, railway tracks, other service areas, etc and where cables enter buildings, the cables shall be installed in heavy duty uPVC pipes. The sleeves shall be heavy duty class 34 uPVC sleeving with a wall thickness of not less than 1,5mm thick and a smooth finish inside. Roads and railway crossings shall be done at right angles.

Sleeves shall be a minimum diameter as specified and shall extend at least 1,0m beyond the road edge or kerb on either side of the crossing.

After installation of cables, the ends of all sleeves shall be sealed with a non-hardening watertight compound. All sleeves intended for future use shall likewise be sealed.

Where sleeves have to be built into structures by others, the Contractor shall supply the sleeves and ensure that they are installed correctly.

C3.2.6.15 **Cable Installation and Back Filling**

The Contractor is responsible to ensure that the cable is installed at the depths specified, Cables depths indicated from finished ground level (FGL) must be installed accordingly. It is the Contractors responsibility to ensure that cable depths are measured from a finished final ground level. The contractor will be responsible to excavate and re-install the cable if this depth if not found to be correct.

Before the cable is laid into the trench, the bottom of the trench shall be filled across the full width with a 50mm layer of suitable sifted soil and levelled off. After cable laying, a further layer of bedding shall be provided to extend 50mm above the cables.

If there is no suitable soil available on site, the contractor shall import fill and make all the necessary arrangements to do so. The cost of importing soil for bedding purpose shall be included in the rates for excavations.

The bedding under joints shall be fully consolidated to prevent subsiding.

The contractor shall not commence with the back filling of trenches before the Engineer has inspected the cable installation. Should the Contractor fail to give timeous notification, the trenches shall be re-opened at the Contractors cost. Such an inspection shall not be unreasonably delayed.

Cables (1000V to 11000V) shall be provided with a yellow coloured plastic marking tape installed 400mm above the cable. The tape shall be marked with a red skull and crossbones with the words Electric Cable . This marking tape shall be installed over the entire length of the cable.

The maximum accepted diameter of stones present in the back fill material is 75mm.

The backfill shall be compacted in 150mm layers and sufficient allowance shall be made for final settlement. The contractor shall maintain the refilled trench at his expense for the duration of the contract. The surface shall be made good to the same density and to match the surrounding areas on completion.

In the case of roadways or paved areas, the excavations shall be consolidated to the original density of the surrounding material and the surface finish reinstated.

C3.2.6.16 **Cable Markers**

Cable markers shall consist of concrete blocks dimensioned as follows:

300mm high, 150mm x 150mm and 250mm x 250mm at the bottom.

A stainless steel plate for labelling shall be cast into the tops of the blocks in such a manner that they cannot be prised loose. The wording as follows as well as arrows indicating cable direction shall be clearly stamped on the plates.

- For MV and LV cable routes: ELECTRICAL CABLES
- For joint positions: ELECTRIC CABLE JOINT

Cable markers shall be installed on the surface along all the underground routes and shall project 50mm above finished ground level. If the projected markers could be a hazard to pedestrians or other traffic, they shall be installed flush with the surface.

Cable markers shall be installed at all change in direction, at the beginning and the end of cable runs (i.e. where a cable enters a substation or building), above all joints, above cable pipe entries and exits and at intervals not exceeding 50m along the cable route. The position of cable markers shall be indicated on the as built drawings.

C3.2.6.17 **Testing - General**

LV cables shall be tested by means of a suitable megger at 1kV and the insulation resistance shall be tabulated and certified.

The contractor shall make all arrangements, pay all fees and provide all equipment for these tests. The cost of testing shall have been included in the tender price.
The contractor shall notify the Engineer and if applicable the Supply Authority timeously so that their representative may witness the tests.

On completion of the tests on any cable, the contractor shall without delay submit three (3) copies of the certified test results to the Engineer.

The contractor shall provide all the testing equipment as required for the respective tests.

C3.2.6.18 **Measurement and Payment**

C3.2.6.18.1 **Principles**

The basic principles of measurement and payment for cable trench excavations is that the rate tendered for excavations covers the cost of excavations, the re-use of excavated material for back filling and the removal of all surplus material along the trench routes within 0,5 km from the source.

The rate for the laying of the cable covers the cost of the handling and placing of the cable in the approved trench, as well as any other costs concerning the laying of the cables.

Trench excavations for cables, etc. is measured volume wise, but can be measured according to length.

Except when differently stated in the project specification or differently demanded, the depth will be measured from the ground level, along the centre line of the trench, down to the bottom of the specified bottom layer. The ground level is that which was formed after mass ground works was completed, measuring the excavated level or the backfilled level, except where another execution sequence is demanded.

The source of the approved back fill material and the bottom layer is the contractors own responsibility. He is free to use approved material excavated from the side of the trench or other excavations on site, providing such material meats the applicable requirements. He is also free to buy one or both the materials from commercial sources or to excavate along the cable route at his own cost.

Additional and separate payment for the backfill of over-excavations and the removal of surplus materials or any other unforeseen works will only be made if such works was specified by the Engineer.

The requirements of sub clause 8.3.3 of SANS 1200 DA apply to additional transport distances. All additional distances will be measured only via the shortest route possible and only in one direction to the nearest 0,1 km measured and the volumes will be calculated as specified in 8.2.3.

C3.2.6.18.2 **Calculation of Quantities**

The length used for calculations is the total length of the cable, cable trench, etc from one end to the other or from one structure face to the next structure face. No deductions will be made for any manholes, etc.

Excavations will be measured as if excavated with vertical sides, regardless of whether it was excavated with sloping sides. If volumetric measurements are required, the volume will be measured from the depths shown on the drawings or to the bottom of the specified base, whichever is the largest, and a minimum base width of 450mm in the case of high voltage cables and 300mm in the case of low voltage cables.

The volume of the backfill will be calculated from the minimum base with of the trench and the depth of the backfill needed. No allowance shall be made for loss of volume of the compacted material.

Imported material as per 3.2 must be disposed of along the cable servitude within a distance of 50m from the source unless specified otherwise by the project specifications.

Additional transport of material if ordered must be handled as specified in sub clause 8.3.3.4 of SANS 1200 DB. Free haul as specified in sub clause 5.2.6.1 of SANS 1200 DA shall be applied.

C3.2.7 SWITCHBOARDS AND DISTRIBUTION BOARDS

C3.2.7.1 **Codes and Standards**

A. Codes and Standards: Cables supplied and installed shall comply with the following Acts and regulations:

a) The latest issue of SANS 556: Low-voltage switchgear Part 1: Circuit-breakers
b) The latest issue of SANS 1765: Low-voltage switchgear and controlgear assemblies (distribution boards) with a rated short-circuit withstand strength up to and including 10 kA
c) The latest issue of SANS 60439: 1-5: Low-voltage switchgear and controlgear assemblies,
d) The latest issue of SANS 60947: 1-8: Low-voltage switchgear and controlgear,
e) The latest issue of SANS 1973: Low-voltage switchgear and controlgear ASSEMBLIES Part 1-8,
a) The latest issue of NRS 003: Metal-clad switchgear - For rated a.c. voltages above 1 kV and up to and including 24 kV Part 2: Standardized panels
b) Codes and standards as per Section 002: Design Criteria.

B. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:

The manufacturer must be an ISO9001 certified company. Proof of certification is to be submitted together with the tender document, failing which the tender may be disregarded.

Products must carry the SABS mark or an international certification and approved for use in South Africa.

Installers must be certified or registered installers of the manufacturers or their representatives. Manufacturers or their representatives must also have registered offices in South Africa and the local office must carry sufficient stock and spare parts for the project.

C3.2.7.2 **Distribution Switchboards**

A. Distribution switchboards shall have construction with group mounted circuit protective devices and include the following:

1. Switchboard
2. Circuit Protective Devices

B. Switchboards shall consist of the required number of vertical sections bolted together to form one metal enclosed rigid switchboard for circuit protective devices and busbar work. Front and side plates shall be screw removable.

C. Switchboards shall be designed as freestanding switchgear with front only access or otherwise noted on the drawings. This switchgear shall be designed with group mounted devices and isolated busbars, expandable for future sections by the addition of simple splice plates on the horizontal busbar. An air space of at least 50mm or a minimum 3mm thickness insulating barrier shall be provided between end of bus bar and end panel. Switchboard shall be front and rear aligned to a common depth. Switchboard shall be of indoor switchboard construction.

D. The switchboard shall include all protective devices and equipment as shown with necessary interconnections, instrumentation, and control wiring. Small wiring, necessary fuse blocks, and terminal blocks within the switchboard shall be furnished. All groups of control wires leaving and switchboard shall be furnished with terminal blocks with suitable numbering strips. All wiring within switchboard enclosure shall utilize insulated copper conductors.

E. Enclosure Construction:

1. Switchboard framework shall be fabricated on a preformed steel base, or base assembly, consisting of a minimum of 1.6mm corrosion resistant mild steel and commercial channel welded or bolted together to rigidly support the entire shipping unit for moving on rollers and floor mounting. The framework shall be formed of gauge mild steel, rigidly welded and bolted together to support all cover plates, busbars, and component devices during shipment and installation.

2. Each switchboard section shall have an open bottom and individually removable top plates for installation and termination of cables and conduit. Top and bottom conduit areas shall be clearly shown and dimensioned on the shop drawings. All closure plates shall be formed up on all sides, screw removable and small enough for easy handling by one man.

4. All steel surfaces shall be chemically cleaned and treated to provide a bond between paint and metal surfaces to prevent moisture entrance and rust formation under the paint film. The paint finish shall be two (2) coats of gray enamel over a rust-inhibiting phosphate primer.

Baked enamel finish is acceptable if applied to properly prepared surface.

F. The switchboard shall be completely assembled, wired, adjusted and tested at the factory. After assembly, the complete switchboard will be tested for operation under simulated service conditions to assure the accuracy of the wiring and the functioning of all equipment. The main circuits shall be given a dielectric test of 2200 Volts for one minute between live parts and ground and between opposite polarities.

The wiring and controls shall be given a dielectric test of 1500 Volts for one minute between live parts and ground. A certified test report shall be available to the engineer for approval.

G. Busbars:

1. The switchboard busbars shall be 98% conductivity copper with bolted joint connections and of sufficient cross-sectional area to continuously conduct rated full load current with a maximum temperature rise of 65^{o}C above an ambient temperature of 40^{o}C. The switchboard shall have a full size, full length isolated neutral bus and a full-length copper earth bars.

2. The bus bars shall be rigidly braced to comply with the integrated equipment rating of the switchgear. The minimum interrupting current rating shall not be less than 65,000 AMPS symmetrical. The main horizontal bus bars between sections shall be located on the back of the switchboard to permit maximum available conduit area. Busbar supports shall be non-carbonizing, non-tracking insulators arranged to provide short circuit bracing as specified. All bolted joint hardware shall be equipped with lock washers and torqued to the Manufacturer's recommended settings. Bolted joint connection surfaces for copper busbars shall be silver plated.

Torque settings shall be provided for use during installation.

3. Busbars shall be arranged A-B-C, left-to-right, top-to-bottom, and front-to-rear, throughout. A ground busbar shall be secured to each vertical section structure and extend the entire length of the switchboard.

4. Where "space" is shown on one-line drawings, space shall be provided for installation of future switches, sized as shown.

5. Distribution feeder conductors shall be terminated on the "load side" of switchboard devices with hydraulically applied, high conductivity, compression lugs approved for the purpose. Where conductor connections are required to the main bus, they shall be made with copper bodied compression connectors.

H. Integrated Equipment Rating: Each switchboard, as a complete unit, shall be given a single integrated equipment rating by the manufacturer. The integrated equipment short-circuit rating shall certify that all equipment is capable of withstanding the stresses of a fault equal to that shown on the drawings, in RMS symmetrical amperes. Such ratings shall have been established by actual tests by the manufacturer, in equipment of similar construction as that of the project switchboard. This test data shall be available and furnished, if requested, with or before the submittal of shop drawings.

I. Electronic Power Monitoring System:

1. Each switchboard shall be provided with an electronic circuit monitoring system.

2. The Circuit Monitor shall accept inputs from industry standard instrument transformers. The current and voltage signals shall be digitally sampled at a rate high enough to provide accurate RMS sensing and valid data for wave form analysis beyond the 30th harmonic based on a fundamental frequency of the 50 Hz. All set-up parameters required by the Circuit Monitor shall be stored in non-volatile memory (no backup battery) and retained in event of a control power interruption. The instantaneous values and the time and date for the highest peak of all demand readings shall also be maintained in non-volatile memory.

3. The Circuit Monitor shall have capability to perform the following readings:

   a. Current per Phase RMS (–1%).
   b. Three Phase Average RMS Current (–1%).
   c. Apparent RMS Current (–1%).
   d. Phase-to-Phase and Phase-to-Neutral Voltage (–1%).
   e. Three Phase and per Phase Power Factor (–2%).
   f. Three Phase Real and Reactive Power (–2%).
   g. Three Phase KVA (–2%).
   h. Frequency (–0.5%).
   i. Temperature (–2-1/2oC.).
   j. Average Demand Current per Phase (–2%).
   k. Peak Demand Current per Phase (–2%).
   l. Average Real Power Demand (–2%).
   m. Predicted Real Power Demand (–2%).
   n. Peak Real Power Demand (–2%).
   o. Accumulated energy (–2%).
   p. Accumulated reactive energy (–2%).

4. The Circuit Monitor waveform capture capability shall, upon user command, capture and store, in non-volatile memory, three phase voltage and current samples consisting of 256 data points each.

The data points shall represent at least three cycles of each current or voltage waveform. The samples shall be evenly gathered from each voltage and current phase input such that the original power signals with proper magnitude and phase relationships may be reconstructed. It shall be possible to recreate the original power signal from the stored data with sufficient accuracy such that steady-state power harmonic analysis will provide valid information on harmonic content up to the 30th harmonic.

5. All data and calculated values stored in the Circuit Monitor shall be accessible to external devices by means of a built-in RS485/RS422 serial communications port. It shall be possible to connect from one communication port to another such that up to 16 Circuit Monitors may be connected to form a continuous string extending up to 1000m. These strings shall form individual data transfer networks that comply with the RS485 multi-drop communications standards.

   Communication rates for each circuit monitor shall be adjustable up to 19,200 Baud.

6. Circuit Monitors shall be installed by the switchboard manufacturer. All control power, CT, PT, and communications components shall be factory wired and harnessed within the switchboard line-up.

   The Circuit Monitor shall be mounted on the front panel of the main switchboard incoming line compartment.

C3.2.7.3 **Submittals**

A. Shop drawing submittals shall include, but not be limited to, the following:

1. Switchboard shop drawings with all busbar and switch ratings, capacities, characteristics, features and associated accessories clearly indicated.

2. The minimum setting of the earth fault devices and the recommended setting for normal building operation.

3. Sufficient information to show that switchboard overcurrent protection devices have been fully coordinated with load side overcurrent protection devices and the Supply Authorities primary overcurrent protection. This shall include time/current curves and trip settings.

4. Equipment room layout showing switchboards, panelboards, motor control centres, etc., with required clearances as specified in the SANS codes.

C3.2.7.4 **Installation**

A. Install switchboard where shown, in accordance with the manufacturer's written instructions and recognized industry practices to ensure that the switchboards comply with the requirements and serve the intended purposes.

B. Install switchboard on a nominal 100 mm high reinforced concrete housekeeping pad. The housekeeping pad shall extend 80 mm beyond the housing of the switchboard unless shown otherwise. The entire assembled switchboard shall be anchored to continuous 40 mm x 150 mm channels for the full length.

   The channels shall be embedded in the concrete housekeeping pad. Bolt studs shall be at least 10 mm in diameter and located not more than 750 mm apart centre to centre. The mounting channels shall be continuous single-piece structural channels and shall be levelled when embedded in the concrete housekeeping pads. The channel and bolt studs shall be furnished and installed by the Electrical Contractor.

C3.2.7.5 **Equipment of Switchboards and Distribution Kiosks**

The fault-breaking capacity of each breaker shall be certified by IEC test to be not less than the prospective fault levels marked on the wiring schedules. When used as main L.T. switches protecting transformers, they shall be submitted to the Supply Authority for trip testing.

Moulded case circuit-breakers shall comply with IEC 157-1 or SANS 156:2007 as amended, shall be of fixed or draw-out execution as set out in the Project Specification. It shall have fault-breaking capacities certified by I.E.C. test to be equal to or greater than the prospective fault levels marked on the wiring schedules. Wherever possible, circuit breakers shall bear the SABS mark.

Miniature circuit-breakers shall comply with SANS 156:2007 as amended and shall bear the SABS mark. The fault-breaking capacity of miniature circuit breakers shall be certified by SABS test to be not less than the values set out in the wiring schedules.

Current-limiting circuit breakers, suitably certified, are acceptable in all cases.

In general circuit-breaker overload trip systems of the thermal or hydraulic-magnetic types are equally acceptable. In cases where high ambient temperatures or widely varying extremes of ambient temperature are expected hydraulic-magnetic devices shall be preferred: alternatively thermal devices with ambient temperature compensation may be offered.

Where circuit breakers have to sustain motor-starting currents and the like, circuit breakers shall be hydraulic-magnetic with appropriate tripping characteristics. Where described in the Project Specification as being for short-circuit protection only, the circuit breakers shall be supplied without overload trip devices.

Switches shall comply with the requirements of SANS 60947 as amended and shall be capable of safely making onto fault currents of the magnitudes shown on the wiring schedules. Main switches of distribution boards shall additionally comply with the requirements of SANS 60947 applicable to switch-disconnectors. The main switches shall be rated for uninterrupted duty. Other switches shall be rated for 8-hour duty - the utilization category shall in all cases be AC22. All switches and switchdisconnectors shall bear the SABS mark.

Contactors shall comply with SANS 60947 and shall be rated to perform not less than 1 000 000 operations at the current ratings and duties quoted on the wiring schedules. They shall be so fixed as to ensure adequate coil ventilation. Contactors shall comply with the detailed requirements set out later in this Specification.

The internal wiring of switchboards shall be done with colour-coded PVC-insulated stranded conductors and shall include all phase, neutral, earth and control wires between equipment and to terminal blocks. Wiring channels shall be made spacious enough to permit the easy passage of all circuit wiring with adequate spacing between different circuits to promote ventilation. All the wires of each circuit or sub-circuit shall be braided together with approved strapping and shall be so arranged as to permit any individual circuit to be examined or renewed without disturbing any other circuits. Stranded conductors shall be terminated in crimped lugs of ferrules; manual crimping shall be done with makers' special tools which will not release until the full crimping pressure has been achieved; the ends of conductors from 50mm† cross-sectional areas upwards shall be crimped by hydraulic machine.

C3.2.7.6 **Spare Space**

All distribution boards shall be of adequate size to accommodate specified equipment and a minimum of 30% spare capacity shall be allowed for future equipment unless specifically stated in the detail specification.

C3.2.7.7 **Labels and Legends**

All labels shall be of plastic "sandwich board" material, the legends being engraved through the front plastic layer to the contrasting inner layer.

The lettering of legends shall not be less than 6mm high in sans-serif capitals; white lettering on black ground or black lettering on white ground shall be selected as necessary to ensure maximum legibility and contrast with the switchboard finish. All labels shall be secured by at least two bolts or rivets per label and shall be accurately level and central over their subjects.

C3.2.7.8 **Busbars**

Bus bars shall be of copper or aluminium and shall comply with SANS 1195 as amended. Copper bus bars shall be tinned after fabrication; the current ratings shall be those assigned by the Copper Development Association. Multiple bars shall be arranged with air gaps between the sections, equal to the section thickness. Insulating busbar supports shall be provided at intervals related to the prospective short-circuit fault currents, the following table being a guide for single-section bus bars:

BUSBAR SECTION mm x mm	**kA at 400 V FOR INSULATING SPACINGS OF**			
	450mm	**610mm**	**760mm**	**915mm**
25 x 9,5	29	21	17	14
40 x 9,5	47	35	27	23
50 x 9,5	55	47	39	33
75 x 9,5	61	53	47	43
100 x 9,5	67	58	52	47

C3.2.7.9 **Colour Finish**

The front panels of normal supply, standby power and no-break supply sections shall be painted in distinctive colours as follows:

Normal supply : Light Orange, colour B26 of SANS 1091.
Standby power : Signal Red, colour A11 of SANS 1091. UPS supply: Light Blue, colour of SANS 1091.

Refer to the DB schematic for details. The DB manufacture to supply three (3) x sets of drawings for approval prior to manufacture.

C3.2.7.10 RECESSED AND SEMI-RECESSED DISTRIBUTION BOARDS

A. Distribution boards shall consist of the following parts:

The bonding tray shall be constructed from 1,60 mm corrosion resistant mild sheet steel. Bracing gussets with cam-shaped slots shall be welded on the four corners. Knock-outs shall be provided in the upper and lower sides of the distribution boards. Expanded metal shall be spot-welded to the back of all bonding trays for 102,5 mm thick walls.

The architrave frame shall be constructed from 1,20 mm sheet steel with square edges. The architrave frame shall form 25 mm border around bonding tray and shall be fixed to the tray in such a manner as to allow for adjustment for the inequalities in wall the finish. A minimum of 75 mm shall be allowed between the inside of the architrave frame and the equipment. Distribution board numbers consisting of white engraved lettering on a black background shall be fixed to the top of the architrave frame.

Doors shall be constructed from 1,20 mm sheet steel, reinforced to ensure rigidity.

Doors shall be mounted flush in architrave frames. Door catches shall be constructed of chromium-plated brass and shall be mounted flush in the door. Built-in locks shall be provided when specified in the distribution board schedule.

The chassis shall be fixed to the architrave frame. The chassis shall be reinforced, with the necessary provision for fixing of the switchgear. A distance of 75 mm shall be allowed between rows of equipment.

Panels shall be rigidly constructed from 1,6 mm sheet steel with machine-cut openings for flush mounted equipment. Panels shall be fixed to the architrave frame on studs with chromium plated hexagon dome headed nuts, or captive fasteners such that a clearance of 40 mm is maintained between panels and doors. Chromium-plated handles shall be supplied to facilitate removal of panels.

Busbars shall be of tinned HDHC solid copper with adequate cross-section and shall only be supplied if called for in the Schedules. Busbars are to be mounted on suitable isolators and shall be drilled and tapped.

Each distribution board shall be supplied with copper neutral and earth bars. Adequate terminals shall be provided.

Each busbar must be supplied with one larger terminal for the feeder cable.

Wiring shall be by means of PVC insulated conductors with sizes to suit the relevant switchgear. The ends of wires shall be provided with suitable lugs, firmly crimped or soldered for connection to busbars.

Wiring shall, where possible, be carried out in front of the chassis and shall be neatly bound in horizontal and vertical rows by means of approved plastic cable ties. Wiring shall be kept free of any current carrying parts.

Ends of wires which are connected to the clamps of miniature circuit breakers, shall be turned together firmly before insertion into terminals.

Finish: Welding joints and steelwork shall be ground smooth and free from blemishes.
Metal components of the framework, panels and chassis, shall be painted in accordance with the procedure detailed below. Baked enamel or electrostatically applied powder coating may be used.

1. Surface preparation: Prior to painting, all metal parts shall be thoroughly cleaned of rust, millscale, grease and foreign matter to a continuous metallic finish. Sand or shot blasting, or acid pickling and washing may be employed for this purpose.

2. Baked enamel finish: Immediately after cleaning all surfaces shall be covered by a rust inhibiting, tough, unbroken metal phosphate film and then thoroughly dried to SANS 10064. Within forty eight (48) hours after phosphating, a passivating layer consisting of a high quality zinc chromate primer shall be applied, followed by two (2) coats of high quality baked enamel to SANS 2808 Codes. The minimum paint thickness after baking shall be 0,6 mm. The paint shall have a shock resistance of 25 kg-cm on 0,9 mm soft steel plate and a scratch resistance of 2 kg.

3. Powder coated finish: Immediately after cleaning the metal parts shall be pre-heated and then covered by a micro structured paint powder applied electrostatically. The paint shall be baked on and shall harden within 10 minutes at a temperature of 190^{o}C. The minimum paint thickness after baking shall be 0,05 m and the paint cover shall have a shock resistance of 25 kg-cm on 0,9 mm soft steel plate and a scratch resistance of 2 kg.

C3.2.7.11 **Surface Mounted Distribution Boards**

Surface mounted distribution boards shall comply with SANS 60456 and shall be similar to the specification for flush mounted boards, except that the architrave frames and bonding trays are not

required. In this case a box shall be supplied manufactured from 1,60 mm corrosion resistant sheet steel with knock-outs at the top and bottom for conduit entry. The board shall have a 25 mm wide frame around the flush mounted door, if required.

C3.2.7.12 **Training**

A. Installation of the switchgear shall require no special tools. Product training shall be made available at the purchasers facility if required.

C3.2.8 CONDUIT AND OUTLET BOXES

C3.2.8.1 **Codes and Standards**

A. Codes and Standards: The conduit and conduit accessories shall comply fully with the applicable SANS specifications as set out below and the conduit shall bear the mark of approval of the South African Bureau of Standards.

a) The latest issue of SANS 60614 and SANS 61035, parts 1 and 2: Metallic conduit and accessories
b) The latest issue of SANS 950: Non-metallic conduit and accessories

B. Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:

The manufacturer must be an ISO9001 certified company. Proof of certification is to be submitted together with the tender document, failing which the tender may be disregarded.

Products must carry the SABS mark or an international certification and approved for use in South Africa.

Installers must be certified or registered installers of the manufacturers or their representatives. Manufacturers or their representatives must also have registered offices in South Africa and the local office must carry sufficient stock and spare parts for the project.

C3.2.8.2 **Conduit and Accessories**

The type of conduit and accessories required for the service, i.e. whether the conduit and accessories shall be of the screwed type, plain-end type or of the non-metallic type and whether metallic conduit shall be black enamelled or galvanised, is specified in the particular specification.

Electrical and ICT distribution within buildings shall be as follows:
Cable trays in open areas and accessible ceilings
Cable Baskets in accessible ceilings
PVC Conduits in accessible ceilings and hidden conduits
Galvanised steel conduits exposed and surface mounted

Unless other methods of installation are specified for certain circuits, the installation shall be in conduit throughout. No open wiring in roof spaces or elsewhere will be permitted.

All conduit fittings, except couplings, shall be of the inspection type. Where cast metal conduit accessories are used, these shall be of malleable iron. Zinc base fittings will not be allowed.

Bushes used for metallic conduit shall be provided in addition to locknuts at all points where the conduit terminates at switchboards, switch-boxes, draw-boxes, etc.

Draw-boxes are to be provided in accordance with the Wiring Code and wherever necessary to facilitate easy wiring.

For light and socket outlet circuits, the conduit used shall have an external diameter of 20mm. In all other instances the sizes of conduit shall be in accordance with the Wiring Code for the specified number and size of conductors, unless otherwise directed in the particular specification or indicated on the drawings.

Only one manufactured type of conduit and conduit accessories will be permitted throughout the installation.

Running joints in screwed conduit are to be avoided as far as possible and all conduit systems shall be set or bent to the required angles. The use of normal bends must be kept to a minimum with exception of larger diameter conduits where the use of such bends is essential.

Under no circumstances will conduit having a wall thickness of less than 1,6mm be allowed in screeding laid on top of concrete slabs.

Bending and setting of conduit must be done with special bending apparatus manufactured for the purpose and which are obtainable from the manufacturers of the conduit systems. Damage to conduit resulting from the use of incorrect bending apparatus or methods applied must on indication by the Engineers inspectorate staff, be completely removed and rectified and any wiring already drawn into such damaged conduits must be completely renewed at the Contractors expense.

Conduit and conduit accessories used for flame-proof or explosion proof installations and for the suspension of luminaires as well as all load bearing conduit shall in all instances be of the metallic screwed type.

All conduit and accessories used in areas within 50 km of the coast shall be galvanised to SANS specifications.

Tenderers must ensure that general approval of the proposed conduit system to be used is obtained from the local electricity supply authority prior to the submission of their tender. Under no circumstances will consideration be given by the Employer to any claim submitted by the Contractor, which may result from a lack of knowledge in regard to the supply authoritys requirements.

C3.2.8.3 **Screwed Metallic Conduit and Accessories**

Screwed metallic conduits shall comply with SANS 60614 and shall bear the SABS mark. Screwed metallic conduits shall comprise of a heavy gauge, welded or solid drawn, black enamelled or hotdipped galvanised, screwed steel tube.

Galvanised conduits shall be hot-dipped on both the inside and outside thereof, in accordance with SANS 121.

All conduit ends shall be reamed and threaded on both sides and shall be delivered to site with a steel coupling fitted at one end and a plastic screw on cap on the opposite end.

All screwed metallic conduit accessories shall be of malleable cast iron or pressed steel with brass bushes and all accessories shall be in accordance with SANS 60614 Part II. No alloy or pressure cast metal accessories or zinc base alloy fittings will be accepted.

All accessories whether galvanised or black enamelled shall be supplied with brass screws.

Locknuts are to be of the narrow, hexagonal type. Ring type lock nuts shall not be accepted except when used in round grouping boxes.

Bushnuts and male or female conduit bushes shall be manufactured from solid brass. Brassed alloy bushnuts and bushes shall not be accepted.

In general screwed steel conduit shall be used in the wiring of buildings. The installation shall conform to requirements of SANS 10142. All joints in conduit tubing shall be red leaded to prevent rust. Galvanised conduit and accessories shall be used in the following circumstances and normally be electro-galvanised or cadmium plated:

1) In damp areas
2) In areas exposed to the weather
3) For all installations within 50 km of the coast. (These conduits and accessories shall be hotdip galvanised to SANS 121).
4) In plenum chambers containing humidifying equipment.
5) For surface mounted conduit installations in kitchens and boiler rooms.
6) In screed resting directly on soil.
7) For connection points to future installations.
8) For underground conduit containing earthing conductors.
9) In buildings where animals are housed such as cattle, sheep, dogs, etc.

Screwed conduits shall be terminated by means of a brass female bush and two lock nuts in pressed steel switchboards and distribution boxes, cable ducts, power skirting, etc. The conduit end shall only project far enough through the hole to accommodate the bush and locknut.

A female bush and two lock nuts shall be used to terminate conduits at draw boxes and outlet boxes without spouts should there be sufficient room in the box. Where there is insufficient room, a coupling, brass male bush and locknut may be used with sufficient allowance for the reduction of the internal diameter by the male bush. Mechanical and electrical continuity shall be maintained throughout the conduit installation. The resistance of a completed joint shall not exceed 0,2 ohm. Under no circumstances shall conduit be relied upon for earth continuity

C3.2.8.4 **Plain-End Metallic Conduit and Accessories**

As an alternative to threaded metallic conduit, plain-end or unthreaded metallic conduit and accessories may be used. Plain-end conduit shall be manufactured from mild steel having a minimum wall thickness of 0,9 mm and shall comply with SANS 60614. Bending and setting of plain-end conduit shall be undertaken using the correct bending apparatus as recommended by the manufacturer of the conduit.

Galvanised conduits shall be hot-dipped on both the internal and external surfaces, in accordance with SANS 121. All plain-end metallic conduit accessories shall be of malleable cast iron or pressed steel and shall comply to SANS 60614.

Where specified plain-end conduit shall be installed. The following shall apply:
Bending and setting of plain-end conduit shall be done with special benders and apparatus manufactured for this purpose. Damaged conduit resulting from the use of incorrect bending apparatus shall be completely removed and rectified at the electrical contractor's expense.

C3.2.8.5 **PVC Conduit and Accessories**

PVC conduit shall comply with SANS 950 and shall bear the SABS mark. PVC conduit shall be constructed from rigid PVC and shall be supplied in standard 4 metre lengths. PVC conduit shall be white in colour and shall be noninflammable. The minimum softening temperature shall be at 75C. All PVC conduit accessories shall be fully in accordance with SANS 950 and shall bear the SABS mark.

Where specified for a particular service, PVC conduit shall be installed.
All PVC conduit shall be installed in accordance with SANS 950. Insulated heat-resistant boxes shall be used for outlets of totally enclosed luminaires and other fittings where excessive temperatures are likely to occur. Luminaires and other fittings shall not be supported by PVC conduit of conduit boxes.

These fittings shall be secured to the surrounding structure in an acceptable way.

C3.2.8.6 **Flexible Conduit**

Flexible steel conduit and adaptors shall comply with BS 731, part 1 where applicable. Flexible steel conduit shall be of a galvanised steel construction which is not required to be waterproof, but shall be verminproof and suitable for protection of cables against mechanical damage. In moist or damp areas flexible steel conduit shall be of the plastic sheathed galvanised steel type. Flexible polypropylene tubing shall only be fastened to PVC conduit installations.

In installations where the equipment has to be moved frequently to enable adjustment during normal operation, for the connection of motors or any other vibrating equipment, for the connection of thermostats and sensors on equipment, for stove connection and where otherwise required, flexible conduit shall be used for the final connection to the equipment.

Flexible conduit shall be connected to the remainder of the installation by means of a draw box. The flexible conduit may be connected directly to the end of a conduit if an existing draw box is available within 2 m of the junction and if the flexible conduit can easily be rewired.

Flexible conduit shall consists of metal reinforced plastic conduit or PVC covered metal conduit with an internal diameter of at least 15 mm, unless approved to the contrary. In false ceiling voids, flexible conduit of galvanised steel constructions may be used. Connectors for coupling to the flexible conduit shall be of the gland or screw-in type, manufactured from either brass or mild steel plated with zinc or cadmium.

C3.2.8.7 **Earth Clamps**

Earth clamps shall comprise of copper strips having a minimum thickness of 1 mm and shall not be less than 12 mm wide. Earth clamps shall be provided complete with a 25 mm x 4 mm brass bolt, washer and nut and shall be constructed so that the clip can be firmly attached to the conduit without the need for any additional packing.

C3.2.8.8 **Flush Mounted Steel Wall Boxes**

Flush mounted steel wall boxes shall be manufactured from heavy gauge sheet steel and shall be galvanised. All wall boxes shall comply with SANS 1085. The boxes shall be provided with the necessary mounting lugs to suite the units for which the box is intended. Mounting highs shall be drilled and tapped at 82,5 mm centres suitable for fastening either flush mounted switch and socket outlet units.

All fastening screws shall be provided with the box. Single gang wall boxes shall be approximately 500 mm wide by 100 mm long by 50 mm deep, with one knock-out at each end and at the back, and with two knock-outson each side thereof. Double gang wall boxes shall be approximately 100 mm wide by 100 mm long by50 mm deep, with two knock-outs on each end and with at least two knockouts on the back, and on each side. All knock-outs are to be suitable for making-off 20 mm diameter conduits.

C3.2.8.9 **Flush Mounted PVC Wall Boxes**

Flush mounted PVC wall boxes shall be manufactured from rigid PVC and shall be white in colour. All PVC wall boxes shall comply with SANS 950. The boxes shall be provided with the necessary mounting lugs to suite the units for which the box is intended. Mounting lugs shall be drilled at 82,5mm centres and shall be provided with no 6 screw threads.

The boxes shall be of approximately the same physical dimensions as those specified for steel wall boxes and shall have 20 mm knock-outs. Facilities shall be provided for the fixing of earth terminals to the box.

C3.2.8.10 **Round Group-Type Steel Boxes**

The boxes shall be manufactured in accordance with SANS 1085 where applicable. The boxes shall be of the long spout pattern and shall be constructed from either store enamelled jet black or galvanised steel, or from malleable cast iron. The two cover fixing holes shall be diagonally opposite each other, and shall be drilled and tapped at 50 mm centres. The internal dimensions shall be approximately 60 mm in diameter by 60 mm deep for use in concrete work. Shallower boxes shall be used in open roof spaces.
Threaded spouts shall be suitable for 20 mm diameter conduit. Round box covers shall be constructed from pressed enamelled or galvanised steel and shall be seared by using brass screws.

C3.2.8.11 **Round Group-Type PVC Boxes**

The boxes shall be similar in shape to those specified for steel boxes and shall have spouts which are to be reinforced with webs. The cover screw pillars shall be provided with tapped brass inserts and provision shall be made for a brass earthing terminal adjacent to one or both of the pillars. PVC round box covers shall be of PVC and shall be secured by means of 2 cadmium plated or brass screws at 50 mm centres. The boxes shall be fully in accordance with SANS 950.

C3.2.8.12 **Draw Wires**

All draw wires for unused conduits shall comprise of galvanised steel wire having a minimum diameter of 2 mm.

C3.2.8.13 **Installation Requirements**

All accessories such as boxes for socket outlets, switches, lights, etc shall be accurately positioned. It is the responsibility of the electrical contractor to ensure that all accessories are installed level and square at the correct height from the floor, ceiling or roof level as specified. It shall be the responsibility of the electrical contractor to determine the correct final floor, ceiling and roof levels in conjunction with the principle contractor.

Draw boxes shall not be installed in positions where they will be inaccessible after completion of the installation. Draw boxes shall be installed in inconspicuous positions to the approval of the engineer's representative and shall be indicated on the "as built drawings. Galvanised steel draw wires shall be installed in all unwired conduit, e.g. conduits for future extensions, telephone installations and other services. The edge of flush mounted outlet boxes shall not be deeper than 10 mm from the final surface. Spacer springs shall be used under screws where necessary. Oversize cover plates shall be provided on all flush mounted round conduit boxes, where required. Surface mounted boxes shall be provided with standard size cover plate.

C3.2.8.14 **Installation in Concrete**

In order not to delay building operations, the electrical subcontractor shall ensure that all conduits and accessories which are to be cast in concrete are placed in position in good time. The electrical contractor or his representative shall be in attendance when the concrete is cast. Draw boxes, expansion joints and round ceiling boxes shall be installed where required and shall be neatly finished to match the finished slab and wall surfaces. Ceiling draw boxes shall be of the deep type. In columns where flush mounted draw boxes are installed, the conduits shall be offset from the surface of the column immediately after leaving the draw box. Elbows for conduits of 32 mm dia and smaller and sharp bends will not be allowed in concrete slabs.

Draw boxes and/or inspection boxes shall, where possible, be grouped together under a common approved cover plate. The cover plate shall be secured by means of screws. All conduits shall be installed as close as possible to the neutral axis of concrete beams, slabs and columns. The conduits shall be rigidly secured to the reinforcing to prevent movement towards the surface of the concrete. All conduits, draw boxes etc, shall be securely fixed to the shuttering to prevent displacement when concrete is cast. Draw boxes and outlet boxes shall preferably be secured by means of a bolt and nut installed from the back of the box through the shuttering. Fixing lugs may also be used to screw the boxes to the shuttering where off-shutter finishes are required. Where fibre glass shuttering is used by the builder, the equipment shall be fixed to the steel only and no holes shall be drilled or

made in shuttering. All draw boxes and outlet boxes shall be plugged with wet paper before they are secured to the shuttering.

As far as possible, conduits shall not be installed across expansion joints. Where this is unavoidable a conduit expansion joint shall be provided. The expansion joint shall consist of two draw boxes with an interlinking flexible conduit connection. The draw box shall be installed adjacent to the expansion joint of the structure and a conduit sleeve, one size larger than that specified for the circuit, shall be provided on the side of the draw box nearest to the joint. The one end of the sleeve shall terminate at the edge of the joint and the other shall be secured to the draw box. The circuit conduit passing through the sleeve shall be terminated 40 mm inside the draw box and in the case of metallic conduit, the conduit end shall be fitted with a brass bush.

The gap between the sleeve and the conduit at the joint shall be sealed with a suitable and approved sealing compound, to prevent the ingress of wet cement. In the case of metallic conduit, an earth clip shall be fitted to the conduit projection inside the draw box and the conduit bonded to the box by means of 2,5 mm2 bare copper earth wire and a brass bolt and nut. The other end of the circuit conduit shall be secured to the draw box by means of lock nuts and a brass bush in the case of screwed metallic conduit or a standard bushed adaptor for other conduit types. In addition to an earth wire which may be specified for the circuit, a 2,5 mm2 bare copper wire shall be provided between the first conduit box on either side of the joint in the case of metallic conduit. The conduit boxes shall be drilled and tapped and the earth wire shall be bonded to the boxes by means of lugs and brass screws. Suitable steel cover plates shall be screwed to draw boxes installed along the expansion joint.

The cover plates shall be installed before the ceiling is painted. Where a number of conduits are installed in parallel they shall cross the expansion joint of the structure via a single draw box. A number of draw boxes adjacent to each other will not be allowed. The installation of conduits in floor screed shall be kept to a minimum. Where conduits are installed in screed, the top of the conduit shall be at least 20 mm below the surface of the screed. Where the screed is laid directly on the ground, galvanised conduits shall be used. A minimum distance of twice the outside diameter of the conduit shall be left free between adjoining conduits. Conduits shall be secured to the concrete slab at intervals not exceeding 2,0 m. The electrical contractor shall ensure that conduits are not visible above the screed where the conduits leave the screed. All draw boxes, conduits, etc, which are installed in concrete shall be cleaned with compressed air and provided with draw wires two days after removal of the shuttering.

Errors that occurred during the installation of the conduits, or any lost draw boxes, or blocked conduits shall be immediately reported to the engineer and confirmed in writing in order that an alternative route can be planned and approved by the engineer before the additional concrete is cast. Where it is necessary to cut or drill holes in the concrete structure, prior permission shall be obtained from the engineer in writing.

C3.2.8.15 **Installation in Brickwork**

Recessed conduits and accessories installed in brickwork shall be built-in. In order not to delay building operations the electrical contractor shall ensure that all conduits and accessories which are to be built-in are placed in position in good time. Any conduits, draw boxes, outlet boxes etc, which have been damaged, lost or omitted shall immediately be reported to the engineer by telephone and confirmed in writing.

C3.2.8.16 **Chasing and Builder's Work**

Except where otherwise specified the builder or principle contractor shall be responsible for building in of conduits, outlet boxes, switchboard trays, bonding trays and other wall outlet boxes. The electrical contractor shall notify the builder of his requirements and the responsibility lies with the electrical contractor to ensure that all builder's work is clearly indicated or marked where necessary and provided in accordance with his requirements.

Electrical materials to be built in must be supplied, placed and fixed in position by the electrical contractor when required to do so by the builder or principle contractor. The electrical contractor shall also ensure that these materials are installed in the correct positions.

Unless specifically stated to the contrary in the detail specification all flush mounted conduits, accessories, switchboard trays, bonding trays etc, shall be built-in and no chasing shall be allowed.

C3.2.8.17 **Mounting Height of Distribution Boards, Switches and Socket Outlets**

Except where stated otherwise, mounting heights shall be as follows:

- Distribution boards: top frame 2000 mm above finished floor level
- Switches: underside 1400 mm above finished floor level
- Socket outlets: underside 300 mm above finished floor level
- Telephone outlets: underside 300 mm above finished floor level
- Power skirting: underside 100 mm above finished floor level

All distribution boards, switches and socket outlets shall be of the flush mounted type except where stated otherwise.

C3.2.8.18 **Position of Outlets, Equipment and Conduit**

Position of light outlets indicated on the plans are approximate. The exact positions of light outlets shall be determined with due regard to ceiling squares, brandering and patterns. Where any doubt arises as to the correct location of outlets, the engineer and/or architect shall be consulted. The positions of other outlets, equipment and conduit are also approximate. The exact positions shall be determined on site in consultation with the engineer and/or architect.

C3.2.8.19 **Conduit in Roof Spaces**

Conduit in roof spaces shall be installed parallel or at right angles to the roof members and shall be secured at intervals not exceeding 1,5m by means of saddles or conduit clips nailed to the roof timbers.

Where non-metallic conduit has been specified for a particular service, the conduit shall be supported and fixed with saddles with a maximum spacing of 450 mm. The Contractor shall supply and install all additional supporting timbers in the roof space as required.
Under flat roofs, in false ceilings or where there is less than 0,9m of clearance, or should the ceilings be insulated with glass wool or other insulating material, the conduit shall be installed in such a manner as to allow for all wiring to be executed from below the ceilings.
Conduit runs from distribution boards shall, where possible terminate in fabricated sheet steel drawboxes installed directly above or in close proximity to the boards.

All conduits shall be installed horizontally or vertically as determined by the route. The electrical contractor shall take all measures to ensure a neat installation. Conduits shall be firmly secured by means of saddles and screws and in accordance with SANS 10142. Conduits shall be secured within 150 mm before and after each 90o bend. Only approved plugging materials such as fibre plugs or plastic plugs, etc, and round head brass screws shall be used when fixing saddles, switches, plugs etc, to walls. Wood plugs are not acceptable nor should plugs be installed in joints in brick walls.

C3.2.8.20 **Surface Mounted Conduit**

Wherever possible, the conduit installation is to be concealed in the building work; however, where unavoidable or otherwise specified under the particular specification, conduit installed on the surface must be plumbed or levelled and only straight lengths shall be used.

The use of inspection bends is to be avoided and instead the conduit shall be set uniformly and inspection coupling used where necessary.

No threads will be permitted to show when the conduit installation is complete, except where running couplings have been employed.

Running couplings are only to be used where unavoidable, and shall be fitted with a sliced couplings as a lock nut.

Conduit is to be run on approved spaced saddles rigidly secured to the walls.

Alternatively, fittings, tees, boxes, couplings etc., are to be cut into the surface to allow the conduit to fit flush against the surface. Conduit is to be bedded into any wall irregularities to avoid gaps between the surface and the conduit.

Crossing of conduits is to be avoided, however, should it be necessary purpose-made metal boxes are to be provided at the junction. The finish of the boxes and positioning shall be in keeping with the general layout.

Where several conduits are installed side by side, they shall be evenly spaced and grouped under one purpose-made saddle.

Distribution boards, draw-boxes, industrial switches and socket outlets etc., shall be neatly recessed into the surface to avoid double sets.

In situations where there are no ceilings the conduits are to be run along the wall plates and the beams.

Painting of surface conduit shall match the colour of the adjacent wall finishes.

Only approved plugging materials such as aluminium inserts, fibre plugs, plastic plugs, etc., and round-head screws shall be used for fixing saddles, switches, socket outlets, etc., to walls, wood plugs and the plugging in joints in brick walls are not acceptable.

C3.2.8.21 **Flexible Connections for Connecting Up of Stoves, Machines, Etc**.

Flexible tubing connections shall be of galvanised steel construction, and in damp situations of the plastic sheathed galvanised steel type. Other types may only be used subject to the prior approval of the Employers site electrical representative.

Connectors for coupling onto the flexible tubing shall be of the gland or screw-in types, manufactured of either brass or cadmium or zinc plated mild steel, and the connectors after having been fixed onto the tubing, shall be durable and mechanically sound.

Aluminium and zinc alloy connectors will not be acceptable.

C3.2.8.22 **Wiring**

Except where otherwise specified in the particular specification, wiring shall be carried out in conduit throughout. Only one circuit per conduit will be permitted.

No wiring shall be drawn into conduit until the conduit installation has been completed and all conduit ends provided with bushes. All conduits to be clear of moisture and debris before wiring is commenced.

Unless otherwise specified in the particular specification or indicated on the service drawings, the wiring of the installation shall be carried out in accordance with the Wiring Code . Further to the requirements concerning the installation of earth conductors to certain light points as set out in the Wiring Code , it is a specific requirement of this document that where plain-end metallic conduit or non-metallic conduit has been used, earth conductors must be provided and drawn into the conduit with the main conductors to all points, including all luminaires and switches throughout the installation.

Wiring for lighting circuits is to be carried out with 1,5mm† conductors and a 1,5mm†-earth conductor. For socket outlet circuits the wiring shall comprise 4mm† conductors and a 2,5mm†-earth conductor. In certain instances, as will be directed in the particular specification, the sizes of the aforementioned conductors may be increased for specified circuits. Sizes of conductors to be drawn into conduit in all other instances, such as feeders to distribution boards, power points etc., shall be as specified elsewhere in this specification or indicated on the drawings. Sizes of conductors not specified must be determined in accordance with the Wiring Code .

The loop-in system shall be followed throughout, and no joints of any description will be permitted.

The wiring shall be done in PVC insulated 600/1000 V grade cable to SANS 60227.

Where cable ends connect onto switches, luminaires etc., the end strands must be neatly and tightly twisted together and firmly secured. Cutting away of wire strands of any cable will not be allowed.

C3.2.8.23 **Switches and Socket Outlets**

All switches and switch-socket outlet combination units shall conform to the Employer Quality Specifications, which form part of this specification.

No other than 16 A 3 pin sockets are to be used, unless other special purpose types are distinctly specified or shown on the drawings.

All light switches shall be installed at 1,4m above finished floor level and all socket outlets as directed in the Schedule of Fittings which forms part of this specification or alternatively the height of socket outlets may be indicated on the drawings.

All switches, isolators and socket outlets shall be Lumex or Crabtree with plastic covers.

C3.3 PART B: PARTICULAR SPECIFICATIONS

C3.3 PART B: PARTICULAR SPECIFICATIONS

This Particular Specifications provide specifics to the work to be carried out for this project. The Particular Specifications must be read in conjunction with the General Specification, drawings, Bill of Quantities and other schedules provided specific to this project.

C3.3.1. DETAILED SCOPE OF WORK

Sibongile substation, located and operated by Endumeni Municipality was damaged during a fire and the MV switchgear and electrical infrastructure inside the room was completely damaged. This affected the power supply to a large section of Sibongile Township to an extent that no electrical supply was supplied to the affected communities. A temporary supply solution was implemented by Endumeni Municipality to restore the power supply. A section of overhead line was constructed next to the substation and all incomer and outgoing cables were routed to this temporary overhead structure to restore power to the area.

The scope under this tender is to re-instate the MV switchgear and auxiliary supplies at Sibongile Substation to restore the power supply in the area on a permanent basis. The following is proposed to bring this substation back to full operation:

1. Removal of damaged MV (11kV) switchgear
2. Installing new MV (11kV) switchgear
3. Substation earthing and lightning protection
4. Substation small power and lighting
5. Auxiliary power supply and mini-substation installation
6. Relocation of all incoming and outgoing 11kV cables to the new MV switchgear
7. Removal of existing overhead line structures
8. Testing and commissioning of the full electrical system

All building works will be carried out by an appointed building contractor.

1. Removal of damaged MV (11kV) switchgear

The contractor is required to remove all existing MV switchgear and other equipment within the substation. All removed equipment to be discarded at an approved dump site or all or parts of the equipment to be given back to the municipality as instructed by the Engineer. All oil from the MV switchgear to be decanted before removal. Oil to be removed by an approved service provider. The existing transformer to be returned to the Municipality stores.

2. Installing new MV (11kV) switchgear

New MV switchgear is to be procured and installed under this contract. Equipment to be supplied as per specifications. All equipment is subject to Engineer approval prior to manufacture. New 11kV circuit breakers panels are required for 2 x incomers, 1 x bus-section and 6 x feeder circuits. The required protection systems and battery Trip unit is required to be provided. A specialist protection Engineer is required to calculate, set and test the protection systems. Recommended Miles Walker: 082 802 0366 from Systems Technology Consulting (Pty) Ltd OR Simon Russel: 083 422 9345 from 3I Protection Systems.

3. Substation earthing and lightning protection

New earthing and lightning protection is necessary to bring the system to compliance. A new earth mat is to be installed and new lightning protection to be installed on the building roof.

4. Substation small power and lighting

New power points and lighting is required to be installed with a new distribution board. Existing power and lighting has been vandalised. Part of this scope is to remove all vandalised wiring and equipment.

5. Auxiliary power supply and mini-substation installation

A new mini-substation is required to be installed to feed the substation auxiliary power for the power and lighting and the battery trip unit. The new mini-substation will also feed the street lighting along the roadway.

6. **Relocation of all incoming and outgoing 11kV cables to the new MV switchgear** Once all new switchgear has been installed and tested, existing cables from the temporary overhead structures will need to be terminated to the new switchgear. All reconnections of existing MV cables will need to be carried out under power outage conditions. Contractors to note that shutdowns will be per the Municipality discretion and could possibly be arranged during weekends or after normal working hours.

   Contractors must take into consideration site conditions and restrictions with regards to outages and tying into existing power supplies. All shutdowns must be planned well in advance and will be subject to Endumeni Municipality approval. No delays or additional costs can be claimed due to delays in shutdowns and outages.

7. **Removal of existing overhead line structures**
   The temporary overhead structures will need to be dismantled and removed. All poles and equipment to be returned to the Municipal stores under direction of the Engineer.

8. **Testing and commissioning of the full electrical system**
   The contractor is required to carry out all Factory Acceptance Tests (FAT) and Site Acceptance Tests (SAT) to be witnessed by the Engineer and Municipal Electricity Department representatives. The contractor is required to allow for attendance to all tests as per specification.

C3.3.2. **MV SWITCHGEAR TECHNICAL SPECIFICATION AND RETURNABLE SCHEDULE**

Item	Description	Detail	Compliance** Yes / No
1	Quote Address to	Civtech Engineers (Pty) Ltd	N/A
2	Number required	9	
3	Nominal system frequency:	50 Hz	
4	Construction Type:	Indoor, floor mounted sheet steel type, fixed pattern	
5	IP rating:	IP44 totally enclosed	
6	Busbar Insulation:	Air Insulated	
7	Panel compartments:	Circuit breaker , Main busbar, Cable termination, Protection and control, VT compartment on Incomer panels,	
8	CB Type:	Triple pole	
9	CB Insulation:	Vacuum. No Oil will be accepted.	
10	Protection Meters	Earth Fault, Overcurrent + transformer protection on transformer CB	
11	Nominal voltage:	12 kV	
12	BIL:	95 kV peak	
13	Busbar Ratings:	800A	

14	Incomers :	2 X 800A	
15	Bus-Section :	1 X 800A	
16	Feeders:	5 X 630A	
17	Transformer Feeder:	1 X 630A	
18	Fault Withstand:	25 kA for 1 second	
19	Internal Arc Withstand:	25 kA for 1 second	
20	Aux contacts:	At least 5 sets of normally open dry contacts & At least 5 sets of normally closed dry contacts	

Item	Description	Detail	Compliance** Yes / No
21	Remote Indicators	Circuit Breaker open and closed indications. Circuit Breaker control open and close commands (control outputs) Protection Alarm Protection Trip Circuit Breaker fail alarm Spring charged indication Load (Amps) for each panel Voltage (required on the incomer, Busbar, Outgoing main feeder & Generator feeders) 110 V DC Fail alarm (from charge system) Local / Remote status Earth status	
22	Mechanical Indicators	Breaker fully engaged with busbar, Breaker in the cable earth position, Spring charged, Open and Closed indication.	
23	Interlocking of breakers	Consistent with the earthing mechanism	
24	Incomer & Bus-Section CT's	Core 1: Ratio: 800/400/1 Use: Metering Class: 0.5 Burden: 15 VA Core 2: Ratio: 800/400/1 Use: Protection O/C & E/F Class: 10P15 Burden: 15 VA	
25	Feeder CT's	Core 1: Ratio: 600/400/200/1 Use: Protection O/C & E/F Class: 10P15 Burden: 15VA Core 2: Ratio: 600/400/200/1 Use: Metering Class: 0.5 Burden: 15VA	

26	VT's	1 x VT on each incomer. 11kV/110V, Burden 200VA, Class 1. Terminals to be provided for remote monitoring & control.	
27	Maximum door height	1800mm	
28	Remote alarms & trips required	Yes	
29	Type Test Certs required	Yes	
30	FAT Tests necessary	Yes	
31	Shop drawings to be provided	Yes - Prior to manufacture	
32	Battery Trip Unit	Yes, 110V for 12 Hrs	
33	Cable entry	Trench	
34	Colour	Grey	
Item	**Description**	**Detail**	**Compliance** Yes / No**
35	Relevant Codes	1. NRS003 Metal enclosed switchgear Part1 and 2. 2. IEC 62271-100 Part 200 3. SANS 1885:2004 4. IEC 60255 5. IEC 60298 6. NRS029:2002 7. SANS 60044-1: 2003 Part 1 8. SANS 60044-2: 2003 Part 2 9. SANS 1195: 1978 10. SANS 1091:2004 11. NRS 076 12. The Occupational Health and Safety Act, 1993 (Act 85 of 1993) as amended	
36	Switchgear Brand	SBV4E preferred	
37	Delivery to site	Yes	
38	Lead Time	To be provided by supplier	
39	Site Location	Ziga Sithole Street, Dundee, KwaZulu-Natal	
40	Altitude	1276m	
41	Location Coordinates	Lat: -28.174101 , Lon: 30.237764	

** To be completed by tenderer.

C3.3.3. **MINI-SUBSTATION TECHNICAL SPECIFICATION**

Item	**Description**	**Detail**	**Compliance** Yes / No**
1	Location	Sibongile Substation - Dundee	N/A
2	Number required	1	

3	Unit type	Mini-substation without RMU	
4	Rated Voltage	12kV	
5	Indoor or Outdoor?	Outdoor	
6	kVA Rating	1 x 200kVA	
7	Number of phases	3	
8	Rated frequency Hz	50Hz	
9	Plinth required	Yes Concrete	
10	Tap changer	Yes - off load	
11	Earth Fault Indicator	No	
12	Colour	Light Stone	
13	RMU Type	N/A	
14	Main LV Circuit Breaker	Yes. 300 amp 3 Phase	
15	Feeder Circuits	Yes. 1 x 160amp 3 Phase, 1 x 100Amp 3 Phase, 1 x 60Amp 3 Phase, 2 x 60amp 1 Phase.	
Item	**Description**	**Detail**	**Compliance** Yes / No**
16	Metering	Yes. 1 x A1700 on main incomer	
17	Instruments	Voltmeter and MDI Ammeters	
18	Street light circuit	Yes. 2 x 30 amp 3 phase + contactors + daylight switch	
19	Primary Voltage	11000V	
20	Secondary Voltage	420/240V	
21	Door Locking Mechanism	Required. Anti-vandal Padlocks	
22	Labels	Yes, MSS, MV Circuits, LV Circuits	
23	Housing Material	3CR12	
24	Winding Material	Copper	
25	Vector Group	Dyn11	

** To be completed by tenderer

C3.3.4. BATTERY TRIP UNIT TECHNICAL SPECIFICATION

Item	Description	Detail	Compliance** Yes / No
1	Location	Sibongile Substation - Dundee	N/A
2	Number required	1	
3	Unit type	Free Standing	
4	Rated Input Voltage	230VAC single phase input	
4	Rated Output Voltage	110VDC	
5	Rated Output Current	10Amp Continuous (Min)	
6	Indoor or Outdoor?	Indoor	
7	Charger Type	Thyristor power supply with integral DC current limit, voltage control and automatic and manual boost charge facility	
8	Connection point to AC	60amp 230V Isolator on wall	
9	Connection point to MV Panel	DC Cabling in trench	
10	Controls and Instruments	AC and DC control circuit breakers on unit. Voltmeter Ammeter LED Displays for normal and alarm conditions Test button Manual and automatic boost facility	
11	DC Output current Rating	10amp DC continuous	
Item	**Description**	**Detail**	**Compliance** Yes / No**
12	IP Rating	Min. IP20	
13	Colour	Light Grey	
14	Door Locks	Yes	

15	Cable Entry / Exit	Bottom	
16	Battery Type	Nickel Cadmium	

All equipment must comply with the relevant SANS and NRS codes AND Endumeni Municipality Specifications.

Manufacturers: If they comply with these specifications and requirements, products of the following manufacturers will be acceptable:

The manufacturer must be an ISO9001 certified company. Proof of certification is to be submitted together with the tender document, failing which the tender may be disregarded.

Products must carry the SABS mark or an international certification and approved for use in South Africa.

Installers must be certified or registered installers of the manufacturers or their representatives. Manufacturers or their representatives must also have registered offices in South Africa and the local office must carry sufficient stock and spare parts for the project.

C3.3.5. **DRAWING SCHEDULE**

The following drawings are part of the tender documentation.

Drawing No.	**Title**
DNA-ENM-ELE-SC-1001-00	Single Line Diagram Rev B
DNA-ENM-ELE-PL-1002-00	Substation Building & Electrical Layout Rev B
DNA-ENM-ELE-DE-1003-00	Standard Details Rev A

C3.3.6. **SCHEDULED PAY ITEMS (PI)**

Scheduled pay items are items to be priced in the bill of quantities. Contractors are to familiarise details and components indicated under each item as these are to be allowed for in the pricing. No additional costs or variations will be allowed for items indicated. Contractors to comply with the General and Particular Specification in its entirety when pricing.

C3.3.6.1 **MV SWITCHGEAR**

PI.1.1 MV Panels **Unit: No.**

The unit of measure shall be for the manufacture, supply, delivery, installation and commissioning of the MV Switchgear. The price per unit shall include for the complete panel with circuit breaker, instruments, protection relays and associated internal wiring. To be in full compliance to MV switchgear schedule and Single Line Diagramme. Refer to Schedule B2.

PI.1.2 Battery Trip Unit (BTU) **Unit: No.**

The unit of measure shall be for the manufacture, supply delivery, installation and commissioning of the BTU. The BTU to be as specified with maintenance free batteries capable of providing full 110VDC power to the system for a minimum of 12 Hours of power shutdown. DC voltage : 110V nominal, Charger rating: 3A, Batteries NiCd, 10Ah

PI.1.3 Mini-substation (MSS) **Unit: No.**

The unit of measure shall be for the manufacture, supply, delivery, installation and commissioning of the 11/0.4kV Mini-Substation. The price per unit shall include for the complete MSS with circuit

breakers, instruments, protection relays and associated internal wiring. To be in full compliance to MSS schedule and Single Line Diagramme. Refer to Schedule B3.

C3.3.6.2 **MV PROTECTION SETTING AND TESTING**

PI.2.1 System Settings and Testing **Unit: No.**

A specialist protection Engineer is required to calculate, set and test the protection systems. Recommended Miles Walker: 082 802 0366 from Systems Technology Consulting (Pty) Ltd OR Simon Russel: 083 422 9345 from 3I Protection Systems.

The unit of measure shall be to provide a full report, carry out complete testing, including secondary injection testing, proving and handing over of a completed working system.

C3.3.6.3 **RETICULATION SYSTEM**

PI.3.1 LV and MV Cable. **Unit: m.**

The unit of measure shall be the cable length in meters supplied, installed, terminated and commissioned.

All cable ends shall be labelled. The labels shall be included in the rate. Laying cables in trenches:

Measurement of cables laid in trenches shall be of the actual length of that part of a cable laid in the trench when the cable is finally installed.

Drawing cables into ducts, pipes and conduits:
(excluding supply and installation of ducts, pipes and conduits).

Measurement of cables drawn into ducts, pipes and conduits shall be of the actual length of that part of a cable laid in ducts, pipes or conduits when the cable is finally installed.

PI.3.2 Cable Joint and Termination. **Unit: No.**

The unit of measure shall be the number of joints and terminations supplied and installed.

The joints and termination shall be rated for 1000V for LV cables and 11000V for MV cables and be made from resin joints (LV) or heat shrinkable material (MV).

PI.3.3 Earth Works - Excavation and Backfill

Excavation of all material for trenches, backfill, compaction and removal of excess material. The volumes of the cable sleeve, cable ways and cable trench excavations must be calculated according to the length and depth as shown on the drawings or to the bottom of the specified bedding, whichever is the largest and to the minimum base width specified in 5.8. The tariff covers the cost to comply with safety and protection regulations, except in the case of particular items listed to cover the cost of excavations, backfill and compaction as well as the removal of any excess material as specified.

The tariff also covers the cost of the same works in tunnels if the contractor wishes to use this method of excavation. No additional payment will be made for such tunnels and no deductions will be allowed for the decrease in the amount of excavation quantities.

LV trenching to be 800mm deep and MV trenching to be 1000mm deep. The maximum width of a single cable trench shall be fixed at 300mm.

1. Hand pickable soil (soft soil). **Unit: m‡.**

The unit of measure shall be the number of cubic metres of hand pickable soil removed from the trenches (see general specifications for definition of soil type).

2. Machine excavation (soft rock). Unit: m‡.

The unit of measure shall be the number of cubic metres of soft rock removed to form the trenches(see general specifications for definition of soil type).

3. Hard rock (blasting). Unit: m‡.

The unit of measure shall be the number of cubic metres of hard rock removed to form the trenches (see general specifications for definition of soil type).

4. Back filling and compacting. Unit: m‡.

The unit of measure shall be the number of cubic metres of backfilling and compaction done to close the trenches (the measurement shall be based on the size of the trench).

When backfilling, every 150mm shall be compacted to 90% AASHTO.
The size of the trench shall be from the top of the bedding to ground level with a trench width maximum of 450mm.

5. Sifting of local soil for bedding of the cables. Unit: m‡.

The unit of measure shall be the number of cubic metres of bedding sifted and installed in the trenches.

The bedding shall have a thermal resistivity of at least 1.2 K.m/W and be approved by the Engineer prior to installation. A 6mm grid shall be used during the sifting process.

The bedding shall be 150mm above and below the cable as well as cover the width of the trench.

6. Import soil for bedding of cables. Unit: m‡.

The unit of measure shall be the number of cubic metres of imported soil and installed in the trenches.

The bedding shall have a thermal resistivity of at least 1.2 K.m/W and be approved by the Engineer prior to installation. A 6mm grid shall be used during the sifting process.

The bedding shall be 150mm above and below the cable as well as cover the width of the trench.

The bedding shall be 150mm below and 150mm above the MV cable.

PI.3.4 Cable Warning Tape. Unit: m.

The unit of measure shall be the number of metres supplied and installed. (trenching measured elsewhere).

The warning tape shall be installed 300mm above cables.

C3.3.6.4 **SMALL POWER & LIGHTING**

PI.4.1 Luminaires Unit: No.

The unit of measure shall be the number of luminaires supplied, installed and commissioned. Each light fitting to be supplied with complete control gear and mountings.

The luminaires will be supplied complete with lamps, gear and mounting equipment, installed, commissioned and aimed by the contractor. Refer to luminaire schedule.

PI.4.2 Socket Outlets, Isolators & Switches Unit: No.

The unit of measure shall be the number of switched socket outlets or switches supplied, installed and commissioned.

PI.4.3 Switchboards and Distribution Boards **Unit: No.**

The unit of measure shall be the complete manufacture, supply, delivery, installation and commissioning of the equipment. All switchboards and distributions boards are subject to Electrical Engineer approval prior to manufacture. Pricing must allow for all items indicated on the SLD and must be in compliance to the specifications.

C3.3.6.5 **TEST, COMMISSION & HANDOVER**

PI.5.1 Test, Commission & Handover **Unit: No**.

The unit of measure shall be the complete testing, proving and handing over of a completed working system.

C3.3.6.6 **LABELLING OF EQUIPMENT**

PI.6.1 Labelling **Unit: No**.

The unit of measure shall be the supply and installation of labels for all equipment as specified. Refer to relevant sections in the specification detailing labelling for Poles, Masts, Kiosks, Mini-substations, etc.

C3.3.6.7 **AS-BUILT AND HANDOVER DOCUMENTATION**

PI.7.1 As-built documents **Unit: Lump Sum**.

Provide full "As-built" documentation as specified and to the Engineer's satisfaction.

Documents to include:

- Post installation Lux levels tests
- Surveyor certificate confirming "As-built" information.

One set of As-built/ Record drawings for the entire system, inserted in a plastic sleeve to be submitted,

Drawings shall be red lined on a hard copy of the latest construction drawings issued. A copy of the construction drawing set shall be for the contractors cost.

PI.7.2 Operating and Maintenance manuals **Unit: Lump Sum**.

A draft copy of the operating and maintenance manual shall be submitted to the Engineer one month prior to practical handover. Once approved, the following to be submitted:

- One CD copy of the entire operating and maintenance manual. Documents may be scanned.
- Three copies of the approved maintenance and operating manual must be submitted to the Engineer as a requirement for practical handover. These manuals must as a minimum requirement include the following information:
- The manual shall be bound in a plastic hardcover ring file,

- Name of the project shall be clearly and boldly shown on the spine and on the cover of each document,
- Contact details of contractor and person for callouts,
- Brief description of installation and summary of equipment installed,
- Technical data sheets and operating instructions on all equipment installed,
- Maintenance schedules for each item of equipment giving each maintenance activity and also frequency,
- Recommended spares to be kept on site,
- Nearest agents details for each item of equipment. Name, address, telephone and fax numbers,
- Commissioning data, including, test sheets and sign-off commissioning sheets

PI.7.3 Certificate of Compliance (CoC) **Unit: Lump Sum**.

The contractor to submit a completed CoC as per requirements of SANS 10142.
All tests and any additional tests to be conducted by the registered person listed on the CoC.

C3.3.6.8 **CONTRACTORS PRELIMINARY AND GENERAL OBLIGATIONS**

PI.8.1 P&G Obligations **Unit: Lump Sum.**

The unit of measurement shall be Lump Sum. The tendered rate shall include full compensation for site establishment and subsequent removal from site for all equipment, transport, plants, materials, security camps and personnel necessary to carry out the specified works. It shall also include for all permits, contractors administration, managements and supervision of the works, as well as for the production of all method statement reports, designs/drawings as required for the Engineers acceptance.

Compliance with all Health and Safety obligations in accordance with the OHS Act and Construction Regulations shall also be required, as well as Environmental compliance.

EQUIPMENT SCHEDULE

	Panel Reference	P1	P2	P3	P4	P5	P6	P7
1	Panel label	INCOMER 1	LOCAL TRANSFORMER	MINISUB 01	MINISUB 13	BUS-SECTION	INCOMER 2	RMU HOSTEL
2	Panel Function	Main Incomer Circuit Breaker	Feeder	Feeder	Feeder	Feeder	Main Incomer Circuit Breaker	Feeder
3	Busbar Rating	800A	630 A	630 A	630 A	800A	800A	630 A
4	Circuit Breaker Rating	800A	630 A	630 A	630 A	800A	800A	630 A
5	Circuit Breaker Type	Triple Pole Circuit Breaker	Triple Pole Circuit Breaker	Triple Pole Circuit Breaker	Triple Pole Circuit Breaker	Triple Pole Circuit Breaker	Triple Pole Circuit Breaker	Triple Pole Circuit Breaker
6	Circuit Breaker Insulation	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum	Vacuum
7	Protection Meters	Earth fault, Overcurrent	Earth fault, Overcurrent, transformer alarm & Trip	Earth fault, Overcurrent	Earth fault, Overcurrent		Earth fault, Overcurrent	Earth fault, Overcurrent
8	Relay Type	ABB REF615	ABB RET615	ABB REF615	ABB REF615		ABB REF615	ABB REF615
9	Nominal Voltage	12 kV	12 kV	12 kV	12 kV	12 kV	12 kV	12 kV

10	BIL	95 kV Peak	95 kV Peak	[redacted]	95 kV Peak	95 kV Peak	95 kV Peak	95 kV Peak
11	Fault Withstand (Min)	25 kA for 1 Sec	25 kA for 1 Sec	25 kA for 1 Sec	25 kA for 1 Sec	25 kA for 1 Sec	25 kA for 1 Sec	25 kA for 1 Sec

12	Internal Arc Withstand	25 kA for 1 Sec	25 kA for 1 Sec	25 kA for 1 Sec	25 kA for 1 Sec	25 kA for 1 Sec	25 kA for 1 Sec	25 kA for 1 Sec
13	Location	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor	Indoor
14	Protection CT Ratio Burden + Accuracy	800/1 15 VA 10P15	600/1 15 VA 10P15	600/1 15 VA 10P15	600/1 15 VA 10P15	800/1 15 VA 10P15	800/1 15 VA 10P15	600/1 15 VA 10P15
15	Metering CT Ratio Burden + Accuracy	800/5 15 VA CL. 0.5					800/5 15 VA CL. 0.5	
16	VT Ratio Burden + Accuracy	1 x 11kV/110V 200VA CL. 1	-	-	-	-	1 x 11kV/110V 200VA CL. 1	-
17	Cable Entry	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom	Bottom
18	Cable Size	95mm^2 Cu XLPE	25mm^2 Cu XLPE	95mm^2 Cu XLPE	95mm^2 Cu XLPE	95mm^2 Cu XLPE	95mm^2 Cu XLPE	95mm^2 Cu XLPE
19	Mechanical Indicators	Yes	Yes	Yes	Yes	Yes	Yes	Yes
20	Energy Meter	Yes. PM8000	-	-	-	-	Yes. PM8000	-
21	Trip Voltage	110VDC	110VDC	110VDC	110VDC	110VDC	110VDC	110VDC
22	BTU	Yes	Yes	Yes	Yes	Yes	Yes	Yes
23	Remote Socket & Switch	Yes - 10m	Yes - 10m	Yes - 10m	Yes - 10m	Yes - 10m	Yes - 10m	Yes - 10m

LUMINAIRE SCHEDULE

LUMINAIRE SCHEDULE

TYPE	EQUIVALENT WATTAGE	LOCATION	DESCRIPTION	IMAGES/CODE
A	2 x 54W	Substation Interior	1500mm, Surface mounted, glass fiber reinforced body. Polycarbonate injection moulded lens with linear prism, with standard clips. 2 x T5 tubular Fluorescent luminaires complete with electronic control gear. Minimum 4450 Lumens. 4000K Cool White. colour white.	
B	10W	Substation Exterior	Wall Mounted LED Bulkhead . IP 65, die-cast Aluminium. Corrosion resistant luminaire, complete with 1 x LED lamps, electronic control gear and all necessary accessories. Minimum 1510 lumens . 4000K (cool white). Colour: Black.	

Note: 1. All luminaires are subject to the approval of the Engineer prior to ordering and purchase.
2. All images are of luminaires used for the design. The supplier to provide specified fittings subject to approval by the Engineer.
3. Light output verification is subject to simulation of submitted IES/LDT files. Non-submission of photometric data files could lead to rejection of the proposed luminaire.
4. All light fittings supplied must comply with SANS requirements for manufacture and SANS 10114-1.The Engineer reserves the right to request such compliance certificates. Failure to submit such compliance certificates will result in the fittings being rejected.
5. Alternate fittings proposed will only be considered if cost saving, better quality and longer guarantee is provided and subject to approval by the engineer, architect and client.

PART C4: DRAWINGS